2024 Northeast Natural History Conference
Oral Abstracts

Listed in alphabetical order by first-listed author/presenter. 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). Authors in bold are the presenting authors.

Paleoecology of Brachiopod Shell Hashes in the Middle Devonian Mt. Marion Formation of Eastern New York State

Tzevi Aho (Skidmore College, Saratoga Springs, NY, and New York State Museum, Albany, NY), Lisa Amati (New York State Museum, Albany, NY), and Sarita Morse (New York State Museum, Albany, NY)

Abstract - The upper part of the Middle Devonian Mt. Marion Formation in eastern New York State consists of sandstone, siltstone, and shale and contains distinctive brachiopod-dominated shell hashes. Deposition occurred above storm-wave base in a progradational setting near the Acadian uplift. Fissile, silty shale is the dominant lithology and contains very few brachiopod fossils except in rare, thin shell hashes. At the tops of the sections, ~40 cm of fine sandstone is densely fossiliferous. The shell accumulations are divided into 3 types: (1) nearly monospecific *Mucrospirifer mucronatus* brachiopod hashes, (2) nearly monospecific *Devonochonetes coronatus* brachiopod hashes, and (3) higher diversity hashes with the brachiopods *Mucrospirifer*, *Cupulorostrum*, and *Devonochonetes*, as well as bivalves like *Ptychopteria*, ostracodes, and tentaculitids. The main goal of this project is to determine what drove the taxonomic composition of the different types of accumulations. We measured 2 stratigraphic sections in the upper part of the Mt. Marion Formation that are ~12.5 km apart. Detailed descriptions of the lithologies through the sections allow us to interpret each depositional environment and make inferences about the ecological setting. Documenting patterns in the occurrence of different shell hash types demonstrates how the ecosystems changed and may reveal evidence for ecological succession. Finally, researching previously documented paleoecological restrictions for each type of organism provides insight for our interpretations. This information allows us to compare sediment supply and organism ecology to determine which factor played a greater role in forming concentrations of bioclasts.

Sat-AM1-B-3

When Morphology Matters: The Complicated Cladistics of Extinct Groups

Lisa Amati (NY State Museum, Albany, NY)

Abstract - Trilobites are an extinct group of arthropods that lived during the Paleozoic Era from about 521 to 252 million years ago. They declined in abundance and diversity starting with the Late Devonian extinctions (372Ma and 359Ma), and the last order died off during the largest mass extinction known. One drawback to studying trilobites is that researchers must rely almost exclusively on morphological information and interpretation to reconstruct evolutionary relationships. Many of the problems inherent in using strictly morphology for systematics involve the nature of the available data. Without significant funding, it is impossible to travel to every country where the trilobites under study once lived, and specimen loans are not always possible. Instead, researchers must turn to images in the published literature. Not only is it difficult to access older papers or studies in obscure journals, published images are often small, grainy, over- or under-lit, and may omit important angles and ontogenetic stages. Arthropods present their own complications because they are rarely preserved as complete individuals. Partial disarticulation during ecdysis and post-mortem disarticulation due to the activities of scavengers and wave energy require that multiple sclerites be recovered to represent a single species and even more to document intraspecific variation. Regardless of the limitations, rigorous systematic review is necessary even in extinct groups like trilobites. Big pictures in paleontology, like changes in the diversity of the organisms that make up marine faunas over time or shifts in ecosystems during environmental perturbations rely on accurate diversity data. This talk uses a cladistic analysis of the subfamily Cheirurinae (Trilobita) to provide examples of the difficulties of studying extinct groups and our processes for overcoming them.

Sat-AM2-B-2

Wildlands Ecology in Action

Eric Bailey (Northeast Wilderness Trust, Montpelier, VT) and **Shelby Perry** (Northeast Wilderness Trust, Montpelier, VT)

Abstract - During this session Shelby will give an introduction to Northeast Wilderness Trust's Wildlands (NEWT) Ecology program and properties, including rules for research. The goal will be to introduce ecologists and biologists interested in conducting research on NEWT preserves with the information they need to apply for research permission. Eric will finish the session with a brief overview of forest-plot research already underway on some of the properties. They will end with 5–10 minutes for questions about the properties, process, and data that has already been collected.

Sun-AM2-C-5

Wetland-Restoration Impacts on Wet-Meadow Ecology in Lake Ontario Coastal Wetlands

Adellia Baker (SUNY Brockport, Brockport, NY) and Rachel Schultz (SUNY Brockport, Brockport, NY)

Abstract - Regulation of Lake Ontario water levels has been associated with an increased invasion by *Typha* x *glauca* (Hybrid Cattail) in the lake's coastal wetlands. This invasion has negatively impacted the biodiverse wet-meadow zone through the displacement of native graminoids. To restore this habitat, restoration efforts around Lake Ontario have focused on restoring the wet-meadow zone by managing cattail and updating the lake regulation plan. However, the effects of these methods on wet-meadow ecology have not been fully studied. As such, our study focused on 2 grasses: the native grass *Calamagrostis canadensis* (Canada Blue Joint) and the invasive grass *Phalaris arundinacea* (Reed Canary Grass). In 2023, we conducted vegetation and soil-nutrient sampling in 8 wetlands around southern and eastern Lake Ontario and the Upper St. Lawrence River to determine how previous cattail management has impacted the wet-meadow zone following recent changes to the water-regulation plan. Four of these wetlands have had chemical and mechanical cattail treatments implemented at the wet-meadow–cattail interface between 2010 and 2018, while the remaining 4 wetlands have not been treated. We paired wetland sites based on hydrogeomorphic type and wetland size, and sampled across an elevational gradient. Preliminary results suggest that restored sites had lower species richness, fewer native species, and higher nutrient levels compared to unrestored sites, but these effects varied across elevations. Restored sites had lower *T*. x *glauca* cover and lower phosphorus levels at higher elevations, but greater cover and higher phosphorus levels at lower elevations compared to unrestored sites. *Calamagrostis canadensis* cover was more prevalent in the middle elevations in restored sites compared to unrestored sites, while *P*. *arundinacea* trends varied greatly by site. Contrary to our expectations, sites with higher overall phosphorus levels were positively correlated with greater species richness, whereas nitrogen and species richness were not correlated. Results of this research should be considered by restoration practitioners when restoring wet-meadow habitats and planning for potential impacts to non-target species and overall ecosystem functioning.

Sat-AM1-A-1

Buck Wild: Wildlife Habitat Suitability Across a Chronosequence of Wildfire-Origin Stands at a Jack Pine Barrens

Meghan Bargabos (SUNY Plattsburgh, Plattsburgh, NY), Madelyn Lehman (SUNY Plattsburgh, Plattsburgh, NY), James Wholey (SUNY Plattsburgh, Plattsburgh, NY), Mark Lesser (SUNY Plattsburgh, Plattsburgh, NY), and Danielle Garneau (SUNY Plattsburgh, Plattsburgh, NY)

Abstract - Research on wildlife's response to wildfire in fire-dependent pine barrens is limited. In the northeastern United States, pine barrens ecosystems are often relatively small landscape patches nested within a matrix of northern hardwood forest with low burn frequency. Thus, pine barrens not only represent a unique habitat type for wildlife at the landscape scale, but also may contain varied forest patches of differing stand age and structure based on their wildfire-disturbance history (i.e., frequency, severity, extent). Wildlife may, in turn, respond in their use of this habitat mosaic. The objective of this study was to quantify wildlife habitat preference across a fire-dependent *Pinus banksiana* (Jack Pine) sandstone pavement barrens in northeastern New York. The Altona Flat Rock is a ~2000 ha pine barrens dominated by Jack Pine interspersed with, and surrounded by, northern hardwood forest. Historically areas of the Flat Rock have experienced wildfire (i.e., 1919, 1940, 1957, and 2018), resulting in a chronosequence of stand-origin ages. In September 2022, we established a network of twenty 1-km^2 grid-cells spanning the extent of the Flat Rock and surrounding hardwood forest. We positioned camera traps in the center of each grid cell to continuously monitor wildlife. Additionally, we randomly selected 3 locations within each grid cell to determine forest structural attributes (e.g., Jack Pine density, basal area, canopy closure, understory composition, and abundance of coarse woody debris) and stand age. Overall, we recorded 2829 wildlife occurrences across 13 species. *Odocoileus virginianus* (White-tailed Deer), *Canis latrans* (Coyote), and *Lepus americanus* (Snowshoe Hare) were the most frequently occurring, observed in 89%, 6%, and 1% of all recorded occurences, respectively. The majority of White-tailed Deer occurrences were in the hardwood forest and mature Jack Pine stands (37% and 30%, respectively) and least in the most recently disturbed areas (4%), but differences in occurrences between stand types were not significant. We will used wildlife occurrence data in conjunction with forest structure data to build species-specific occupancy models. The results will provide critical information for ecologically sound management (i.e., frequency and extent of burning) of this globally rare pine barrens.

Sun-AM1-C-1

Host Shifting, Host-Plant Phenology, and Speciation in the *Enchenopa binotata* (Insecta) Complex

Eryl Bevan (SUNY Potsdam, Potsdam, NY) and Robert L Snyder (SUNY Potsdam, Potsdam, NY)

Abstract - *Enchenopa binotata* (Two Spotted Treehopper), formerly described as a single species, has more recently come to be understood as a complex of host-plant adapted species occupying 11 specific host-plants across the Northeast. These species exhibit 1 generation per year which is synchronized to host-plant phenology. These treehoppers are sap-feeding insects whose diet is lacking in amino acids, and they depend on their obligate bacterial symbiont *Sulcia* for the synthesis of essential amino acids. This nutritional dependence on their bacterial symbiont and mediation of life-history timing by host-plant phenology may mean that host-shifting events permitted by variation in symbiont amino-acid capabilities are responsible for speciation events in this complex. We investigated the arginine synthesis pathway of the *Sulcia* symbionts of various host-plant–adapted *E. binotata* species to determine whether symbiont amino-acid synthesis capabilities are at play in speciation events across distantly related host plants.

Sat-AM1-D-3

The Oldest Record of Sea Scorpion Muscles Preserved in the Late Ordovician Beecher's Trilobite Beds (New York State)

Russell D. C. Bicknell (Division of Paleontology [Invertebrates], American Museum of Natural History, New York, NY), Robert R. Gaines (Geology Department, Pomona College, Claremont, CA), and Melanie J. Hopkins (Division of Paleontology [Invertebrates], American Museum of Natural History, New York, NY)

Abstract - Beecher's Trilobite Beds (Late Ordovician) represent a rare example of preservation through pyrite replacement. This preservation has allowed detailed examination of trilobite and ostracod soft-tissue anatomy. Although the site was quarried intensively in the late 1880s as well as over the last 30 years, new discoveries continue to be made. Here we present the first example of a eurypterid from the Beecher's Trilobite Beds that also preserves the first, and oldest evidence for mesosomal musculature in eurypterids. This unique specimen demonstrates that Ordovician arthropod musculature can be preserved within pyrite and evidences the oldest example of euchelicerate muscles within the fossil record. This discovery therefore significantly expands the limited fossil record of euchelicerate muscular, while expanding the taphonomic scope for preservation of detailed internal structures, more broadly, within arthropods.

Sat-AM1-B-2

Demographics of the Asian Shore Crab in Southern New England: A Preliminary Assessment

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

Abstract - *Hemigrapsus sanguineus* (Asian Shore Crab) is an invasive species that has caused dramatic declines in abundance and diversity of native organisms on rocky shores in New England. Like many invasive species, it has increased rapidly in abundance in its introduced range. Nevertheless, invasive species often undergo equally rapid declines in population size, a phenomenon known as "boom–bust" population dynamics. The Asian Shore Crab may have entered the bust phase of boom–bust dynamics at multiple sites in southern New England. The exact causes of boom–bust dynamics are unclear, as many factors could result in population declines. Therefore, we studied Asian Shore Crab populations at 7 sites in Massachusetts and Rhode Island to investigate potential demographic explanations for declining population sizes, such as increased adult mortality and decreased juvenile recruitment. Over time, sex ratios have become more male-biased, and mean body size has increased, although the proportion of juveniles at most sites did not exhibit a directional trend. Additional studies are necessary to determine the cause of shifting body-size distributions and to investigate the implications of these results for fecundity, recruitment, and future population dynamics of the Asian Shore Crab and its native prey.

Sat-PM2-D-1

Wildlife Acclimation to Urban Environments: Comparing Evolutionary and Management Frameworks

Daniel A. Bogan (Department of Environmental Studies and Sciences, Siena College, Loudonville, NY)

Abstract - Urbanization is one of the greatest threats to wildlife and forested ecosystems in the northeastern US, and is creating a reemerging issue of widespread ecological disturbance. Unlike past forms of disturbance, urbanization is likely a longer lasting, if not permanent change with significant effects on wildlife. Studying wildlife responses to urban landscapes is necessary to examine how humans and wildlife may coexist in these relatively novel environments. For example, researchers may evaluate wildlife spatial ecology or perhaps study direct and indirect human–wildlife interactions to learn about natural history or applied population management issues, respectively. Yet these potentially "siloed" approaches may benefit from combining theoretical and applied frameworks to improve our understanding of urban wildlife. I hypothesize that conceptualizing behavioral theory and applied management terminology together to identify overlapping agreement and misaligned concepts will help to advance research investigating both natural history and management of urban wildlife. Considering Tinbergen's 4 questions, Johnson's 4 scales of habitat selection, Whittaker and Knight's conceptualization of behavioral responses, and the categorization of wildlife species through an urban wildlife framework, I attempt to drill down through this hierarchy to identify overlapping concepts and clarify wildlife behavior (ethology) compared with applied population ecology (wildlife science). My aim is to differentiate terminology rooted in animal-behavior theory and suggest alternate terminology (e.g., acclimation) for management purposes. This work is intended to help improve conservation and management issues, particularly when animal behavior is not clearly identifiable within the broader management context, or specifically when wildlife behave in ways that urban residents (the humans) might not expect.

Sun-AM2-A-1

Effect of Decreased Snowfall During an Atypical Winter on a Rare Butterfly's Host Plant

Rachael E. Bonoan (Providence College, Providence, RI), Breelyn Gilbert (Providence College, Providence, RI), Elizabeth Glasspool (Providence College, Providence, RI), and Isabelle Heron (Providence College, Providence, RI), Caitlin McHugh (Providence College, Providence, RI)

Abstract - The most well-known aspect of climate change is global warming. Among other things, Earth's warming temperature has caused less snow to fall, and snow to melt earlier in the spring. Early melting has been shown to alter the phenology, the timing of life-history events, of spring organisms. Phenological shifts caused by climate change can vary considerably between taxa, which can lead to mismatches between interacting species. *Callophrys irus* (Frosted Elfin) is a spring-flying butterfly in the Eastern United States, and is listed a species of concern in 11 states. As host-plant specialists, Frosted Elfins only lay eggs on *Baptisia tinctoria* (Small Yellow Wild Indigo) and *Lupinus perennis* (Wild Lupine), and are especially vulnerable to climate-induced mismatches. To simulate the impact of global warming on Frosted Elfin host-plants, we conducted a snow-removal experiment at Gavins Pond (Foxboro, MA) where Small Yellow Wild Indigo is abundant, but the Frosted Elfin population is declining. In December 2021, we set up 5 plots of each of 3 treatments: snow-removal (shoveled), trample-control (plot walked on with snowshoes), and control (untouched). Over 2 field seasons (2022, 2023), we tracked soil temperature and timing of Indigo leaf out/development relative to the current Frosted Elfin flight season and larval developmental period (April–July). Beyond shifts in physical presence of plants, phenological shifts may also affect the nutritional content of the larvae's sole food source. We also sampled leaves from each treatment for carbon and nitrogen analysis. Since there was no snowfall at our field site over Winter 2022–2023, we analyzed data from control plots to investigate how plant development and nutritional status differ between a field season following snow (2022) and a field season following no snow (2023).

Sun-AM1-D-1

Effects of Human Habituation on Eastern Gray Squirrel Predator Response Behaviors

Charles R. Brill (East Stroudsburg University, East Stroudsburg, PA)

Abstract - *Sciurus carolinensis* (Eastern Gray Squirrel) is one of the most prevalent urban adapted species, found in areas representing nearly every degree of urbanization. It is known that Eastern Gray Squirrels exhibit variation in responses to visual threats across a gradient of rural–urban habitats, but little work has been done in regards to variation in responses to auditory threats as a result of urbanization. In this study, Eastern Gray Squirrels residing in both college campus and wild habitats were observed for behavioral responses to a variety of predator, non-predator, conspecific, and artificial sound cues.

Sun-AM2-A-3

Threats to Northern Diamondback Terrapin Nests Vary by Nesting Substrate in Cape Cod, Massachusetts

Eamon C. Caffrey (University of Vermont, Burlington, VT), James Murdoch (University of Vermont, Burlington, VT), William Allan (Eastham Conservation Foundation, Eastham, MA), and Brittany A. Mosher (University of Vermont, Burlington, VT)

Abstract - Many turtle species are having to adapt to a changing world under immense pressure from human expansion, and their populations are declining because of a variety of external factors affecting their annual nesting success. *Malaclemys terrapin terrapin* (Northern Diamondback Terrapin) is a state-listed threatened species of salt marsh turtle that occupies many of the coastal marshes and estuaries scattered across southern Massachusetts and Cape Cod. The main goal of this study was to assess the impact of nest substrate on 3 threats to Terrapins in Eastham in Cape Cod, MA. The substrates we investigated were beach sand, dune sand, upland sand, and mixed sandy substrates, and the threats we investigated were nest infestation by *Sarcophagidae* (Flesh-eating Fly) larvae, red ant spp., and egg desiccation. Over a 2-year period, we surveyed 406 Diamondback Terrapin nests and 4846 Terrapin eggs across the 4 substrate types, and collected data on the amount of mortality that occurred due to ants, maggots, and desiccation. Using logistic regression, we found that dune-sand sites were associated with the greatest probabilities of egg and hatchling mortalities due to desiccation and maggot infestation. In addition, we found that red ant infestations in Terrapin nests were unlikely to occur in beach sands. Upland sites showed low probabilities of individual egg desiccation. Our research provides information that may be considered in future management practices; however, more research is needed to determine whether these trends are maintained over time and how they can best be used in conservation planning.

Sun-PM2-B-3

The *Podokesaurus* Project: Rediscovering Holyoke's Swift-Footed Lizard

Maxwell Miles Candlen (Hudson Valley Community College, Troy, NY; New York State Museum, Albany, NY) and Freya S. Wilhelm (Hudson Valley Community College, Troy, NY; New York State Museum, Albany, NY)

Abstract - *Podokesaurus holyokensis* is a theropod dinosaur from the Early Jurassic of Massachusetts. The holotype specimen was described in 1911 by Mignon Talbot, making her the first woman to discover and name a non-avian dinosaur. Only 6 years later, this unique fossil was destroyed in a devastating fire. The Podokesaurus Project aims to compile a comprehensive history and review of the species, utilizing historical documents, publications, and photographs, and will culminate in a reinterpretation of *P. holyokensis*, including a revised anatomical description and several phylogenetic analyses. Richard S. Lull was instrumental to the original interpretation and publication of the fossil, and a search of his personal correspondences with Talbot, Gerhard Heilmann, and others, archived at Yale University, revealed much previously unpublished information, including definitive dates for key events such as the discovery and preparation of the fossil, alternative interpretations of its relationships and anatomy, and details on regions of the fossil not figured or described in the literature. These correspondences allow us to construct a thorough account of the fossil from discovery to destruction, replete with compelling anecdotes and interpersonal tension.

Sat-AM2-B-1

Invasive Species Management in a Changing Climate: Challenges and Solutions from the Northeast

Eva M. Colberg (New York Invasive Species Research Institute, Department of Natural Resources and the Environment, Cornell University, Ithaca, NY), Bethany Bradley (Northeast Climate Adaptation Science Center, Department of Environmental Conservation, University of Massachusetts Amherst, Amherst, MA), Toni Lyn Morelli (Northeast Climate Adaptation Science Center, Department of Environmental Conservation, University of Massachusetts Amherst, and the US Geological Survey, Amherst, MA), and Carrie J. Brown-Lima (New York Invasive Species Research Institute, Department of Natural Resources and the Environment, Cornell University, Ithaca, NY, and the Northeast Climate Adaptation Science Center, University of Massachusetts, Amherst, MA)

Abstract - Climate change and biological invasions interact to pose joint challenges to ecological and natural resource management, but effectively addressing these challenges is often hindered by differences between available research and the practical realities of management. In the northeastern US, managers are concerned about the effects of climate change on invasive species but face barriers to incorporating climate change into their invasive-species management. To understand barriers to action, identify potential solutions, and guide future research, we conducted 23 semi-structured interviews with invasive-species managers and decision-makers on how they perceive and act upon the interactive effects of climate change and invasive species. We present the results of thematic analysis of these interviews and examples of current climate-smart invasive-management practices demonstrated by our interviewees. These include proactive monitoring and preventative management of climate-impacted, range-shifting species; adapting timelines to account for climate-driven shifts in invasive phenology and less-predictable field conditions; and reprioritizing target species, habitats, and invasive management goals based on viability in a future climate. Where previous research has focused on changes in treatment efficacy with rising temperatures and CO_2 levels, interviewees expressed concern about the negative impacts of climate change on the feasibility of current management practices. Finally, interviewees identified climate-smart restoration as an emerging research priority. This work is part of an ongoing project to co-produce guidelines for climate-smart invasive-species management in the Northeast.

Sat-AM2-D-1

Land Snails of an Ecologically Rare Alvar Preserve

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

Abstract - Land snails, including slugs, are ecologically important yet among the most understudied groups of animals. The highest levels of their abundance and diversity exist in calcareous areas. Alvar ecosystems, characterized in part by large areas of exposed limestone pavement and shallow, high-pH soils, are known to support a great abundance and diversity of land snails, including rare and endemic species. Chaumont Barrens Preserve (owned by The Nature Conservancy) in Jefferson County, NY, is one of the ecologically rare alvar sites around the Great Lakes region. Since the 1990s, several plant and animal groups of Chaumont Barrens have been well documented, except for land snails. A malacologist who collected land snails there in the 1990s died before finishing his survey and writing the results. I observed and collected land snails and slugs during a few trips to Chaumont Barrens Preserve in 2021 and 2022 by visual search and leaf-litter collection methods. Thus far, I have identified 22 species, including 2 potentially new species. I found the greatest abundance and diversity of snails located in the limestone deciduous woodland, including a variety of microsnails measuring between 1 and 3 mm. My research objectives are 2-fold: I will continue to collect and identify land snails from Chaumont Barrens Preserve, and second, I will study and identify the snail specimens collected by the previous malacologist, which are now housed at the Canadian Museum of Nature. Results from my collections and study can lead to new species descriptions, enrich the understanding of rare plant and rare snail associations, support further investigation into soil and leaf-litter ecology of this and other alvar areas, and may help tell the story of disjunct populations of rare snails throughout the arc of alvars around the Great Lakes over geological history.

Sun-AM1-A-1

Nocturnal Moths in Xeric Habitats in the Northeast

Elizabeth Crisfield (Pennsylvania Biological Survey, State College, PA), **Rick Van de Poll** (Ecosystem Management Consultants, Sandwich, NH), **Mark Mello (**Lloyd Center for the Environment, Falmouth, MA), Helen Poulos (Wesleyan University, Middletown, CT), and Andrew Barton (University of Maine, Farmington, ME)

Abstract - In 2018, the Northeast Association of Fish and Wildlife Agencies, through the Northeast Fish and Wildlife Diversity Technical Committee and the Regional Conservation Needs Grant Program, initiated a 5-year project with the objective of improving habitat management of barrens in the northeastern US. The states funded the "Xeric Habitat for Pollinators" project due to the known concentration of regional species of greatest conservation need at barrens sites, including rare Lepidoptera. In 2021 and 2022, four lepidopterists visited 20 sites 5 times from May to October and deployed UV traps overnight. The compiled dataset includes 814 macro moth taxa, 627 micro moth taxa, and 6 non-native species. The team identified 88 species closely associated with barrens habitat conditions and found 64 of these species at 1 or more sites. Fourteen of these species are considered regional species of greatest conservation need.

Sun-AM1-D-2

Marine Georeferencing: Challenges and Lessons Learned

John E. D'Angelo (Field Museum of Natural History, Chicago, IL)

Abstract - For biodiversity-occurrence data to be readily accessible for research, text-based locality descriptions must be converted into coordinates through the process of georeferencing. Marine localities present a particular challenge for georeferencing, due to the lack of landmarks at sea, and much work remains to be done to develop marine-georeferencing workflows. In the course of digitizing specimens and georeferencing occurrences for the Eastern Seaboard TCN, I have encountered many challenges and potential pitfalls of marine georeferencing. Vague locality descriptions, such as an on-shore reference location being recorded with no information on the direction and distance from that location, are common. These records are usually not devoid of geographic data, but leave unresolved questions about what arbitrary assumptions are acceptable when georeferencing them. Knowledge of individual collector habits can aid in interpreting ambiguous locality descriptions, but may substantially increase the time investment required. Bathymetry provides a useful tool for narrowing down marine localities, especially for benthic organisms, for which collection depth can be assumed to correspond to bottom depth, but there are limitations to the precision bathymetric data can provide. Ultimately, marine georeferencing involves tradeoffs between accuracy, precision, and efficiency, but hopefully, continued effort to develop marine-georeferencing standards can resolve some of these challenges.

Sat-PM2-B-2

Creating an Invasive Species Curriculum for Middle and High School Science Classes

Jennifer Dean (NYS Department of Environmental Conservation, Albany, NY)

Abstract - Invasive species are ubiquitous on the landscape, thus providing easily accessible teaching opportunities for students to experience local environmental issues and participate in solutions by collecting data. The New York State Department of Environmental Conservation (NYSDEC) Strategic Plan for Invasive Species Education and Outreach identified a need to "develop and provide invasive species curriculum units aligned to New York's science learning standards". This curriculum was developed through a collaborative effort among NYSDEC, NYS Education Department, New York Natural Heritage Program, and a local high school science teacher. It includes nine 40-minute lessons with teacher tips, supplemental worksheets, and a PowerPoint for teachers to modify for their classrooms. This curriculum is also aligned to the Next Generation Science Standards (NGSS), which was implemented into all public school classrooms starting in the 2019–2020 school year. During the unit, student research groups collect and analyze data using the community science application, iMapInvasives. This unit gives students an authentic experience using the scientific method to learn about invasive species.

Sun-AM2-B-3

Adapting Invasive Species Management Strategies Due to Sea Level Rise on the Hudson River

David Decker (Audubon NY, Philipstown, NY)

Abstract - For many years, Audubon NY has managed invasive species in Hudson River tidal marshes to conserve habitat for secretive marsh birds such as *Ixobrychus exilis* (Least Bittern) and *Rallus limicola* (Virginia Rail). Due to sea-level rise from climate change, increased water levels have become almost a greater threat to marsh bird habitat than invasive species. This has led us to adapt our invasive-species management strategy to focus more of our efforts to areas that may provide the habitat these marsh birds need in the future. By working in areas that marsh habitat will migrate to as the water levels rise, we hope to ensure that the new marsh areas will be colonized by native species and not invasive species.

Sat-PM1-D-4

A Bird's Eye View: Avian Community Differences Across Forest Type, Age, and Time in a Disturbed Pine Barrens

Caley Doell (SUNY Plattsburgh, Plattsburgh, NY), Luke Tyrrell (SUNY Plattsburgh, Plattsburgh, NY), and Mark Lesser (SUNY Plattsburgh, Plattsburgh, NY)

Abstract - Differences in forest structure (e.g., canopy height, understory cover, coarse woody debris) can play a large role in dictating habitat utilization for many bird species. In the northeastern United States, unique habitats like pine barrens nested within the dominant northern hardwood forest provide habitat diversity and house otherwise nonexistent or rare species. The objectives of this study were to understand how bird communities differ (1) based on forest type (pine barren versus northern hardwood), (2) based on forest successional stage within the pine barrens, and (3) over time. The Altona Flat Rock, in northeastern New York, is a globally rare ecosystem dominated by fire-dependent *Pinus banksiana* (Jack Pine). Over the past century, multiple wildfires have burned various areas and extents of the Flat Rock creating a mosaic of stand ages intermixed with unburned northern hardwood forest and wetlands. In spring 2023, we surveyed bird communities across 2 different-aged Jack Pine stands that had originated following wildfires in 1957 and 2018, and the surrounding hardwood forest. We conducted auditory and visual distance-weighted point sampling at 8 randomly selected locations in each forest stand and visited each 4 times. We used non-metric multidimensional scaling to compare community assemblage between forest types. We found clear differentiation between the hardwood forest and the 2 Jack Pine stands. The 2 Jack Pine stands were differentiated from each other, but to a lesser extent. We also compared the data collected in this study to 2 historical datasets collected at the same sites in 1978 and 1992 to contrast community change over time. Again, the community in the hardwood stand was clearly differentiated from that of the Jack Pine. However we found little change in the communities over the ~50 year record, with only 5 and 19 species having been extirpated or colonized, while 18 species persisted over that time period. Results suggest that Jack Pine habitat within the landscape is important for maintaining unique species and landscape-level diversity. We also suggest high resiliency in the Flat Rock bird community, especially in light of large population declines observed in other areas.

Sun-AM1-C-2

Soil Fungi Drive the Positive Relationship Between Historical and Future Evenness in Old-Field Plant Communities

Mary Douglas (Bard College, Annandale-on-Hudson, NY) and Cathy D. Collins (Bard College, Annandale-on-Hudson, NY)

Abstract - While the question of whether diversity begets diversity (DBD) has long been approached from an evolutionary perspective, DBD can also be understood at the ecological scale. Aboveground plant communities influence microbial diversity and composition in the soil. Microbial "legacies" can persist in the soil and affect the next generation of plants, positioning the soil microbial community as a potential driver of DBD relationships in plant communities at ecological time scales. Here we ask whether the diversity of a plant community influences the diversity of future plants grown in the same soil, and whether that relationship is microbially mediated. We seeded uniform communities of plants native to New York's Hudson Valley region in mesocosms inoculated with soils from old-field plant communities differing in species richness and evenness. We paired live and sterile soil-inoculum treatments to determine whether any plant DBD relationship was microbially mediated. We found that plant diversity was correlated between old-field and mesocosm communities when measuring evenness. We observed this relationship only in the live inoculum treatments, indicating that soil fungi mediated the relationship between field (historical) and mesocosm (sown) plant diversity. Redundancy analyses and Mantel tests indicated that compositionally unique plant communities were associated with compositionally unique soil fungal communities. Our findings suggest that DBD relationships in plant communities occur at the ecological time scale, and further suggest that diversity-associated soil microbial communities may help increase plant diversity in restored and recovering landscapes.

Sat-PM2-A-3

The Hart's-Tongue Complex: Molecular Systematics, Phylogenetic History and Biogeography

Danilo D. Fernando (SUNY ESF, Syracuse, NY), Namjoo Heo (SUNY ESF, Syracuse, NY), Mark Lomolino (SUNY ESF, Syracuse, NY), and Donald Leopold (SUNY ESF, Syracuse, NY)

Abstract - Genomic analysis allowed the delineation of the *Asplenium scolopendrium* (Hart's-tongue Fern) complex. Results suggest that it is composed of 5 distinct infraspecies consisting of 3 subspecies and 2 varieties, and thus requiring revision of the current taxonomic treatment. Phylogenetic and historical biogeographic analyses suggest that these 5 taxa descended from a common ancestor that was once widely distributed across Europe, North America, and East Asia, but diverged through different vicariance events. The 3 proposed subspecies (currently treated as *A. scolopendrium* var. *scolopendrium*, var. *americanum*, and *A. komarovii*) were likely formed by geological vicariance due to the closure of the Atlantic and Bering land bridges. Founder effect and polyploidy events that occurred in American ancestral populations appeared to have created additional reproductive barriers, making interbreeding between the taxa unlikely. The other 2 taxa (*A. scolopendrium* var. *lindenii* and subsp. *antri-jovis*) are interpreted to have diverged by more recent ecological vicariances caused by climate change. Their phenotypic and genetic divergence was less apparent, and thus, these taxa were proposed to be treated as varieties.

Sat-AM2-A-1

Assembling a Database of Climate-Smart Native Plants for the Home Gardener

Matthew E. Fertakos (UMass Amherst, Amherst, MA), Jenica Allen (UMass Amherst, Amherst, MA), Thomas Nuhfer (UMass Amherst, Amherst, MA), Matt Brinka (NY State Parks), Eve Beaury (Princeton University, Princeton, NJ), and Bethany Bradley (UMass Amherst, Amherst, MA)

Abstract - Climate change threatens to shift the ranges of suitable habitat for many plant species, including the ornamentals we plant in our home gardens. The ornamental-plant trade is already responding by offering better-adapted species to areas they weren't sold in before. If these species are non-native, the ornamental-plant trade could be seeding future invasions with negative consequences on ecosystems and economies. Planting and increasing the demand for native plants is the solution to this issue, but information about viable native species under current and future climate conditions in a specific area can be hard to come by. Through the Northeast Regional Invasive Species and Climate Change (RISCC) Network, we have developed a climate-smart native-plant database that synthesizes currently available information combined with surveys of current nursery availability for use by home gardeners. The finished database will be accessible through an interactive webpage that allows users to narrow down their species search by geographic area as well as light, soil, moisture, and other requirements. The list contains information for over 5000 species and covers the Northeast and Mid-Atlantic United States.

Sat-AM2-D-2

American Woodcock (*Scolopax minor*) Resource Selection in New York State

Kayleigh Filkins (SUNY Brockport, Brockport, NY), Jacob Straub (SUNY Brockport, Brockport, NY), and Josh Stiller (NYS Department of Environmental Conservation, Albany, NY)

Abstract – *Scolopax minor* (American Woodcock) is a migratory upland gamebird found across the Midwest and eastern US. Most previous woodcock-migration studies relied on data from band recovery and localized movements using short-range radio telemetry. The large gap in migratory information led the Association of Fish and Wildlife Agencies to identify migration ecology as one of the greatest research needs for the American Woodcock. This project is looking into the habitat preferences and resource selection of migratory and breeding woodcock in New York State to inform management of early successional habitats. This is a collaborative project with the Eastern Woodcock Migration Research Cooperative (EWMRC), which includes 30+ organizations across the eastern United States that share data. Since 2017, the EWMRC has deployed 653 transmitters on woodcock across 14 states and 3 Canadian provinces. We estimated home-range sizes for both male (n = 22) and female (n = 24) American Woodcock during the breeding season (May 15 to October 15) in New York State, plus a 50-km buffer, using kernel density estimation. We filtered these data to only include birds with >5 locations that were recorded over the course of at least 21 days. The average home range for females was 297 ha (median = 50.25 ha, maximum = 2241 ha, minimum = 1.5 ha). The average home range for males was 515 ha (median = 295 ha, maximum = 2233 ha, minimum = 0.01 ha). We are building a resource-selection function to compare breeding season and migration-landscape use. This information will be given to managers to aid in making decisions about what types of landscape characteristics should be managed for woodcock populations.

Sat-PM2-C-1

Leedy's Roseroot Propagation, Experimental Reintroduction, and Options for Monitoring

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), a federally listed threatened species ranked as S1, is one of the most fascinating native plants in the country for its unique form and niche cliffside habitat. It is a relic from the past, hailing from a now shrinking number of alpine plant species that thrived during glaciation in the Pleistocene era, but now are suffering from a warming climate, shrinking habitat, and invasive species. Census numbers indicate that the largest population, located on the western cliffs of Seneca Lake, has declined from ~10,000 plants in 1985 to 2779 in 2022. As a proactive approach to its conservation, we grew plants in the greenhouse from field-collected seeds and outplanted them at Watkins Glen State Park, NY, in collaboration with NYS Parks Recreation, and Hisotric Preservation and NY Natural Heritage Program. Out of the 90 plants introduced in spring 2022, the survival rate after 1 year was 38%. Three of the overwintered transplants were flowering. We planted out another 32 plants in summer 2023. Monitoring of this cliff-dwelling plant is challenging, so we are considering options for the use of an unmanned aerial system (UAS or drone) as an efficient method to assess the introduced populations regularly. If successful, the same automated approach can be used to monitor the entire Seneca Lake population.

Sat-AM2-A-2

Survey of Freshwater Turtles in Salmon Brook, Nashua, New Hampshire

Jeremy Fontaine (Boston, MA), Shanna Demers (Rivier University, Nashua, NH), and Danielle Clement (Rivier University, Nashua, NH)

Abstract - New Hampshire is home to 8 species of freshwater turtles, including an introduced species, *Trachemys scripta elegans* (Red Eared Slider). Literature on freshwater turtle populations and ranges throughout New England is not as complete as in other parts of the country. Here, we provide population parameters for 4 native species of freshwater turtles: *Emydoidea blandingii* (Blanding's Turtle), *Sternotherus odoratus* (Common Musk Turtle), *Chelydra serpentina* (Snapping Turtle), and *Chrysemys picta* (Eastern Painted Turtle) that we captured using hand and baited hoop nets over 3 years from 2021 to 2023. Excluding recaptures, we obtained biometric data, including carapace and plastron length and width, mass, and visual sex on 404 *C. picta*, 19 *S. odoratus*, 21 *C. serpentina*, 2 *T. scripta elegans,* and 1 state-endangered *E. blandingii*. We set at traps 3 locations throughout a small river tributary, Salmon Brook, in southern Nashua, NH, during May and July 2021, April 2022, and May and September 2023. This survey established prevalent species found in the Salmon Brook tributary. It will be used as baseline information for a longer-term population study assessing spatial and temporal variation in these species.

Sun-PM2-B-2

Digitizing Allows Micro-shell Citizen Science

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

Abstract - Shell collecting has long been a popular hobby. It has spawned shell clubs, shell shows, shell shops, and shell art, but the focus has been on large and colorful species. Numerous field guides have been published, but rarely do justice to small species. Published identification resources for micro-shell species are still lacking, but online resources of high-quality photos of marine and terrestrial micro-shells are becoming more available. The online platform iNaturalist is now providing the first widely available opportunity to use the potential workforce of citizen science to improve our knowledge of micro-shells. The iNaturalist species profiles are designed to build distribution maps based on actual records, as well as a library of reference photos. Anyone, including novices, are encouraged to contribute reports, and the iNaturalist community provides checks and corrections of the identifications. Identification difficulties generate discussion and become learning opportunities. The diversity of micro-shells, even in New England, is impressive. A quart sample of shelly sand from a Massachusetts beach may contain 60 species of marine mollusks.

Sat-PM2-B-1

American Beachgrass Reproductive Phenology, Genetics and Fungal Associations

Clay Gibbons (SUNY ESF, Syracuse, NY) and Danilo D. Fernando (SUNY ESF, Syracuse, NY)

Abstract - *Calamagrostis breviligulata* (American Beachgrass) is an invaluable species in constructing and preserving dunes across the eastern United States, including the Great Lakes region. These dunes provide habitat for many plants, invertebrates, mycorrhizal fungi, and nesting birds. They also provide a buffer from dramatic storm events and global sea change. Thus, the presence and vigor of American Beachgrass must be properly managed. One of the pressing questions about it is the uncertainty on what constitutes native versus introduced genotypes, and what genotypes make up the restored sites. Reports on its reproductive phenology indicate that native genotypes flower earlier in the season, while the introduced one's flower later in the season. The occurrence of this trend needs to be validated in our study sites in Eastern Lake Ontario (ELO), NY. It is also not clear whether this flowering time difference is due to differing environments or genetics. Our study of American Beachgrass at Sandy Pond in ELO represents a common garden experiment that allows analysis of this topic. Our preliminary results indicate that beachgrass in representative restored sites produced panicles across a higher proportion of the dune than the presumed native populations do. Individuals in restored sites seem to flower later in the season than the native samples. We also found that genotypes from Lake Champlain, NY, and ELO have similar flowering phenology. Genetic analysis is ongoing, and results will be correlated with phenology. Our result also shows that beachgrass individuals form fungal relationships in both restored and unrestored sites. Promoting these associations could resolve the noted decline of dune community vigor over time.

Sat-AM2-A-3

Eastern Whip-poor-will and Ecosystem Health in an Inland Pitch Pine–Scrub Oak Barrens

Neil A. Gifford (Albany Pine Bush Preserve Commission, Albany, NY), Amanda M. Dillon (Albany Pine Bush Preserve Commission, Albany, NY), and Steven P. Campbell (Albany Pine Bush Preserve Commission, Albany, NY)

Abstract - Rare wildlife distribution and abundance can be excellent indicators of ecosystem health, especially when a reference community is lacking. The Albany Pine Bush Preserve supports 74 New York State (NYS) wildlife species of greatest conservation need (SGCN), and 36 regional SGCN (RSGCN) including *Antrostomus vociferus* (Eastern Whip-poor-will [EWPW]). EWPW is both a high-priority and regional SGCN in New York State and considered a species at risk by the US Fish and Wildlife Service. While its loud and enigmatic song once filled the night skies throughout open-canopied *Quercus* (oak) and *Pinus* (pine) ecosystems across the region, significant occurrence reductions have been documented by the USGS Breeding Bird Survey and the NYS Breeding Bird Atlas. However, after decades of silent nights, it appears efforts to restore ecosystem health to the Albany Pine Bush Preserve's globally rare inland *Pinus rigida* (Pitch Pine)–*Quercus ilicifolia* (Scrub Oak) barrens, may be helping this species reclaim its former habitat. Since 2007, six-minute nocturnal point counts by community scientists have documented sporadic but improving EWPW occurrence in the preserve, with multiple birds documented annually since 2018. To evaluate the potential intersection between EWPW locations and habitat management, we have been tracking male EWPW with Lotek PinPoint-10 1g GPS data-loggers. Breeding-season habitat use by tagged birds was concentrated in actively managed pine barrens. Home ranges of individual males varied from 13 ha to >6000 ha and included varied canopy structures. We suggest that the species' return to this landscape is one of many positive wildlife indicators that restoring ecosystem composition, structure, and function (precolonial fire regimes) is improving ecosystem health in this complicated wildland–urban interface.

Sat-AM2-C-3

A Habitat-Quality Stress Index for the American Crow from a Matrix of Lan-cover Characteristics

Ted Grabarz (Antioch University. Keene, NH, and Housatonic Community College, Bridgeport, CT)

Abstract -Through the lens of environmental endocrinology, I examined patterns of glucocorticoid (GC) hormone differentiation spatially, to better measure how habitat quality affects the life history of organisms. To achieve this end, I investigated how biotic and anthropogenic environmental stressors affect stress response (negative and positive feedback mechanisms) in *Corvus brachyrhynchos* (American Crow). This stress response could have an impact on disease formation in both this taxa and others, including humans. I examined 13 sites throughout Connecticut between 2019 and 2021, from highly rural to highly urbanized. I collected 153 opportunistic fecal samples of the American Crow, then used radio immunoassay to characterize the samples in ng/g as GC hormones, reflecting stress response in avian subjects. Using a geographic information system (GIS), I plotted various catchments for each sample centroid as notional representations of American Crow territories at 1 km, 4 km, 7 km, 14 km,and 18 km. I then overlayed 15 land-cover types as biotic and anthropogenic environmental stressors (ESs). I used ordinary least squares linear regression for my initial analyses to evaluate the degree of validity of the ES–GC relationship at discrete locations where samples were taken and subsequently within varying sized territorial catchments. Finally, I reinterpreted a single constrained gravity model (originally Newton's Universal Law of Gravitation) for the development of a habitat quality stress index (HQSI) to understand more dynamically how stress response is affected by movement around American Crow territories. The model identifies variations in habitat-quality magnitude that could subsequently be used as a means of identifying areas for future conservation of habitat of other taxa. A further major takeaway from these findings is that the historically understood linearly composed landscape gradient has a much greater extracellular or episodic/granular location-specific nature. Examining GIS raster imagery for instance, yields dramatic differentiation of land-cover types over very small areas (<0.1 km^2) that indicates stress is occurring in a highly stochastic manner. The extracellular nature of land cover examined showed a dramatic differentiation that stress response in American Crow is unable to adjust to over time, without having a pathological (disease-inducing) response.

Sun-AM2-A-4

Quantifying the Effects of Japanese Knotweed Allelopathy on Growth of Native Plants

Adam C. Graziano (SUNY Brockport, Brockport, NY) and Kathryn Amatangelo (SUNY Brockport, Brockport, NY)

Abstract - Biological invasions are one of the leading causes of decreasing biodiversity around the world. One way that invasive plants can interfere with native communities is through the release of allelochemicals. Allelochemicals are secondary compounds that inhibit the growth of nearby plant competitors. *Fallopia japonica* (Japanese Knotweed) is an invasive perennial herb native to east Asia that has become increasingly abundant in New York State, particularly in agricultural, roadside, and riparian settings. *Fallopia japonica* is known to produce several potentially allelopathic compounds; however, their isolated effects on growth of native plants are understudied. I evaluated the impact of *F. japonica* allelochemicals in a manipulative growth experiment. I collected soil from beneath a dense *F. japonica* population and soil from a nearby uninvaded control area. I compared the growth of 3 native species: *Asclepias syriaca* (Swamp Milkweed), *Cornus racemosa* (Gray Dogwood), and *Persicaria virginiana* (Jumpseed) for 8 weeks between soil types. I also had a third treatment where I added knotweed leachate to the control soil. I hypothesized that the growth of native plants receiving *F. japonica* leachate and plants potted in knotweed soil would be limited. Contrary to my hypothesis, I found no significant differences in growth, root:shoot ratio, specific leaf area, or phenology among treatments. My results suggest that when isolated, *F. japonica* allelopathy does not affect growth of native plants; rather it is likely the combination of several competitive factors that make *F. japonica* so successful.

Sat-PM1-D-1

Bringing the American Burying Beetle Back to New York

Carmen Greenwood (SUNY Cobleskill, Cobleskill, NY), John Pipino (SUNY Cobleskill, Cobleskill, NY), Roger Masse (SUNY Cobleskill, Cobleskill, NY), Melissa Fierke (SUNY ESF, Syracuse, NY), Matt Schlessinger (NY Natural Heritage Program, Albany, NY), Amy Quinn (SUNY Cobleskill, Cobleskill, NY), and Brandon M. Quinby (SUNY Cobleskill, Cobleskill, NY)

Abstract - *Nicrophorus americanus* (American Burying Beetle [ABB]) is currently listed as a threatened species under the Endangered Species Act and critically endangered on the IUCN Redlist. It is an iconic carrion-feeding burying beetle, the largest in its genus, known for its biparental care of offspring. While the historic distribution of ABB included most eastern and central states and the southern borders of 3 Canadian provinces, the known distribution of the species at the time of listing was limited to 3 disjunct natural populations at extremities of its historical range in Oklahoma, Nebraska, and Rhode Island. This proposed reintroduction project directly addresses one of the highest priority US Fish and Wildlife Service (USFWS) recovery actions for ABB, to reintroduce individuals from the Rhode Island population to mainland areas within the Great Lakes region. We conducted 5 years of survey work on the viability of habitats within central New York that resulted in the award of the Recovery Challenge Grant from the USFWS to support our proposed reintroduction. Our habitat-viability evaluations for ABB reintroduction included extensive surveys of habitat, reproductive host availability (small mammals and birds), and baseline characterization of existing *Nicrophorus* spp. communities. Results of these surveys suggest the existence of abundant and diverse reproductive carrion sources, a *Nicrophorus* spp. community comparable to other locations that host ABB currently, and habitat conducive to burying beetles.

Sat-AM1-D-1

How to Share a Rock with a Gull: Determining Researchers' Impact on the Fledging Success of Herring Gulls on Mount Desert Rock

Kaiti Hall (College of the Atlantic, Bar Harbor, ME)

Abstract - Mount Desert Rock is a 1-ha island located 40 km south of the Maine coastline. The island is home to the Edward McC. Blair Marine Research Station, which houses 7 to 16 students and researchers from June until September each year. Of necessity, the station staff lives in close proximity to the island's *Larus argentatus* (Herring Gull) colony, which currently consists of 253 nests. For the past 3 field seasons, researchers have performed a "chick check" in which chicks from select Herring Gull nests are weighed and monitored for mortality every day, weather permitting. To assess the impact of researchers' activities on nesting gull recruitment and survival, I grouped nests across the island into different disturbance regimes: (1) active disturbance ("chick check" chicks handled once a day), (2) passive disturbance (researchers are in constant proximity of the nests —within a few meters), and (3) low disturbance (nests are flushed by humans 5 times a month or less). I measured the fledging success of all 3 groups by regularly observing nest mortality and found no statistical significance between them. I will discuss the implications of my results on future gull research at Mount Desert Rock, as well as the colony's habitat utilization across the island's varying terrains.

Sat-PM2-C-3

Traffic Impacts on Green Frog Calling Behavior

Kristina Hannam (SUNY Geneseo, Geneseo, NY), Micah Hosley (SUNY Geneseo, Geneseo, NY), Julia Brzezicki (SUNY Geneseo, Geneseo, NY), Robert Colbath (SUNY Geneseo, Geneseo, NY), and Anna Tessier (SUNY Geneseo, Geneseo, NY)

Abstract - Roads are an ubiquitous feature of landscapes across United States, and land along roadsides represents an enormous amount of potential habitat that may be critical for some species. With wetlands in decline in the landscape, roadside ponds may provide the best available breeding habitat for frogs and other animals, if they can use them successfully. We conducted acoustic monitoring of 3 permanent ponds along I-390, and 3 rural ponds in Livingston County, NY, during the early summer 2019 frog-breeding season. We examined temporal patterns of frog presence at all ponds in May and June as evidenced by calling behavior, the critical component of mate attraction. *Rana clamatans* (Green Frog) wa the most common calling species in May and June. We examined whether Green Frogs at roadside ponds alter their calling behavior to avoid masking by traffic noise. We developed a standard definition of "traffic noise" in our recordings, and examined Green Frog calling behavior before and after the peak noise of passing traffic. Preliminary results suggest male frogs at roadside ponds alter the timing of their calling on a minute-to-minute basis to avoid masking by traffic noise, and to increase the probability of being detected by females.

Sat-AM1-C-3

Lessons from Mountain Birdwatch: Strategies to Improve the Collection and Analysis of Wildlife-monitoring Data from Remote Locations

Jason M. Hill (Vermont Center for Ecostudies, White River Junction, VT), Emily K. Anderson (Vermont Center for Ecostudies, White River Junction, VT), Pete F. Kerby-Miller (North Branch Nature Center, Montpelier, VT), Julia M. Pupko, Nathaniel R. Sharp (Vermont Center for Ecostudies, White River Junction, VT), and Kevin S. Tolan (Vermont Center for Ecostudies, White River Junction, VT)

Abstract - Wildlife monitoring in remote locations presents unique challenges. Maximizing the value of monitoring trips to remote locations is necessary, because return visits are likely to be cost prohibitive and logistically unfeasible. Building off of our experience conducting wildlife monitoring in wilderness areas, I will discuss several methodical and statistical actions that can increase the precision and quality of your wildlife monitoring. These approaches include estimating background/ambient noise levels, conducting shorter repeated counts at the same location, accounting for imperfect detection probability and differences in observer ability, and alternatives to point counts for bird monitoring that are especially helpful for rare bird species or species with low detection probability. As an extended example, I will share our results with accounting for background noise during Mountain Birdwatch point-count surveys for 4 montane bird species. Using 10,020 point counts over 5 years, community scientists assessed overall soundscape volume via a specific smartphone app or ambient noise via a simple, subjective 1–10 scale. We used N-mixture models within a Bayesian framework to estimate local population size while accounting for imperfect detection due to observer ability and background noise. Background noise was relatively quiet at sampling locations, but our model-selection process still selected background noise as being an informative covariate for all 4 species' comparisons—especially for bird detections beyond 50 m from the observer. For *Empidonax flaviventris* (Yellow-bellied Flycatcher) detections within 50 m from the observer, for example, an increase of 10 decibels in overall soundscape volume (i.e., a doubling of the perceived loudness to humans) was associated with a reduced detection probability of 13.56%, and including soundscape in the model increased relative abundance estimates for Yellow-bellied Flycatchers by 14.08%. Given the ease of our field and modeling approach, other researchers could easily incorporate ambient-noise estimation into their field protocols and analyses with minimal costs or added complexity to improve abundance estimates and to increase the comparability of avian surveys conducted across different acoustic environments.

Sun-AM2-C-2

Unravelling Parallel Conceptions of the Ordovician Trilobite *Flexicalymene senaria* (Conrad, 1841)

Melanie J. Hopkins (American Museum of Natural History, NYC) and Markus J. Martin (Watertown, NY)

Abstract - Over the last 180 years, there has been occasional observation that collections of specimens identified as "*Calymene senaria*" or "*Flexicalymene senaria*" comprise more than 1 species. This possibility was first recognized within a year after the species was named and has been remarked upon as recently as 2002. Perusal of the literature reveals that this history is due to the sustentation of parallel conceptions of this species, which has been possible for a number of reasons including (1) the lack of an original type and relatively recent adoption of a neotype; (2) different strategies for illustrating specimens, particularly in the early to mid-1800s; (3) inconsistent availability (and some evidence for outright suppression) of potentially pertinent literature; (4) inconsistent and/or sparse provenance information for key specimens; and (5) broad geographic distribution of specimens assigned to this name and others in the mid- to late 1800s. New field collections alongside examination of collections at the American Museum of Natural History, New York State Museum, Harvard Museum of Comparative Zoology, and the Paleontological Research Institute, confirm that within the Trenton Group, there are 2 species of *Flexicalymene* and 1 or more species of *Gravicalymene*. Formal description of new species is currently in preparation.

Sat-AM1-B-1

Exploring the Bioacoustics of Freshwater Ponds

Micah Hosley (SUNY Geneseo, Geneseo, NY) and Kristina Hannam (SUNY Geneseo, Geneseo, NY)

Abstract - A soundscape is all sounds within a landscape and includes sound produced by living organisms, including by humans, or by the abiotic environment. Previous studies have used bioacoustic data to assess the health and biodiversity of terrestrial and marine areas. These same principles can be applied to freshwater pond environments. This study collected acoustic recordings from 4 ponds in the Genesee Valley in western New York in summer 2022. We identified 22 unique sounds produced by underwater biotic sources across our 4 ponds. We used acoustic measures from spectrograms to determine changes in the pond soundscapes across the season and to document bioacoustic differences between the 4 ponds. Future studies should record pond soundscapes over longer timeframes to get a clearer picture of long-term seasonal soundscape changes and capture the full biodiversity of sound-producing organisms. This study paves the way for future long-term acoustic research in small freshwater environments.

Sat-AM1-C-1

Panel Discussion: Partnerihg with Education to Further Invasive Species Research

Brian Hoven (SUNY Geneseo, Geneseo, NY) and the presenters within this session

Abstract - This discussion panel will offer the attendees to engage with the presenters in a group discussion on the challenges and possibilities of creating educational opportunities to promote invasive species research.

Sun-AM2-B-5

Fungal Diversity Survey (FunDiS) and its Role in Conserving Fungi Nationwide

Hannah Huber (Pennsylvania Natural Heritage Program, Harrisburg, PA), Gabriela D'Elia (Fungal Diversity Survey, Zena, NY), and Rick Van de Poll (Ecosystem Management Consultants, Sandwich, NH)

Abstract - Since 2006, the Fungal Diversity Survey (FunDiS, formerly the North American Mycoflora Project) has been advocating for the greater recognition and conservation of the "Fifth Kingdom" (fungi) in North America. Through a series of coordinated efforts involving national and regional mushrooming clubs and societies, as well as a number of registered fungaria, FunDiS has been supporting the citizen- and amateur-based collecting, vouchering, and sequencing of fungi. This talk will review what FunDiS does and how interested participants might get involved in the recording, documentation, and conservation of fungi in their area. This talk will introduce and compliment other talks in this session related to fungal conservation efforts in the Northeast.

Sat-PM1-C-1

Teaching Plant Biology in a Curriculum Focused on Course-based Undergraduate Research Experiences

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

Abstract - The biology department at Bates College recently shifted towards a curriculum rooted in course-based undergraduate research experiences (CUREs). This change was intended to expand accessibility to the major and resulted in a significant increase in the number of majors and student satisfaction. The entry point into the biology major for each student is a 100-level CURE focusing on a research topic related to faculty expertise. For plant biology, this has included investigating the concept of phenotypic plasticity in woody plants and the impact on carbon capture. While tackling a specific research question, students gain essential skills for scientific inquiry, including approaches to field work, laboratory techniques, data acquisition and analysis, and scientific communication

Sun-AM1-B-2

Developing a Monitoring Protocol for the Eastern Whip-poor-will in New Hampshire and the Northeast

Pamela Hunt (NH Audubon, Concord, NH)

Abstract - While available evidence indicates range-wide declines in populations of *Antrostomus vociferous* (Eastern Whip-poor-will), the species' crepuscular behavior has limited our ability to accurately assess population trends. To address this need, New Hampshire Audubon and partners developed a specialized protocol under the auspices of the Northeast Coordinated Bird Monitoring Partnership in the early 2000s. The resulting methodology was subsequently adopted by multiple states and provinces and remains in use today. This presentation focuses on protocol development in the Northeast, including considerations of detectability and route placement. It also presents an overview of results obtained to date in New Hampshire, where the protocol has been implemented continuously since 2007.

Sat-AM2-C-3

The *Sphagnum* species of New England, New Jersey, and New York

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

Abstract - I incorporated the knowledge gained from the many genetic studies completed in the past 25 years with traditional morphological- and ecological-based species concepts to arrive at an updated taxonomy for the *Sphagnum* (peat moss) species occurring in New England, New Jersey, and New York. Following this taxonomic updating, check lists based on herbarium records are provided for each of the 6 New England states, New York, and New Jersey. A total of 53 species are documented for the entire New England region, 51 for New Jersey, and 48 for New York. No infrageneric taxa are recognized. Species richness was highest for Maine and for New Jersey, with each having 51 species. Eight *Sphagnum* species occurring in New England are currently represented by herbarium collections from ≤5 locations across the conterminous US dating from 2000 to 2023. One paper relating to this project is currently in press and a second is being reviewed for publication.

Sun-AM2-D-1

Mammal Responses to a Major Highway in Southern New York

Scott LaPoint (Black Rock Forest, Cornwall, NY and Columbia University, New York, NY)

Abstract - Facilitating successful wildlife movements is fundamental to sustaining landscape resiliency. Roads impede these successful movements via barrier effects and as direct mortality sources. Quantifying these impacts is challenging but necessary to inform mitigation efforts and to justify associated costs. Over 49,000 vehicles/day pass over a 4-lane highway in my Orange County study area, which has the highest deer–vehicle collisions rates in New York State. To understand how this highway may impact local mammal species, I have recorded mammal-distribution data (via camera traps), carnivore-movement behavior (via GPS-collared *Lynx rufus* [Bobcat]), road mortality (via road-kill surveys and accident records), mammal usage of under-highway culvert monitoring (via camera traps), and genetic-connectivity data (via carnivore fecal DNA). After 6 years of deployments, camera traps have yet to detect *Pekania pennanti* (Fisher) nor *Erethrizon dorsatum* (North American Porcupine) east of the highway. Movement behavior of Bobcats reveals a series of modified behaviors adjacent to the highway, including changes in movement speeds and trajectories. Monitoring of 6 culverts also revealed species-specific patterns in proximity to the highway and pass-through failure and success rates. A year-long biweekly road-kill survey complemented a 23-yr dataset of deer–vehicle collisions by suggesting that 2.7 *Odocoileus virginianus* (White-tailed Deer) carcasses/mile and 19 mammal carcasses/mile occur annually. Genetic-connectivity work is currently underway for 4 carnivore species. This information provides a robust view of mammal responses to a major highway, which I hope informs mitigation opportunities.

Sun-PM2-A-1

Frontiers in Imaging of Specimens in Mollusk Collections

José H. Leal (Bailey-Matthews National Shell Museum and Aquarium, Sanibel, FL)

Abstract - Natural history collections are important depositories of biodiversity data. Digital photography of natural history collection specimens and subsequent dissemination of the resulting images on the web allow for the virtual discovery of these specimens, enhancing their accessibility to the target audience and the public in general. This presentation discusses digital photography of marine mollusks in collections, including some of the latest techniques for imaging of very small specimens, photography of specimens preserved in liquid, haptobionts, problems of color retention, transparency, 3-D photography, equipment, and other current areas of interest. Despite the focus on mollusks, the discussions can be extrapolated as generalities applicable to invertebrates from other phyla. The presentation also includes a discussion on equipment and the ideal digital parameters for imaging of natural history collection specimens, including image policies on acceptable file-format requirements for data hosts and aggregators such as iDigBio and others. The presentation includes work funded in part by the NSF Thematic Collections Network grant award 2001528 “Mobilizing Millions of Mollusks from the Eastern Seaboard”.

Sat-PM1-B-3

Reconstructing the First New York City Lichen Baseline from 1823

James C. Lendemer (NY State Museum, Albany, NY)

Abstract - Abraham Halsey published the first checklist of New York City lichens in 1823. It has long been believed that his collections were destroyed in a tragic 1866 fire that consumed a city block of Manhattan. The inability to examine these vouchers has meant that the baseline of New York City lichens, among one of the oldest, most comprehensive such baselines outside of Europe, could not be translated to modern taxonomic concepts and compared to the subsequent baselines of 1914, 1968, and present-day. This talk will present the rediscovery of Halsey's collection. The history and contents of the collection will be discussed, as will be Halsey's checklist updated to modern taxonomic concepts. Comparisons to the modern baseline of New York City lichens will be included. This discovery highlights the value of natural history collections in reconstructing historical ecologies, contextualizing centuries of human-mediated environmental change, and informing conservation priorities. It also illustrates the wealth of irreplaceable information located in the botanical collections of New York State, and the urgent need to assure these are preserved, digitized and most importantly, continuously restudied.

Sun-AM2-D-2

Impact of Knotweed Species and Land Use On Drift-Insect Diversity in the Housatonic River in Southeastern Massachusetts and Northwestern Connecticut

Colleen Lutz (University at Albany, New York Natural Heritage Program)

Abstract - Interpreting how riparian vegetation can impact drift-insect diversity may help understand what type of fish species are present in a waterbody. I collected insect-drift samples at 6 locations in the Housatonic River from June through August 2019. Three sites were infested with *Reynoutria x bohemica* (Bohemian Knotweed), and 3 sites were not infested with Bohemian Knotweed. Preliminary results suggest that Bohemian Knotweed-infested sites have a lower diversity of insect orders than non-infested sites; however, land use and land-cover type may be interacting variables. Overall, insect diversity may impact the fish species found within areas of the Housatonic River, which is prized for recreational use, including fishing.

Sat-PM1-D-2

Discovering an Urban River: Connecting to Place While Learning Ecology in an Undergraduate Lab Course

Terryanne Maenza-Gmelch (Barnard College Environmental Science, New York, NY), Sedelia Rodriguez (Barnard College Environmental Science, New York, NY), Elizabeth M. Cook (Barnard College Environmental Science, New York, NY), and Brian J. Mailloux (Barnard College Environmental Science, New York, NY)

Abstract - Connecting students to the natural history of a local waterbody is an authentic way to learn science and can encourage stewardship and an understanding of how communities interact with water. In urban settings, waterbodies are often regarded as polluted and lifeless so student exploration of the waterbody can be a journey from misconception to understanding as they visit, read, collect, and analyze data. Topics such as ecology, natural history, water quality, the scientific method, climate change, pollution, environmental policy, and environmental justice are easily incorporated into the study of a waterbody. We take undergraduates enrolled in an environmental science lab course to the Hudson River in New York City each fall to capture a moment in the life of the river. One week prior to lab study of the river, 2 lecture sessions are prepared on foundational topics, and student readings are assigned from both river ecology texts and news articles featuring current and local issues. Focus questions are included to help guide the readings. In the first 3-hour lab session, students engage in field and laboratory work during which they visit the site and collect and analyze water samples for aquatic life, dissolved oxygen, water clarity, temperature, and salinity. In the second week, data analysis and write up in the format of a scientific paper are completed. Upon successfully visiting a local waterbody and completing this module, students feel empowered knowing that they can visit a local resource, ask questions, use field methods to collect data, and then analyze and write about their investigations. Connecting with the environment in this way reveals the richness and significance of the local ecology and successfully facilitates the learning of the natural history of a waterbody in an urban setting. Several students in the class that grew up in New York City, from both low- and high-income backgrounds, commented that although they have lived in the city their whole lives, they never thought about the river much. The students previously felt disconnected from it and certainly didn't think there was anything living in it due to its environmental history.

Sun-AM1-B-1

Determinants of Deciduousness: Detangling the Genetic vs. Environmental Correlates of Intrapopulation Variation in Tree Leaf Phenology

Hanna Makowski (Black Rock Forest, Cornwall, NY)

Abstract - Climate change is increasing the pace and intensity of seasonal shifts, which impacts the start and end of winter dormancy in trees. Delayed falls and earlier springs can extend the growing season, increasing carbon uptake; however, this benefit is only realized if trees can respond to the climatic shifts. Forests play a crucial role in global climate regulation by sequestering and storing carbon, so it is important to understand how increasingly unpredictable seasonal fluctuations will impact their phenology and therefore their survival. My work explores the factors influencing variation in leaf phenology in temperate deciduous forests. While abiotic factors like photoperiod and temperature contribute to broad geographic patterns, they do not explain intrapopulation variation. I characterized phenological variation in 550 trees across 4 species at Black Rock Forest, NY, in the fall of 2023. There is significant variation within and between species. I am working to determine whether that variation is due to microenvironmental or genetic differences between individuals. Parsing apart the interaction between genetic variation and environmental conditions at the individual level is crucial for understanding the adaptive capacity of a population.

Sun-PM2-C-2

Biodiversity and Invasive Species on Long Island

Abigail Marino (Long Island Invasive Species Management Area, Brentwood, NY)

Abstract - Long Island hosts numerous significant ecological communities and is one of the most biodiverse regions of New York State—but it also has plenty of invasive species. At the Long Island Invasive Species Management Area, we confront this reality by considering biodiversity conservation in virtually all of our work. In this session, I will discuss the practicalities of invasive species management and biodiversity conservation both in terrestrial and aquatic systems, through our priority areas, surveys, map models, and more.

Sat-PM2-D-3

Site-specific Field Guides for the Classroom: Use of Wiki Templates to Customize

Declan J. McCabe (Saint Michael's College, Colchester, VT)

Abstract - Educators often frequent the same field sites year after year with new groups of students. With most taxonomic groups, the common species encountered are the same each year. After a few repeat visits, a short list of "the usual suspects" can be compiled to facilitate rapid identification. Unless the educational aim is to train botanists or entomologists, efficiently getting to a list of species per sample is a worthy goal. At Saint Michael's College, we have used 2 approaches to simplify taxonomic identification when training students in ecology courses. Firstly, Professor Peter Hope developed a key to the trees in the Gillbrook natural Area. Hope's key, by eliminating species that do not occur in Gillbrook, allowed students to use a dichotomous key without ever encountering phrases like "occurs only in the Ohio River Valley". Secondly, we developed a series of site-specific field guides to pond and stream macroinvertebrates sampled from each of more than 80 sites. These field guides are hosted on Wikieducator and easily modified when additional sampling visits uncover more taxa. The guides are designed for benthic samples and made available at genus and family level. Over the course of the project, 180 unique taxa have been added to the resource. Each family of genus is represented by a wiki template that includes identification tips and a photograph. In many cases, we have added common names and tied flies. When new field sites are added, we can build a new field guide simply by linking a set of templates on a single wiki page based on the list of sampled macroinvertebrates sampled. The wiki pages can then be collected on a smart phone app that provides a hand-held electronic field guide.

Sun-AM1-B-3

Lessons in Beewatching: Making Insects Watchable Wildlife

Max W. McCarthy (Rutgers University, New Brunswick, NJ) and Nick Dorian (Chicago Botanic Garden, Chicago, IL)

Abstract - The natural history, distribution, and population trends of most wild bee species remain poorly known. This type of knowledge has not been generated quickly through traditional academic research, creating major roadblocks to identifying bee species of conservation concern, and enacting effective and targeted management. Taking a lesson from birds, butterflies, dragonflies, and other "watchable wildlife", we propose that this obstacle could be overcome for bees and other insects by adopting minimally lethal observation methods that capitalize on the skill and enthusiasm of amateur naturalists. Through a combination of photographing live bees and collecting voucher specimens, we link "new" field characters to published taxonomic literature in a rigorous way that continues to expand the pool of "watchable" bee taxa. Wider adoption of minimally lethal observation methods would enable amateur naturalists to gather large amounts of high-quality data and open new avenues for regional monitoring of wild bee populations.

Sun-AM1-D-3

Movement Behavior, Isotopic Niche and Population Dynamics of Invasive Jumping Worms in Northeastern Forests

Timothy S. McCay (Colgate University, Hamilton, NY), Kyleigh M Frank (Colgate University, Hamilton, NY), Alice Hurst (Colgate University, Hamilton, NY), Mieko Kim (Colgate University, Hamilton, NY), Roma E. B. Lerner (Colgate University, Hamilton, NY), and Joy Tang (Colgate University, Hamilton, NY)

Abstract - Pheretimoid earthworms are expanding their non-native range in parts of the northeastern United States and Canada. Among pheretimoids, the so-called jumping worms share distinct behaviors, parthenogenetic reproduction, and an annual life cycle. Three species are common in the Northeast: *Amynthas tokioensis* (Compact Jumping Worm), *A. agrestis* (Rustic Jumping Worm), and *Metaphire hilgendorfi* (Large Jumping Worm or Snake Worm). Multiple jumping worm species often are found together as part of a co-invading assemblage. Despite apparent differences in size, little is known about the ecological differences among these 3 species. We conducted behavioral, isotopic, and population studies to better understand differences among the 3 common jumping worms. We conducted field studies at sites supporting all 3 species together. *Metaphire hilgendorfi*, the largest species, traveled furthest and most quickly in both laboratory and field studies. The smallest species, *A. tokioensis*, traveled the shortest distances, and *A. agrestis* travelled intermediate distances. Studies of stable nitrogen ($\delta^{15}N$) and carbon isotopes ($\delta^{13}C$) in earthworm tissues suggested differences in feeding among these 3 species. There was a gradient in ^{13}C enrichment that trended with body size, suggesting that *A. tokioensis* might be restricted to shallow carbon sources; whereas, larger species can burrow more deeply and use deeper soil carbon sources. *Metaphire hilgendorfi* hatched earlier in the spring than the other 2 species. *Amynthas tokioensis* individuals collected later in the year were smaller in the adult life stage, suggesting an ability to become reproductive at an earlier chronological age during autumn. Our results underscore significant ecological differences that exist among these 3 species. *Metaphire hilgendorfi* had a longer active season and may feed more deeply in the soil than the other jumping worms, which may magnify the impact that *M. hilgendorfi* has on gardens and natural ecosystems in some areas. *Amynthas tokioensis* may have the greatest potential to colonize sites with short growing seasons because of its ability to quickly reach reproductive size.

Sun-AM1-A-3

Simon's Rock Herbarium, a "New" Herbarium for the Northeastern US and Montserrat, West Indies

Donald McClelland (Bard College at Simon's Rock, Great Barrington, MA)

Abstract - Herbaria are the foundation of botanical knowledge and provide permanent repositories of data and collective expertise in plant identification, however many people are unaware of their existence and importance. For most of the history of the Simon's Rock Herbarium at Bard College at Simon's Rock, the collection was primarily relegated to a teaching role and was otherwise largely forgotten. The oldest specimens in the collection are from the late 1970s, but it was only in the spring of 2023 that I registered the collection with Index Herbariorum receiving an official acronym, SRH, and making the broader botanical community aware of its existence. It seems likely that a similar scenario of undervaluing exists for many collections at small colleges and institutions though the extent of this problem inherently cannot be known. Ignoring small herbaria is, in fact, a problem because such collections often contain hyper-localized data that is absent from large herbaria. Furthermore, small herbaria provide opportunities for building focused collections for specific areas or projects. At SRH, the majority of specimens are from the college's campus or nearby in Berkshire County, MA, and therefore provide a unique dataset for this location; similarly, as a result of the college's long-running field program on the small West Indian island of Montserrat, it is the second-most represented location in our collection. Collections like SRH allow students and the public to participate at a high level in botanical research and are relatively inexpensive to run in comparison with many other branches of biology. Paying increased attention to small herbaria like SRH by increasing collecting efforts and establishing regional specimen exchanges, involving more people in operations and growth, digitizing specimens and making data freely available, sharing skills, and registering with Index Herbariorum will benefit everyone.

Sat-PM1-A-1

Breeding Season Nest Ecology for Eastern Whip-poor-wills in Northern New York

Asch N. McDonnell (SUNY Brockport, Brockport, NY), Kristen M. Malone (SUNY Brockport, Brockport, NY), Jacob N. Straub (SUNY Brockport, Brockport, NY), and Matt D. Palumbo (New York Department of Environmental Conservation, Albany, NY)

Abstract - *Antrostomus vociferus* (Eastern Whip-poor-will) is an IUCN near-threatened species that has declined throughout its range. This decline is potentially due to loss of breeding habitat, so research into Eastern Whip-poor-will breeding ecology is essential for conserving their populations. Our research seeks to address nest-site selection and nest survival of Eastern Whip-poor-wills in northern New York through a telemetry-based study during the 2023 and 2024 breeding seasons. During the 2023 breeding season, we deployed VHF telemetry transmitters on 15 male Eastern Whip-poor-wills between mid-May and late-June. We located 14 Eastern Whip-poor-will nests by tracking the males around dusk. We monitored each nest every 2–6 days until failure or chicks reached 15 days of age. Daily nest survival rate was 98.5%. Our preliminary results from logistic regression analyses suggest that Eastern Whip-poor-wills in our study area select for more coniferous tree cover, greater amounts of ground litter cover, and taller shrubs when placing their nests, possibly for protection from predators and nest accessibility. As Eastern Whip-poor-wills are a target species for conservation in New York, our results will inform future forest best-management practices on public lands in the state for sustaining and promoting Eastern Whip-poor-will breeding populations.

Sat-AM2-C-2

The Where, What, and Why of Stream Crossings

Luke McNally (Forester, Ruffed Grouse Society, Boquet River Association, Willsboro, NY)

Abstract - The landscape of human infrastructure impacts not only wildlife connectivity but also habitat structure and stream function as well as flood resiliency and critical infrastructure during natural disasters. Understanding the depth of the problem as well as the many unknowns reveals a conservation initiative that has been hidden in plain site. Today, aquatic connectivity as a practice is gaining traction in New York, revealing co-benefits for both wildlife, the economy and society. This discussion will include mapping the extent of road–stream crossings and other infrastructure, understanding concepts such as ghost dams and culverts, and finally quantifying and prioritizing implementation projects and why they matter within a landscape scale.

Sun-AM2-C-3

Plankton in Lake Champlain: Invasive Species Impacts (aka the Adventures of Captain Fishhook Waterflea and Others)

Tim Mihuc (SUNY Plattsburgh and Lake Champlain Research Institute, Plattsburgh, NY)

Abstract - Aquatic invasive species in Freshwater lakes can have severe impacts. Long-term records (1992–present) for native zooplankton in Lake Champlain illustrate the impact of invasive species over the past 3 decades. Zooplankton exhibited major shifts in community composition associated with invasive species, including a decline in rotifer and Mysid abundance in the mid -1990s, following invasion of *Dreissena polymorpha* (Zebra Mussel). More recent community shifts can be attributed to invasion of the *Alosa pseudoharengus* (Alewife) in 2006–2008, *Bythotrephes longimanus* (Spiny Waterflea) in 2014 and *Cercopagis pengoi* (Fishhook Waterflea) in 2018. These shifts represent a major change in community structure with implications for the Lake's food-web dynamics. Post- invasion patterns in Lake Champlain's pelagic plankton communities illustrate the threat that invasive species pose to the integrity of freshwater ecosystems. I tell this tale via "The adventures of Captain Fishhook Waterflea", a short story for educators.

Sun-AM2-B-2

Northern Snakehead (*Channa argus*) in New York Waterbodies: Threats and Management

Ashley Morris (NY Department of Environmental Conservation /Water Resources Institute, New Paltz, NY) and Steven Pearson (NY Department of Environmental Conservation, Albany, NY)

Abstract - Aquatic invasive species present a threat to New York fish communities and habitats through predation and competition. *Channa argus* (Northern Snakehead) is a fish species that threatens to alter fish communities if they establish populations. Historically, Northern Snakehead in NY State have been managed through eradication efforts and through monitoring of populations in isolated ponds. In the summer of 2019, 2020, and 2021, reports of Northern Snakehead were made from the Hudson River, the Delaware River, and the Bashakill WMA, respectively. These reports led to rapid-response surveys using electrofishing and environmental DNA. In terms of finding Northern Snakeheads, Hudson River watershed surveys have been negative, while surveys within the Delaware River watershed have been positive. In the Bashakill WMA, eDNA surveys have shown widespread use of the habitat, and in 2022, young of the year were documented. eDNA surveys are being used to track the expansion of Northern Snakehead and monitor upstream dispersal through the Delaware and Hudson Canal into the Hudson watershed. In November 2023, a temporary barrier was installed, and a permanent barrier is being considered. Continued surveying in the Delaware and Hudson Canal will be necessary to determine the barriers' efficacy. Additional studies on Northern Snakehead distribution, ecology, and genetics are being planned.

Sat-PM1-D-3

Progress Report on *New Manual of Vascular Plants of Northeastern United States and Adjacent Canada*

Robert Naczi (New York Botanical Garden, Bronx, NY)

Abstract - The *New Manual of Vascular Plants of Northeastern United States and Adjacent Canada* is an active project by New York Botanical Garden that builds upon the long history of floristic investigation for this large region (entirety or portions of 22 states and 5 Canadian provinces). The chief goal of the *New Manual* is to enable identification of all vascular plants growing spontaneously in the region. *New Manual* content includes traditional information on identification, morphology, taxonomy, nomenclature, geographic range, habitat, and phenology for every species included, as well as several innovations, including etymologies for species names, conservation status, invasiveness of non-native species, and morphologic synapomorphies for families. This presentation will include a synopsis of completed family and species treatments, and also review the impact of the *New Manual* in advancing plant systematics and conservation. Relative to Gleason and Cronquist's *Manual* published in 1991, the *New Manual* current content reveals a 20% increase in species. Preparation of the *New Manual* comes at a critical time, given the unprecedented amount of floristic change in the northeastern US and adjacent Canada.

Sat-PM1-A-3

Risky or Resilient? Traits for Restoration and Relocation of Range-shifting Plants

Thomas W.M. Nuhfer (UMass Amherst, Amherst, MA) and Bethany Bradley (UMass Amherst, Amherst, MA)

Abstract - As our climate changes, the Northeast is predicted to be a climate refuge for range-shifting native plants. Restoration managers have an opportunity to support resilient plant communities by facilitating these range shifts, but such efforts raise concerns about range-shifting plants causing ecological damage. Research in invasion ecology has identified plant traits linked to invasion risk, and some proposed risk assessments of range-shifting plants make use of these traits. However, there is overlap between traits linked to restoration potential and traits linked to invasion risk. Can we distinguish between traits necessary for establishment and survival in varied environmental conditions and traits which lead to rapid spread or ecological disruption? In this presentation, we will review the current state of knowledge about assessing invasion risk and assessing restoration potential through the lens of the invasion continuum. We will discuss the ecological implications of traits described in literature and risk assessments, and suggest future directions. Our findings suggest that climate-adaptive risk assessment for range-shifting plants and assisted migration should be informed by the integration of invasion ecology with restoration literature and practice.

Sat-AM2-D-3

The Birds Don’t Have Newcomb’s: Vegetation Structure and Nesting Density on Maine Islands

Finley O’Connor (College of the Atlantic, Bar Harbor, ME)

Abstract - Lying on a unique interface between the temperate, boreal, and arctic regions, Maine’s islands support many rare natural communities, contain threatened or endangered plant species, and provide critical summer nesting habitat for colonial waterbird species. These birds predominantly select small, vegetated islands for nesting, but little work has been done to examine relationships between nest siting and vegetation types. Sea-level rise is a ubiquitous threat to otherwise protected colonies, exacerbating other threats including habitat loss, novel predators, toxins, and pathogens such as avian influenza. As the coastline changes and saline conditions reach further inland, island vegetation patterns will shift. It is unknown how—or if—these changes in vegetation will impact nesting seabird populations; my study attempts to answer the “if” portion of this knowledge gap. My research focuses on 3 of the most common nesting seabirds in the Gulf of Maine: *Somateria mollissima* (Common Eider), *Larus marinus* (Great Black-backed Gull), and *Larus smithsonianus* (Herring Gull). I conducted vegetation surveys on 4 nesting islands in Frenchman and Penobscot Bays, taking plant cover, height, and species presence data at points subsetted from a randomly generated point-cloud covering each island. I am analyzing these data in conjunction with nesting data collected by Acadia National Park and the College of the Atlantic in order to detect patterns in nest density by seabird species, related to vegetation structure. I will report my preliminary results in this talk.

Sat-PM2-C-2

Panel Discussion on Conserving Biodiversity Through Invasive Species Management

Mitchell O'Neill (NY Natural Heritage Program, Albany, NY) and the other presenters from the two Invasive Species and Biodiversity Conservation sessions

Abstract - The panel will field questions from the audience as a basis for exploring the issues involved in conserving biodiversity by managing the spread of invasive species.

Sat-PM2-D-4

Identifying New Invasives in the Face of Climate Change: A Focus on Sleeper Species

Ayodele C. O'Uhuru (Northeast Climate Adaptation Science Center, Amherst, MA, and Department of Environmental Conservation, University of Massachusetts, Amherst, MA), Annette E. Evans (Northeast Climate Adaptation Science Center, Amherst MA, and Department of Environmental Conservation, University of Massachusetts, Amherst, MA), Justin Salva (Department of Environmental Conservation, University of Massachusetts, Amherst, MA, and Biological Sciences, Purdue University, West Lafayette, IN), Bethany A. Bradley (Department of Environmental Conservation, University of Massachusetts, Amherst, MA, and Northeast Climate Adaptation Science Center, Amherst, MA), and Toni Lyn Morelli (Department of Environmental Conservation, University of Massachusetts, Amherst, MA, and Northeast Climate Adaptation Science Center, U. S. Geological Survey, Amherst, MA)

Abstract - Sleeper populations are established populations of introduced species whose population growth is limited by 1 or more abiotic or biotic conditions. Sleeper populations pose an invasion risk if a change in those limiting conditions, such as climate change, enables population growth and invasion. With thousands of established species, it is critical that we identify and prioritize potential sleepers. Here, we identified non-native plants established in the northeastern United States with high impacts and the potential to expand with climate change. Of 1795 introduced plants established in 1 or more northeastern states, we focused on 118 taxa regulated by 1 or more states outside the Northeast plus 61 taxa recorded as invasive globally and under consideration for regulation in the Northeast. We used the Environmental Impact Classification for Alien Taxa (EICAT) framework to quantify negative ecological and socioeconomic impacts reported in the scientific literature for these 169 taxa. We compared mean minimum winter temperature and annual precipitation where the species were abundant with current and future climate in the Northeast to evaluate whether climate change could increase risk. We identified 49 plants with ecological impacts linked to loss of native diversity and 94 plants with socioeconomic impacts. Eighty-one species showed an increase in climatic suitability for abundant populations with projected climate change. Using ecological impact, increased climate suitability, and presence in fewer than 20 northeastern counties, we highlight 18 species as high priorities for management in the Northeast. This approach can inform climate-smart, proactive management of sleeper populations before they become invasive.

Sat-AM2-D-4

Updating the Flora of Nantucket: An Island Exploration

Kelly Omand (Nantucket Conservation Foundation, Nantucket, MA), **Chase Mathey** (Great Ecology, New York, NY), and Sarah Bois (Linda Loring Nature Foundation, Nantucket, MA)

Abstract - It has been 28 years since the publication of a comprehensive flora covering Nantucket and its nearby islands, Sorrie and Dunwiddie's *The Vascular and Non-Vascular Flora of Nantucket, Tuckernuck, and Muskeget Islands*. In 2014, we embarked on a cooperative effort by island organizations and partners to undertake an update of the Nantucket County flora, to capture the extensive changes to the plant communities and biodiversity of the islands in the intervening years. We adapted the existing Sorrie and Dunwiddie database to include new functionality and revised the nomenclature for many taxa. We completed many years of field surveys to examine understudied areas of the island and relocate species undocumented since 1936 or earlier, described as "no recent records" by Sorrie and Dunwiddie. We further examined the historical flora via herbarium records databased in the Consortium of Northeastern Herbaria (CNH), which now includes several newly digitized collections, among them the Nantucket Maria Mitchell Association collection, and, in total, amounts to >10,446 vouchers from Nantucket County. This more complete historical voucher database revealed a long and colorful narrative of botanical interest on Nantucket and highlighted several previously obscure species and underacknowledged botanists who made significant contributions to the island's botanical record. We used iNaturalist data, site species lists and datasets, past botanical publications, and herbarium records to create distribution maps that will indicate general phytogeographic patterns in the final flora. As a result of this work, 128 species and hybrids have been added to the known Nantucket County flora; 73% of these species are non-native to the Cape and Islands region. We vouchered newly recorded species and deposited them in NMMA, UMass, and NEBC herbaria. Our work revealed a number of regional native species that had previously gone undetected due to cryptic growth form or recent introductions. Presently, we are completing a draft of explanatory text and making final database edits for publication. We hope to compare these results to other recent flora updates in the New England region and explore Southeast Coastal Plain linkages.

Sun-AM2-D-5

Nightjar Monitoring in New York and the Atlantic Flyway

Matthew D. Palumbo (New York State Department of Environmental Conservation, Albany, NY)

Abstract - In New York, nightjars (family Caprimulgidae) are among several birds that have been documented to be declining and have been monitored for several years through large-scale surveys such as the Breeding Bird Atlas (BBA) and Breeding Bird Survey (BBS). Due to their crepuscular behavior, these survey protocols were misaligned to when the birds were most easily detected. Therefore the New York State Department of Environmental Conservation (NYSDEC) implemented nightjar-specific protocols from the Center of Conservation Biology Nightjar Survey Network. The NYSDEC assessed site occupancy at 19 survey routes from 2014 to 2018 and did not detect a trend. In 2022, other states throughout the Atlantic Flyway were either currently monitoring nightjars or were interested in assessing trends in site occupancy, but a statistically robust sampling framework across the flyway did not exist. To address this need, the US Fish and Wildlife Service and members of the Atlantic Flyway Nongame Migratory Bird Technical committee conducted a power analysis determining that 300 survey routes, randomly stratified by state and Bird Conservation Region, would be needed to detect trends useful for conservation and management. Additionally, the existing nightjar survey data and BBS data were investigated [BY WHOM?] for trends in site occupancy. Similar to the NYSDEC assessment of data collected in New York, the occupancy models for the Atlantic Flyway did not indicate a trend through time. The additional analysis of the BBS data indicated a negative linear trend for all nightjar species. Differences in results between the nightjar-specific surveys and BBS routes most likely represent differences in the purposes and protocols of the survey designs. [WHO?] recommended implementation of the proposed statistically robust survey design created by the US Fish and Wildlife Service and Atlantic Flyway Nongame Migratory Bird Technical committee to ensure states can accurately track the trends in a group of birds that were difficult to survey and not readily detected by other survey methods.

Sat-AM2-C-5

The Past, Present, and Future of New York City's Spontaneous Flora

Lydia Paradiso (the New York Botanical Garden, Bronx, NY)

Abstract - The increased impacts and awareness of the global biodiversity and climate-change crises have led to a critical examination of urban biodiversity and its impact on local and global ecology. Urban areas, despite covering just 3% of global land, exert a disproportionate influence on biodiversity, ecosystem services, and human well-being. While cities often exhibit higher species richness than rural areas, the effects of urbanization on plant community assembly remain complex. New York City, with its diverse ecological and sociological past, serves as a unique case study. The original landscape has been highly modified by human activity, especially over the last 300 years, which has permanently altered the original biodiversity. However, nearly 10% of the city's land area remains natural forest and wetland, which harbor a wide variety of plants, animals, and other organisms. Drawing on a number of historic and contemporary sources, I have compiled checklists of the current and past spontaneous flora of New York City, as well as a trait database covering 10 functional traits. In this talk, I will discuss the makeup of the flora of New York City; explore shifts in taxonomic, phylogenetic, and functional diversity through time; and examine traits associated with persistence and loss in an increasingly urbanized landscape.

Sun-AM2-D-3

Leveraging Digitized (Marine) Specimen Data in Public Data Portals

Katie Pearson (Symbiota Support Hub, iDigBio, Tempe, AZ)

Abstract - With advances in digitization of marine invertebrate and other biodiversity specimens, the need for efficient management and access to these newly available data has also increased. Fortunately, many tools have already been built to meet this challenge, including Symbiota portals (e.g., InvertEBase, [https://invertebase.org/portal/], the Consortium of Northeastern Herbaria [https://neherbaria.org/portal/]), the Global Biodiversity Information Facility (GBIF; (https://www.gbif.org/), and the iDigBio portal (https://www.idigbio.org/). These data portals provide access to millions of specimen records, images, and, increasingly, extended data associated with the records such as genetic sequences and traits. In Symbiota portals like InvertEBase, any user can view, download, and map specimen records and create custom checklists and datasets based on search criteria. As novel trait data such as vitality is mobilized by initiatives like the Eastern Seaboard project, users will be able to refine their searches even further. Here I present these publicly available tools and describe upcoming improvements that will benefit collections managers, researchers, and educators alike.

Sat-PM1-B-1

Wildands Ecology in Action

Eric Bailey (Northeast Wilderness Trust, Montpelier, VT) and **Shelby Perry** (Northeast Wilderness Trust, Montpelier, VT)

Sun-AM2-C-5

***Sarracenia purpurea* Phytotelmata Algal and Cyanobacteria Composition in United States**

Lindsey A. Pett (Norwich University, Northfield, VT), Nicholas Gotelli (University of Vermont, Burlington, VT), and Angélica L. González (Rutgers University, New Brunswick, NJ)

Abstract - *Sarracenia purpurea* (Purple Pitcher Plant), a carnivorous herb that holds micro-aquatic ecosystems within its pitcher shaped leaves, is a well-studied ecological model system. However, the algae and cyanobacteria within *S. purpurea*'s phytotelmata are not well researched. We conducted the first algal and cyanobacteria survey of *S. purpurea* across its native range within the United States from the Florida panhandle to northern Maine. Using diversity indices and biovolume measurements, we modeled taxa assemblage at site-scale and pitcher-scale environmental gradients. At the pitcher scale, we found cyanobacteria responded positively to nutrient gradients of N and P, while algal species responded to elevational and latitudinal effects. Overall, it was found that the algae and cyanobacteria within *S. purpurea* respond similarly to algae and cyanobacteria found in larger aquatic ecosystems.

Sat-AM1-A-3

A Review of Climate Change Impacts on Biocontrol Agents and their Hosts

William G. Pfadenhauer (UMass Amherst, Amherst, MA), Annette E. Evans (University of St. Joseph, West Hartford, CT and UMass Amherst, Amherst, MA), Daniel M. Buonaiuto (UMass Amherst, Amherst, MA), Matthew E. Fertakos (UMass Amherst, Amherst, MA), Carrie J. Brown-Lima (Cornell University, Ithaca, NY and US Geological Survey, Amherst, MA), and Toni Lyn Morelli (UMass Amherst, Amherst, MA and US Geological Survey, Amherst, MA)

Abstract - Biocontrol, the practice of using one species (biocontrol agent) to control the population of another (target host), has been successfully reducing nuisance species in agricultural and natural systems worldwide. Biocontrol can be an effective component of integrated pest management, but how will climate change affect biocontrol relationships? Using a meta-analysis of data collected from a systematic literature review, we evaluated whether changing temperatures will impact the efficacy of biocontrol agents in reducing populations of their target hosts. Overall, the majority of studies evaluating impacts of climate change on biocontrol agents take place in the laboratory and focus on arthropod biocontrol agents that function as parasitoids. Results from our meta-analysis reveal that changes in temperature are projected to impact biocontrol agents and their target hosts similarly, with no universal significant changes to biocontrol efficacy or host performance. However, our results also show that temperature responses vary widely across study systems. Individual case studies show positive, neutral, and negative effects of temperature on biocontrol agents, as well as variation in response across the 3 core biocontrol phases: survival, reproduction, and efficacy. Our work highlights important knowledge gaps including how climate change will affect both biocontrol agents and hosts simultaneously.

Sat-AM2-D-5

Earthworm Community Changes Over 17 Years Along Riparian Habitats

Rebecca A. Pinder (SUNY Columbia-Greene Community College, Hudson NY)

Abstract - This study further investigated earthworm distribution along streamside habitats in the Edmund Niles Huyck Preserve in Rensselaerville, NY, adding to previous survey work (2007–2008 and again in 2017) and examined the status of native and non-native earthworms living in these areas. Previously, earthworm species observed were either native (and generally rare) or non-native species primarily from Europe. Additional groups of earthworms have continued to spread in the Northeast and have begun to reach sensitive forested and riparian habitats throughout the region. Originally from Asia, the so called "jumping worms" have a much more dramatic and devastating impact on local forested ecosystems. My previous studies indicated that streamside habitats were hotspots of biodiversity for European and native earthworm species. This study examined streams that were previously sampled at the preserve, areas surrounding those streams, as well as the shoreline around Lake Myosotis. Results indicate that there are significant changes in the earthworm communities along the streams at the preserve, including a decrease in the number of species along stream banks (including native species). Additionally, the jumping worm *Metaphire hilgendorfi* was detected along the southern shore of Lake Myosotis. This occupied area appears to be relatively small at this time and presents an opportunity to mitigate the impact these worms could have on the sensitive ecosystems nearby. This study highlights the need for continued monitoring of earthworm populations region wide, as earthworm communities examined were significantly different than previously recorded at the preserve. Native earthworms that were previously detected at the preserve, *Eisenoides lonnbergi, Bimastos parvus,* and *Sparganophilus eiseni*, also showed significant changes including that *E. lonnbergi* was not observed in 2023. These results underscore the need for continued monitoring of earthworms for multiple purposes: for invasive species management as well as conservation of native earthworm species.

Sun-AM1-A-2

Fate of Carrion: Competition for Reproductive Resources of *Nicrophorus* Beetles in New York Forests

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

Abstract - Small vertebrate carrion is a nutrient rich commodity for a variety of organisms. As an ephemeral resource, which is both spatially and temporally unpredictable, carrion lends itself to an aggressive competition among species that heavily rely on it. Carrion competition in the Northeast is greatest among vertebrate scavengers, carrion flies, and *Nicrophorus* spp. (burying beetles). The purpose of our study was to determine the fate of small vertebrate carrion among mixed deciduous forest located in Central New York between May and July 2022. Our results revealed burying beetles buried 74% of carcasses available during the trials, indicating they are the dominant competitor for small vertebrate carrion. A logistic-regression model we created based on this study predicts up to 80% of carrion would be buried by burying beetles when average daily air temperatures are 15–22 ° C. Our model also associates average daily air temperature above 22 °C with an increased probability of fly colonization. Our results may influence management strategies for the reintroduction of the federally threatened *Nicrophorus americanus* (American Burying Beetle) to northeastern regions of the continental US.

Sat-AM1-D-2

The Lucasville Pond Renovation Project and the Effect on the Local Turtles and Other Inhabitants

Todd Rimkus (Marymount University, Arlington, VA), Bill Crisp (Wildlife Rescue League, Falls Church, VA), Karen Pratzner (Wildlife Rescue League, Falls Church, VA), and Kelly Geer (Wildlife Rescue League, Falls Church, VA)

Abstract - Retention ponds exist for many planned communities around the US. These ponds can be completely isolated from natural waterways or reservoirs that only temporarily disrupt their flow. Over the years, a number of these ponds, especially the larger ones, have provided important habitat for local species. These retention-type ponds have become standard practice for many new-construction housing projects for the last 30 years. Now many of the older ponds need work and some even require total renovation. Construction plans do not always account for the impact on the species that inhabit the ponds. Even if they do account for the impact, the plan is usually a wait-and-see plan. Using a wait-and-see plan usually puts the animals at higher risk for injury or death while someone figures out what to do with the species encountered. This study took a new, proactive approach and yielded some remarkably interesting results. Prior to any construction, we trapped >1000 turtles and relocated them downstream. The time needed for trapping efforts along with the costs of supplies allowed us to determine an estimate of the cost per turtle. After construction started, we rescued several additional turtles and moved them downstream as well. Having been involved in the efforts to rescue the turtles that remained and dug themselves into the mud, we determined a cost-per-turtle estimate for those too. In addition, we used data from other projects that used only reactive rescue as a model and determined an estimate of cost per turtle for that approach. In studying the literature, we found this is the first known project that had a relocation phase prior to construction of a retention pond. We propose that future renovation projects should employ the proactive plan and the costs should be built into the budget.

Sun-AM2-A-5

Advances in Georeferencing Technologies to Support Marine Invertebrate Digitization

Nelson Rios (Yale Peabody Museum, New Haven CT)

Abstract - Georeferencing plays a vital role in documenting and understanding natural history specimens by providing precise location data. Through georeferencing, researchers can map species distributions, track environmental changes, and gain insights into ecological patterns, enriching our understanding of biodiversity and ecosystem dynamics. Contemporary biological specimen-collecting efforts predominantly utilize global positioning system (GPS) technology to georeference specimens promptly upon collection. However, a significant portion of museum and collection holdings predates the widespread adoption of GPS technologies. Consequently, georeferencing these legacy collections necessitates the human interpretation of written textual locality descriptions associated with each specimen. The Geolocate tool was initially developed in 2003 to facilitate the task of deriving computable geospatial coordinates from textual locality descriptions. To optimize large-scale georeferencing projects, a collaborative georeferencing framework, known as CoGe, was developed and integrated with Geolocate, enabling greater efficiencies through analysis of shared datasets and leveraging shared human resources. Until recently, these tools primarily catered to data from freshwater and terrestrial ecosystems. However, the emergence of the Eastern Seaboard (ESB) and DigIn Thematic Collections Networks (TCN), which concentrate on the digitization of marine invertebrates, has presented an opportunity to expand this infrastructure to support marine georeferencing efforts. Recent advancements in this domain encompass bathymetric querying and visualization techniques, sophisticated spatial representations, and enhanced integrations with collection-management systems.

Sat-PM2-B-3

Open Discussion for Paleontologists and Biologists: Morphology in Cladistic Analyses of Fossil Taxa and of Extant Taxa

Fred Rogers (Frnaklin Pierce University, Rindge, NH) along with all the presenters from this session

Abstract - In paleontology, our knowledge of the systematics, evolutionary relationships, ecology, and biodiversity of fossil taxa is heavily dependent on hard part morphology, whereas students of extant taxa often can add data on soft tissue anatomy, physiology, behavior, and genetics to their analyses. What ideas about using morphology in systematics can paleontologists and biologists share? What are some examples of best practices? What are some difficulties, and how can we work around them?

Sat-AM2-B-3

Live–Dead Distinctions and Why They are Important

Gary Rosenberg (Drexel University and Academy of Natural Sciences of Philadelphia, Philadelphia, PA)

Abstract - Molluscan shells can persist on beaches for centuries or millenia. Their occurrence in an area does not mean that a species still lives there. This gap has recently been addressed by the addition of a field for "vitality" in the Darwin Core, which is a standard for data exchange for natural history collections. Adding this field to millions of previously digitized records can be accelerated by bioinformatic approaches. A case of study of 3 species of arcoid bivalves (*Noetia ponderosa*, *Lunarca ovalis*, and *Anadara transversa*) found in the northeast US demonstrates the importance of live–dead distinctions. During the past interglacial, *Noetia ponderosa* lived as far north as Massachusetts, but it does not currently live north of Chesapeake Bay, as shown by observations on iNaturalist and in museum collections. Integration of data on portals such as InvertEBase, iDigBio, and GBIF can accelerate visualization of data and aid in finding specimens appropriate for addressing particular questions.

Sat-PM1-B-4

Restoring a Degraded Riparian Forested Buffer while Balancing Phosphorus Remediation, Biodiversity, and Indigenous Land Access

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

Abstract - This myco-phytoremediation pilot project on unceded Abenaki land evaluated the utility of mycorrhizae and native plant polycultures in phosphorus (P) mitigation, and pollinator-habitat improvement, while facilitating land access for the Original Peoples. This study restored a degraded riparian buffer by clearing 2 plots of *Rhamnus cathartica* (Common Buckthorn) and planting 32 native species. One cleared plot was inoculated with commercial mycorrhizae, the other was not, and a third served as an undisturbed control. After 4 years, plant diversity was consistently higher in the restored plots compared to the undisturbed control, with means of 22 species surviving and 58 newcomers appearing. Cyclical vegetation harvest removed P. Data also suggests mycorrhizae facilitate soil P mitigation. Soil total phosphorus (TP) in inoculated plots were statistically lower after 4 years than in the other plots. While biomass P removal of 5 plant species was not significantly different between restored plots, P removal between species was significantly different. P concentrations from highest to lowest were *Sambucus canadensis* (Elderberry), *Salix petiolaris* (Meadow Willow), *Cornus sericea* (Red Osier Dogwood), Common Buckthorn, and *Viburnum dentatum* (Arrowood). Eighty-eight percent of plant species introduced are culturally relevant to Abenaki, the site's original inhabitants. Abenaki partners help mitigate P levels through harvesting these culturally significant plants. Impending research on P-accumulating species with more replicates and endemic mycorrhizae will improve field-trial inferences. Addressing trade-offs among P mitigation, indigenous use, and pollinator habitat can revitalize forested riparian buffers.

Sun-PM2-C-1

The Vermont Fungal Scientific Advisory Group (FSAG)

Jess Rubin (University of Vermont, MycoEvolve, Burlington, VT), **Dave Muska** (North Branch Nature Center, Montpelier, VT), Savannah Ferreira (Vermont Agency of Natural Resources, Montpelier, VT), and Rick Van de Poll (Northeast Mycological Federation, Sandwich, NH)

Abstract - The Vermont Fungal Scientific Advisory Group (FSAG) aims to assist the Endangered Species Committee by compiling a species list for the state of Vermont, sponsoring and supporting outreach and educational programs about fungi, and advocating for the conservation of rare fungi species and their associated natural communities. In order to better understand the fungal diversity within the Green Mountain State, comprehensive data collection is necessary. This will entail an accurate accounting of previously vouchered/collected specimens, QA/QCing ongoing observations, and sequencing/genetic barcoding where appropriate. We recognize that this is a vast undertaking and to fully embrace the task, FSAG has employed a community science-based approach to information gathering. In addition to updating archival records, we are focusing our efforts on engaging the public to contribute to these collective aims. In this presentation, Jess Rubin will review the Fungal SAG origins, its role within the VT Agency of Natural Resources, and how our research can support VT Conservation Design Initiatives. Dave Muska will discuss the FSAG's approach to public outreach and education over the past year and forthcoming season.

Sat-PM1-C-2

Floristics as a Tool for Managing Invasive Species: Case Studies From the *New Manual*

Kate E. Samra (New York Botanical Garden, Bronx, NY)

Abstract - Invasive species are considered one of the most significant threats to biodiversity today. Central to our understanding of invasive plants is documenting how our flora has and continues to change over space and time. Regional floristics studies are a powerful tool for identifying, monitoring, and managing invasive plants. Using historic and emerging examples, I discuss ways in which the *New Manual of Vascular Plants of the Northeastern United States and Adjacent Canada* is contributing to our knowledge of well-established invasive species and detecting recent non-native plant establishments, in turn aiding in efficient management of these species. I also explore how outreach and engagement with the public and other important stakeholders can further catalyze effective invasive management.

Sat-PM1-A-4

Howland Research Forest, ME: How Conservation has Supported Long-term Research

Kathleen Savage (Woodwell Climate Research Center, Falmouth, MA), David Y. Hollinger (USDA Forest Service, Northern Research Station, Madison, WI), Andrew Ouimette (USDA Forest Service, Northern Research Station), Shawn Fraver (School of Forest Resources, University of Maine, Orono, ME), Aaron Teets (Center for Ecosystem Science and Society, Northern Arizona University, Flagstaff, AZ), Zoë Dietrich (Woodwell Climate Research Center, Falmouth, MA), Emily Sturdivant (Woodwell Climate Research Center, Falmouth, MA), Rose Gelman (School of Forest Resources, University of Maine, Orono, ME), and Roel Alfredo Ruzol (School of Forest Resources, University of Maine, Orono, ME)

Abstract - The Howland Research Forest, located in central Maine, encompasses 223 ha (550 ac) of unmanaged, mature evergreen forests on flat to gently rolling landscapes. It was established in 1987 through a partnership between the University of Maine and International Paper (now American Forest Management). Over the next 37 years, collaborative partnerships between government, universities, and NGOs established and maintained an active research program focused on carbon and nutrient cycling. In 2007, when the research forest was scheduled for harvesting by the landowner, Northeast Wilderness Trust was able to purchase the site, ensuring that the Howland Research Forest would remain "forever wild" and continue to foster long-term research, education, and collaborations in this unique stand of mature forest. A key finding from the long-term (>25 years) measurement of carbon dynamics at Howland indicates that this forest has continued to take up and store carbon each year, even as it ages and faces climate changes. The move to conserve Howland Forest was critical for maintaining long-term research at the site, which has become a valuable "control" forest that can be used as a baseline for understanding climate-change impacts on northeastern forests, as well as evaluating the effects of forest-management practices on carbon and nutrient dynamics. This talk will provide an overview of the diverse research program at Howland Forest from the past to present, highlighting the scientific insights made possible by conservation of the site.

Sun-AM2-C-4

Monitoring of Wildlife and Scavenging Behaviors in Recreationally Used Nature Reserves in the Greater Boston Area

Samantha J. Sawyer (Curry College, Milton, MA), Lillian DiNoto (Curry College, MA), Amelia Beauregard (Curry College, Milton, MA), and William Noyes (Curry College, Milton, MA)

Abstract - Forest blocks aid in the maintenance of biodiversity within urbanized landscapes, serving as refuge for a variety of wildlife in areas with high human density. Greater Boston is one such area, where downtown Boston is ~11 km from the Blue Hills Reservation, a ~2800-ha nature reserve connected to the ~500-ha Neponset River Reservation. According to the 2023 US Census, more than 28,000 people live in Milton, MA, where both the Blue Hills and Neponset River reservations reside. Wildlife densities are high enough within the Blue Hills that annual deer-hunting has been permitted in areas of the reserve since 2015 to curb the growing population. Curry College exists along the Blue Hill's forest edge and maintains 53 ha of protected wetland that feeds into the Neponset River Reservation, forming a contiguous forest block between both reservations. Like in the Blue Hills, hiking trails are open for recreational use by the public and their dogs, including the 1835 students attending Curry College. Human impact on wildlife in these areas can be indirect, where the presence of human subsidiaries (food items directly or indirectly made available to wildlife) and pest-management strategies through poison-based cull programs in urban areas can influence wildlife behavior, community interactions, and land use. For example, in densely populated urban areas, both mesocarnivores and prey are often found in high densities due to human subsidiaries alleviating predation pressure. However, it is currently unknown if wildlife in forest blocks adjacent to densely populated areas experience a similar reliance on scavenging as mesocarnivore populations. The purpose of this study is to better understand the community dynamics, scavenging behaviors, and land use of wildlife in the recreationally used nature reserve on Curry College's campus. To do this, we placed 24 motion-sensor game cameras ~50 m from each other around the wooded habitat of the Curry College campus and have monitored wildlife since October 2022. Dead *Rattus norvegicus* (Brown Rat) were placed as bait in front of game cameras to monitor scavenging behaviors during February and March 2023 using still image and video. Land-use strategies of wildlife across seasons in addition to novel interactions with carrion exhibited by mesocarnivores will be discussed.

Sun-AM2-A-2

Effects of Climate Change on New York Wildlife

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

Abstract - New York's wildlife is changing. Climate change poses major challenges to natural resource managers, in part because of the idiosyncratic ways that individual species are responding and predicted to respond. A component of the newly available New York State Climate Impacts Assessment identifies key vulnerabilities in our native biodiversity and opportunities for management action. New York's great variety of land-cover types, from coastal to alpine, saltwater to freshwater, and grassland to forest, supports an impressive diversity of species. However, >800 species of plants and >700 species of animals are at some risk of extirpation from the state, threatened by habitat loss and fragmentation, pollution, overharvesting, and invasive species. All these threats, to varying degrees, are exacerbated by climate change, while climate change independently poses new threats to species that were formerly secure. In this talk I will discuss key vulnerabilities in New York's native fauna and flora from climate change and other stressors, including southern range-edge species, temperature-sensitive and low-mobility species, species with evolved interdependencies with other species or with snow and ice, and specialists whose habitat is disproportionately affected. Some species will be lost no matter what management actions are taken, and other species will be gained. Key recommendations from the Assessment are to continue reducing other stressors on native biodiversity, restore and maintain habitat connectivity, and monitor, monitor, monitor.

Sun-PM2-A-2

Comparative Biodiversity of Plum and Fishers Islands

Matthew D. Schlesinger (New York Natural Heritage Program, SUNY ESF, Albany, NY), Richard M. Ring (New York Natural Heritage Program, SUNY ESF, Albany, NY), and Gregory J. Edinger (New York Natural Heritage Program, SUNY ESF, Albany, NY)

Abstract - The New York Archipelago, which extends from the North Fork of Long Island toward the coastal border of Connecticut and Rhode Island, contains 4 islands: Plum, Great Gull, Little Gull, and Fishers. While similar geologically and oceanographically, these islands have vastly different land-use histories, resulting in notable differences in their biodiversity but also some striking similarities. The New York Natural Heritage Program has conducted inventories of Plum and Fishers islands, the 2 largest in the chain, in the last 10 years, combining historical information, community science data, and recent field surveys of vascular plants, mammals, birds, herpetofauna, select insect groups, and natural communities to inform recommendations for management and conservation. In this talk, we compare the islands' natural communities, species composition, presence of at-risk species, and threats to biodiversity. For both islands, invasive species are the primary management issue, although the problem may be easier to tackle on Plum Island because it is smaller and has a single owner. Shorebird- and turtle-nest predation is also a concern on both islands. Coastal natural communities, such as maritime beaches, bluffs, and the rocky intertidal, are standouts in their size and condition but are especially vulnerable to severe storms. The natural areas on Fishers Island may serve as a model for an eventual restoration of Plum Island, which is in transition after 70 years of housing a federal animal-disease lab.

Sat-PM2-D-2

Nightjar Nest Site-Selection Characteristics and Survival on a Military Installation

Alison R. Schroeder (SUNY ESF, Syracuse, NY), Jonathan Cohen (SUNY ESF, Syracuse, NY), Matthew Schlesinger (New York Natural Heritage Program, Albany, NY), and Jeffrey Larkin (Indiana University of Pennsylvania, Indiana, PA)

Abstract - Military installations have the potential to harbor high species densities and are important conservation areas for birds. Understanding the habitat use of threatened species on military bases can help wildlife biologists identify best practices in conserving habitat for these species. Fort Drum Military Base is home to some of the only *Chordeiles minor* (Common Nighthawk) nesting habitat in the Northeast US and routinely manages habitat for listed species. We conducted nest searching and monitoring for Common Nighthawks and *Antrostomus vociferus* (Eastern Whip-poor-will) at Fort Drum Military Base to determine nest-site selection characteristics and nest survival. We collected data on vegetation characteristics at nests and paired random points. Common Nighthawks nested primarily in areas with leaf litter, bare ground, and moderate canopy cover, while Eastern Whip-poor-wills nested primarily in areas with leaf litter, woody ground cover, and moderate-to-high canopy cover. Both species showed a positive association with density of *Quercus* (oak) seedlings and proximity to open fields. Seven of 9 Nighthawk nests were successful and 1 of 4 Whip-poor-will nests were successful, with causes for failure unknown. Based on our preliminary results, we suggest that Fort Drum prioritize protecting forest with a dense woody regeneration layer near open fields during the breeding season from mid-May to mid-August.

Sat-AM2-C-1

Lessons from the Restoration of Braddock Bay on Lake Ontario Under Varying Water Levels

Rachel Schultz (SUNY Brockport, Brockport, NY), Joshua Unghire (US Army Corps of Engineers, Bufflalo, NY), Heidi Kennedy (NY Department of Conservation, Basom, NY), Rene Belleville (SUNY Brockport, Brockport, NY), and Courtney Scoles (SUNY Brockport, Brockport, NY)

Abstract - Braddock Bay, a Lake Ontario coastal wetland degraded by *Typha* x *glauca* (Hybrid Cattail) invasion and erosion due to the loss of its barrier beach, was targeted for restoration by the US EPA through the Great Lakes Restoration Initiative. Restoration goals included increasing floristic quality and wildlife habitat, and ecological criteria were developed to evaluate objectives and trigger adaptive management. Objectives included reducing cattail cover by excavating open-water areas and channels, creating and planting spoil mounds to increase meadow marsh species, and treating cattail at higher elevations to promote succession of meadow marsh species. Marsh floristic quality increased following restoration, especially in low water years. However, *Hydrocharis morsus-ranae* (European Frogbit) increased during high water years. After restoration, bird and anuran diversity increased, and we found evidence of *Esox lucius* (Northern Pike) spawning. From an educational standpoint, this restoration serves as a key case study in managing for resilience in the face of projected climate-change impacts and how adaptive management plays an essential role into the future. We are continuing to explore how best to communicate the complexity of this system to multiple audiences.

Sun-AM2-B-4

The Effects of Silvicultural Management on Arboreal Insect Communities in a Northern Hardwood Forest

Laurel Schuster (SUNY ESF, Syracuse, NY)

Abstract - The role of canopy-insect communities in the health of northern hardwood forests has historically been overlooked in management strategies. In the Adirondacks, forest composition is changing rapidly, therefore incompletely informed practices can exacerbate ecosystem destabilization. My study aimed to address this gap in knowledge through nondestructively sampling canopy-insect communities using a suite of techniques and insect-trap types in differently managed stands in the SUNY ESF Huntington Wildlife Forest (Newcomb, NY). During the summer of 2022, I selected 20 *Acer saccharum* (Sugar Maple) trees across a range of diameters from 2 adjacent stands—a shelterwood and a recently unmanaged stand—and sampled their canopies using stationary-rope tree-climbing techniques (SRT). I subsequently identified the insects collected to the lowest taxonomic level possible, usually to family. I assessed the relationship between insect-community metrics (density and richness) and silvicultural treatment, along with other relevant ecological factors including tree diameter, presence of tree-related microhabitats (TreMs), temperature, and humidity. Trap type and canopy stratification were also included as potentially important predictors of the insect communities sampled. Both silvicultural treatment and tree diameter were informative variables for insect-community composition. Trap type and canopy stratification were significant predictors of insect abundance, and trap type was an influential factor in predicting taxonomic richness. These results underscore the importance of integrating canopy-insect dynamics into forest-management strategies to achieve a more holistic understanding of northern hardwood forest health.

Sun-PM2-C-3

Coyote, Wolves, or Hybrids? Challenging the Status Quo of Public Perception and Traditional Wildlife Protection

Renee Seacor (Project Coyote, Stanfordville, NY)

Abstract - Northeast admixed canids pose interesting genetic, ecological, sociocultural, and public policy questions. Recent studies have identified suitable *Canis lupus* (Wolf) habitat throughout the Northeastern United States, and emerging genetic research, along with recently documented Wolf presence, has re-engaged the conversation of Wolf recovery in the region. As stakeholders contemplate the Northeast within the framework of federal and state wildlife policies, including the development of a new National Wolf Recovery Plan by the US Fish and Wildlife Service, crucial questions have emerged on hybrids and admixed canids that currently inhabit the region and how they should be treated in subsequent policies. Future policy considerations must also address public perceptions toward wild canids and how to promote coexistence across species.

Sun-PM2-D-2

The Extended Invertebrate: Digitizing Novel Traits Expands Research and Education Possibilities

Elizabeth K. Shea (Delaware Museum of Nature and Science, Wilmington, DE) and Gary Rosenberg (Academy of Natural Sciences of Drexel University, Philadelphia, PA)

Abstract - The ongoing digitization of natural history collections has made museum specimens widely available to researchers, educators, students, and the general public. Eastern Seaboard and DigIn are 2 coordinated, multi-institution thematic collections networks (TCNs) that are currently digitizing marine species. In addition to traditional digitization activities such as georeferencing and photographing, mollusk digitization now includes recording whether specimens were collected alive or dead (vitality), a trait that can refine species distributions by restricting them to live-only records. Future activities may include scoring other ecologically and evolutionarily important features such as evidence of predation and the presence of shell-associated fauna (e.g., barnacles) as well as linking to external datasets with biographical information on collectors. Together, these new traits create extended invertebrate specimen records and provide new opportunities for ecological research and informal STEAM education. This presentation will showcase how these non-traditional traits are being used in collections-based research and education today and consider how they may be used in the future.

Sat-PM2-B-4

Influence of Landscape and Site Characteristics on Eastern Gray Treefrog (*Hyla versicolor*) Occupancy in Managed Forests of Pennsylvania and Virginia

Susanna Sousa (Antioch University New England, Keene, NH), Lisabeth Willey (Antioch University New England, Keene, NH), Justin Kitzes (University of Pittsburgh, Pittsburgh, PA), Jeffrey L. Larkin (Indiana University of Pennsylvania, Indiana, PA), Cameron Fiss (SUNY Environmental Science and Forestry, Syracuse, NY), Emily Cohen (University of Maryland, Frostburg, MD), Alexandra Syunkova (University of Pittsburgh, Pittsburgh, PA), Halie Parker (Indiana University of Pennsylvania, Indiana, PA), Jeffery T. Larkin (University of Massachusetts Amherst, Amherst, MA), and Michael Akresh (Antioch University New England, Keene, NH)

Abstract - Amphibians are an integral component of forest ecosystems, and understanding how landscape and site characteristics may relate to species occupancy is important when making natural resource conservation and management decisions. Our study focused on how *Hyla versicolor* (Eastern Gray Treefrog) occupancy is influenced by attributes quantified at various spatial extents. From May through July 2020 and 2021, we deployed autonomous recording units at ~1000 unique locations within managed forests in Pennsylvania and Virginia. Using machine-learned classifiers, we identified locations where treefrog calls were recorded. We evaluated land-cover type, forest type, and road density around each sampling location at 10 spatial extents between 60 and 4000 m. We calculated aspect, elevation, soil drainage class, distance to nearest wetland, and basal area for each location. Detection variables for each location included average daily temperature, percent humidity, precipitation, and lunar illumination factor. We created single-season occupancy models using the 'unmarked' R package and performed model selection based on Akaike information criterion. In the best-fitting model, treefrog occupancy increased at locations that were nearer to seasonally flooded wetlands and at sites with more agriculture within a 750-m radius. We note that no site contained more than 22% agricultural cover within 750 m. Climate variables also influenced treefrog daily detection probability;. These findings can assist with developing future survey protocols. Our results suggest that Eastern Gray Treefrogs are more likely to be found within habitats adjacent to seasonally flooded wetlands and in areas with increased agricultural cover up to ~22% of the area within 750 m. Forest-management practices resulting in reduced basal area, such as clear cutting, partial cutting, and prescribed burning, did not appear to impact treefrog occupancy; thus at least for this amphibian species, populations can likely be sustained in managed forest stands.

Sun-PM2-B-1

Leveraging Emerging Science to Advance State Policies for Northeastern Canids

Nadia Steinzor (The Rewilding Institute, Woodstock, NY)

Abstract - States are undertaking an update to their state wildlife action plans (SWAPs), a once-a-decade effort that sets species-protection priorities and is required to receive key sources of federal funding for wildlife programs. This process opens the door to the greater prioritization of wolves by state agencies, at a time when the animals are likely making their way back to the Northeast. While the *Canis lupus* (Gray Wolf) is a federally listed endangered species, to date no state agency has undertaken consistent field surveys or other studies to determine the presence of Gray Wolves. Advocates are leveraging the SWAP process to advance such action, which is particularly important because of the realities of admixtures among Northeast canids. When misidentified by hunters as *Canis latrans* (Coyote), wolves may be shot, reducing the likelihood that they will be able to migrate and establish a breeding population. Changing science around Northeast canid genetics underscores the need for public and hunter education as a cornerstone for wolf protection and recovery strategies at the state level.

Sun-PM2-D-3

Muller Field Station Internship Program: Contributing Outreach, Monitoring, and Management to Regional Invasive Projects

Maura E. Sullivan (Finger Lakes Community College, Canandaigua, NY), Deborah Sosnowski (Finger Lakes Community College, Canandaigua, NY), and Jet Meyer (Finger Lakes Community College, Canandaigua, NY)

Abstract - Undergraduate involvement in regional invasive species projects provides authentic, applied learning experiences for students while supplying an educated, engaged workforce to these efforts. Student participation in our paid internship program have worked in partnership with the Finger Lakes Partnership for Regional Invasive Species Management (PRISM), NYS Department of Environmental Conservation, Montezuma National Wildlife Refuge, Canandaigua Lake Watershed Association, Cumming Nature Center, and Ontario County Parks. In these positions, they have made significant contributions to increasing awareness, scientific knowledge, and control of a variety of invasive species (e.g., *Lymantria dispar* [Spongy Moth], *Adelges tsugae* [Hemlock Woolly Adelgid], *Lycorma delicatula* [Spotted Lanternfly], *Hydrocharis morsus-ranae* [European Frog Bit], *Microstegium vimineum* [Japanese Stilt Grass], etc.). These types of partnerships are critical for leveraging resources to effectively address these ecological threats.

Sun-AM2-B-1

Archiving Fieldwork for the Future: Sharing Your Research with Museum Collections

Michelle Tang (Museum of Comparative Zoology, Cambridge, MA)

Abstract - With >1 billion specimens held in more than 1000 institutions worldwide, natural history museums represent hundreds of years of biodiversity through contributions from zoologists, naturalists, and other researchers. To increase accessibility and utility, museum collections are pursuing large-scale digitization efforts of specimen data, published publicly on institutional databases (e.g., MCZbase) and collaborative data aggregates (e.g, GBIF). I will discuss recommended field/lab practices to optimize the research value of archived specimens and streamline the process of receiving and digitizing new material. Additionally, I will provide a brief overview of collections work and museum–research collaborations. Regarding the importance of vouchering and citing specimens, I will highlight the concept of the Digital Extended Specimen Network, created by capturing and linking specimen-based data to specimen-derived and specimen-affiliated data (e.g., publications, genetic sequences, scans, and more).

Sat-PM1-B-2

Simulated Herbivory Decreases Frond Size and Number in *Dryopteris intermedia*

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

Abstract - *Dryopteris intermedia* (Common Wood Fern) is the most abundant fern in the northeast US. It often experiences herbivory from large mammals, which trim its fronds to the base. This study addressed the ability of these ferns to regrow following such herbivory. I compared the size and number of new fronds to control plants 1 month following the final cut in each of 3 treatments: early cut (June), twice cut (June and September), and late cut (October) in the 2023 growing season. All 3 treatments significantly reduced the length, width, and number of resultant fronds relative to paired controls. The early treatment resulted in significantly less loss of frond size and number than the other 2 treatments. These results demonstrate that herbivory can reduce the photosynthetic space of fronds of Common Wood Fern, particularly if repeated or late in the growing season.

Sat-PM2-A-1

Acoustic Monitoring of Anurans in a Suburban Forest Area

Alex Thompson (Mianus River Gorge Preserve, Bedford, NY)

Abstract - Anurans are rapidly declining, leading to more research on factors affecting their populations. Acoustic monitoring is a method of surveying animal species from their calls. This monitoring method is time and cost effective, but can be impeded by disturbances that stop calling or other factors. This study was conducted to document anuran species richness within the Mianus River Gorge Nature Preserve and test acoustic monitoring as a method of surveying anurans in ecological research. Recorders were used to acoustically monitor 12 wetlands and vernal pools in the summers of 2022–2023. I estimated species assemblage, richness, and optimal monitoring periods were estimated from recordings and used logistic regression to determine the impact water-body size and type (permanent or vernal) had on anuran calling. I found 7 total different species of anurans. Spring peepers were the most prevalent, in part due to their dates of calling, aligning well with dates recorded. Water body size and type had positive correlations with species abundance and richness. This study and its results will serve as a basis for future work monitoring anurans in the Mianus River Gorge Preserve.

Sat-AM1-C-2

Bird Binocularity: More Than Meets the Eye

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

Abstract - Binocular vision in vertebrates has been implicated in several functions, including depth perception, contrast discrimination, etc. However, the blind area in front of the head that is proximal to the binocular visual field is often neglected. This anterior blind area is important when discussing the evolution of binocular vision because its relative length is inversely correlated with the width of the binocular field. Therefore, species with wider binocular fields also have shorter anterior blind areas and objects along the mid-sagittal plane can be imaged at closer distances. Additionally, the anterior blind area is of functional significance for birds because the beak falls within this blind area. I tested for the first time some specific predictions about the functional role of the anterior blind area in birds controlling for phylogenetic effects. I used published data on visual field configuration in 40 species of birds and measured beak and skull parameters from museum specimens. I found that birds with proportionally longer beaks have longer anterior blind areas and thus narrower binocular fields. This result suggests that the anterior blind area and beak visibility do play a role in shaping binocular fields, and that binocular field width is not solely determined by the need for stereoscopic vision. In visually guided foragers, the ability to see the beak—and how much of the beak can be seen—varies predictably with foraging habits. For example, fish- and insect-eating specialists can see more of their own beak than birds eating immobile food can. But in non-visually guided foragers, there is no consistent relationship between the beak and anterior blind area. I discuss different strategies—wide binocular fields, large eye movements, and long beaks—that minimize the potential negative effects of the anterior blind area. Overall, I argue that there is more to avian binocularity than meets the eye.

Sat-PM2-C-4

The Rare Northeast Fungi Challenge: Results of a Three-Year Effort

Rick Van de Poll (Northeast Mycological Federation and FunDiS, Sandwich, NH) and Gabriela D'Elia (Fungal Diversity Survey, Zena, NY)

Abstract - The Conservation Committee of the Fungal Diversity Survey (FunDiS) accepted a proposal to support the Rare 20 Northeast Fungi Challenge in 2020, and by June 2021, an iNaturalist project was launched. This project has sought observations of 20 demonstrably rare macro-fungi that were known to occur from Newfoundland to central Ontario and south to Pennsylvania and New Jersey. Whereas all 20 species have been recorded in 1 or more states or provinces since the late 1800s, only 14 species were observed during the 3-year survey. A total of 68 observations were recorded, with a finding that nearly all species continue to be verifiably rare. This talk will present the results and discuss population trends and condition-assessment data that supports the red-listing of these species in the IUCN database, as well as the possible listing by state natural heritage programs for tracking as a part of the species of greatest conservation need (SGCN) list.

Sat-PM1-C-3

Panel Discussion: Conserving Fungi in the Northeast—Where Do We Go From Here?

Rick Van de Poll (Northeast Mycological Federation & FunDiS, Sandwich, NH). **Jess Yepeth Perla Rubin** (UVM, Burlington, VT), **Dave Muska** (North Branch EE Center, Montpelier, VT), **Gabriela D'Elia** (Fungal Diversity Survey, Zena, NY), and **Hannah Huber** (Pennsylvania Natural Heritage Program, Harrisburg, PA)

Abstract - The conservation of fungi in Northeast North America will require a coordinated effort between professional mycologists, university fungaria, DNA sequencing labs, and citizen scientists. In spite of over 200 years of collecting and vouchering fungi in North America, very little is known about this remarkably diverse kingdom. The ±150 years of active collecting by mycologists has provided a substantial baseline against which we can access and use modern observational records to determine trends and assess population threats among the >4000 species. But how can each state engender this type of inventory and assessment effort with limited resources? What steps can state natural heritage and endangered species programs take to begin this process? This panel will provide some different perspectives and ideas for initiating fungal conservation work using several examples in Vermont, Pennsylvania, New Hampshire, and elsewhere.

Sat-PM1-C-4

Long-term Monitoring of Fungi on Forever-Wild Conservation Land

Rick Van de Poll (Ecosystem Management Consultants, Sandwich, NH), Eric Bailey (Northeast Wilderness Trust, Montpelier, VT), and Shelby Perry (Northeast Wilderness Trust, Montpelier, VT)

Abstract - One of the curious things about fungi is that they are largely invisible. In fact, certain species of mushrooms are known to "disappear" for years if not decades at a time and then magically reappear. How does one sample for these types of ephemeral, and sometimes evanescent organisms? One of the best ways to ascertain species richness in a given area is to go where there has been little to no human disturbance in the past. This talk will focus on 3 separate studies of fungi at forever-wild conservation sites in the Northeast where fungi were a part of ongoing studies of ecological richness. Methods, results, and take-away lessons will be reviewed.

Sun-AM2-C-1

Using New Genotyping Methods to Understand Northeastern Canids

Bridgett vonHoldt (Evolutionary Genomics and Epigenetics, Princeton University, Princeton, NJ)

Abstract - With high-throughput sequencing we can now develop and implement—at a relatively reduced cost—custom noninvasive genotyping panels, referred to as genotyping-in-thousands sequencing (GTseq) for population monitoring. Based on DNA extracted from scat samples, a tailored GTseq panel has the power to reliably and consistently identify and sex individuals, determine relatedness and ancestry, assess population structure, and track functional traits like disease susceptibility. Great Lakes and Ontario wolves have been identified in the Northeast, sparking the need for a systematic, consistent tool for monitoring wolf population expansion in the region. This is complicated by historic and contemporary hybridization among *Canis lupus* (Gray Wolf), *C. lycaon* (Eastern Wolf), and *C. latrans* (Coyote), resulting in a unique resident Coyote population. Hybrids and admixed individuals represent a rich spectrum of phenotypic and behavioral variation that challenges species identification. Genetic researchers are partnering with Working Dogs for Conservation (WD4C) to build capacity for efficient and effective field-based collection and analysis of scat from northeastern canids. The integration of genetics will help with the confident resolution of species present in the region, their genetic ancestry, and their evolutionary relationships.

Sun-PM2-D-1

Ecology and Ecophysiology of Dryopteris Hybrids

James E. Watkins (Colgate University, Hamilton NY) and Jennifer Blake-Mahmud (Hope College, Holland MI)

Abstract - Hybridization is a widespread phenomenon in plants. The genetic consequences of genome duplication are complex and we have a limited understanding of how hybrid fern offspring differ in ecology relative to their parents. Here we examine the ecology and ecophysiology of diploid, triploid, and tetraploid ferns and evaluate the extent of shared niche space across taxa, focusing on hybrids and their parents. We examined 5 hybrid woodfern species in the genus *Dryopteris* and investigated the comparative ecophysiology of these taxa across light and wetness gradients. We selected 2 triploids, their tetraploid parents, and a single shared diploid parent. We sampled several populations for ecological characteristics, abundance, relative frequency, photosynthetic parameters, and hydraulic conductance. We found that triploids varied in habitat space relative to their parents. In the case of *D.* x *bootii*, this hybrid was more similar to its tetraploid parent whereas *D.* x *triploidea* was more similar to its diploid parent. In both cases, the triploid's photosynthetic rate was intermediate to that of its parents. Xylem-specific hydraulic conductance of the triploid *D.* x *bootii* was significantly higher than its diploid parent whereas there was no difference in *D.* x *triploidea*. Our results indicate that related triploids, diploids, and tetraploids have substantial overlap in morphological and physiological niche space and that the high relative frequency and ecological behavior of sterile triploids may result in competition with their parents when they co-occur.

Sat-PM2-A-2

Long-term Monitoring After Management: 15-year Response of a Rare Plant to Experimental Canopy Gaps in a Forested Fen

Justine B. Weber (Colgate University, Hamilton, NY) and Sara E. Scanga (Utica University, Utica, NY)

Abstract - Despite its clear importance to conservation success, long-term monitoring is uncommon in conservation research. *Trollius laxus* (Spreading Globeflower; Ranunculaceae) is a globally rare plant with limited distribution in the eastern US but is locally abundant in some fen habitats. Few management efforts have been directed toward its persistence. To observe the effects of light and canopy gaps on forested fen populations of *T. laxus*, we created 11 experimental canopy gaps, each paired with a forested control plot, at Nelson Swamp Unique Area (NSUA) in Madison County, NY, in 2002 (n = 6) and 2003 (n = 5). In the first 5 years after gap creation, flower and stem production in the experimental gaps first increased then declined, but remained higher than production in the paired control plots. We revisited these plots 15 years after experimental treatment, in summer 2018, to evaluate their response to gap creation over the longer term. After 15 years, *T. laxus* stem and flower production remained higher in the experimental gaps than in the control plots. In addition, experimental gaps retained significantly higher ground-layer vegetation biomass, percent cover, and average height, and gained more tree basal area. These results suggest that canopy-gap creation causes short-term increases in *T. laxus* vigor but competitive and successional dynamics may limit future *T. laxus* vigor without recurring gap creation. This study demonstrates the importance of long-term monitoring after management intervention, to best ensure the persistence of rare plants.

Sat-AM2-A-4

Stories Behind the Updates: A Continued Accounting of the Vascular Flora of New York State

D**avid Werier** (Werier Botanical and Ecological Consulting, Willseyville, NY)

Abstract - In 2017, I published the Catalogue of the Vascular Plants of New York State (NY). This is a vouchered list of the vascular plants that occur outside of cultivation (i.e., the wild plants) in NY. Since that time, numerous colleagues and I have conducted focused as well as casual field, herbarium, and literature research that has helped to refine our understanding of the wild vascular plants that occur in the state. We documented native taxa that were previously overlooked, nonnatives taxa, some of which were previously overlooked but others that may have newly arrived in the state, and determined that some previously reported taxa were mistakes. In the past 7 years, not counting differences in taxonomy, we documented about 112 additional minimum rank taxa (species, extra infraspecific taxa, and hybrids; 16 per year), including about 13 native and 51 naturalized nonnative, non-hybrid species. We have also added about 5 species to the excluded list. We made these updates via chance encounters, targeted searches, and in-depth study. I will share some stories to help elucidate the varied ways in which these updates have been realized.

Sat-PM1-A-2

Plant Species of Acidic Graminoid Fens for Cranberry Bog Restorations in Massachusetts

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

Abstract - Cranberry-bog restorations in Massachusetts are going full speed ahead, with millions of dollars in restoration funds and multiple projects under way. Will these restorations result in low-diversity shrub swamps, *Acer rubrum* (Red Maple) swamps, or *Chamaecyparis thyoides* (Atlantic White Cedar) bogs? I'll explore the potential to keep some areas of species-rich open graminoid fens, with a discussion and photos of various rare and common species of this natural community, as well as indicate which invasives to watch for. Other types of wetland restorations could benefit from considering these as well. Included will be an illustration of how to use iNaturalist to teach others to identify these species.

Sat-AM1-A-2

New and Interesting Rare Plant Discoveries in Massachusetts in 2023

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

Abstract - Despite being one of the most intensively botanized states in the US, Massachusetts is home to new and surprising discoveries of native plant populations every year; 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.

Sun-AM2-D-4

Sandplain Grasslands of the Northeast, A Quick Tour, And Guide to the Sandplain Grassland Network

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

Abstract - Sandplain grasslands and heathlands are unique, treeless ecosystems in the Northeast. As with similar grasslands across the United States, the extent and quality of these ecosystems has greatly diminished over recent decades, with only a few thousand acres remaining in New York, Massachusetts, and Maine. This habitat is critical for plant and animal species, from Harriers and Short-eared Owls to many state and federally endangered plants, some of which are globally rare. A preliminary analysis found that in Massachusetts alone, sandplain grassland and heathland natural communities host 76 rare vascular plant species, nearly 30% of the 259 state-listed endangered, threatened, and special concern plant species in the state. I'll provide a visual tour of key sites as well as discuss the Sandplain Grassland Network, whose focus is on the conservation and management of these key sites.

Sat-PM2-A-4

A Year in the Life of Skunk Cabbage (*Symplocarpus foetidus*, Araceae)

Steve Young (Botany Visible Niskayuna, NY)

Abstract - *Symplocarpus foetidus* (Skunk Cabbage) is the first wildflower to bloom each year, sometimes as early as January in some parts of the Northeast. I followed a grove of Skunk Cabbage in a swamp in Schenectady County, NY, for 4 years and recorded the flowering, leaf production, and fruiting of the plants over the course of each year. I discovered many aspects of the plant that I had not seen before and made some new discoveries that may surprise you.

Sat-AM2-A-5

How Certain Marine Phytoplankton Species Are Being Affected by Ocean Acidification Along the US Northeast Coast

Joseph D. Zeno (University of Maine, Orono, ME; Columbia University, New York, NY), Joaquim Goes (Columbia University, New York, NY), and Helga Gomes (Columbia University, New York, NY)

Abstract - Earth's oceans serve as a large reservoir where atmospheric carbon dioxide is absorbed and stored. In modern years, fossil fuel emissions have caused a large influx of CO_2 into the atmosphere and thus it is being absorbed into the oceans causing ocean acidification. This phenomenon has vast negative impacts, especially on the most abundant organism in the ocean—phytoplankton. Using data from a cruise in 2018, a prominent pH gradient has been mapped along the east coast of the US, with northeastern waters being more acidic. It is the purpose of our research to investigate how certain phytoplankton species are responding to this pH gradient and changes in their nutrient supplies. We chose 4 different species of phytoplankton from the Long Island Sound and are currently testing them in varying concentrations of CO_2 (280 ppm, 400 ppm, and 800 ppm) to mimic the pre-industrial, modern, and future CO_2 levels, respectively, of the Atlantic ocean. With the results of this experiment, it's evident that the diatom taxa is performing best at 280 ppm and 400 ppm, as their unique carbon concentrating mechanisms allow them to outcompete other phytoplankton in low pCO_2 waters. Overall, this data suggests that the acidic, nutrient-rich, and low pCO_2 waters in the north favor diatom, coastal cyanobacteria, and cryptophyte populations.

Sun-PM2-A-3