2021 Northeast Natural History Conference Poster Abstracts

Listed in alphabetical order by first-listed presenter (names of presenters are in bold). Poster session in which the presentation was grouped appears just below each.

Variation in Song Repertoires of Males in Relation to Ancestry in a Chickadee Hybrid Zone

Ariana Abbrescia (Villanova University, Villanova, PA) and Robert Curry (Villanova University, Villanova, PA)

Abstract - Signals used in mate choice and competition for can deliver important information about the genetic quality of the sender, often serving as prezygotic barriers to hybridization. Our research aims to assess the extent to which song, as an acoustic mating signal, can reliably indicate a male's ancestry, as well as the ways in which signal learning can become muddled in hybrid zones. We analyzed data from 2016 to 2020 involving *Poecile atricapillus* (Black-capped Chickadee) and *P. carolinensis* (Carolina Chickadee) and their hybrids at Hawk Mountain, PA. Species-diagnostic SNP genotypes provided information about ancestry for each male, while autonomous acoustic recording units yielded samples of dawn chorus male repertoires mostly prior to incubation. The sample of males (n = 24) comprised 8.4% Black-capped Chickadees, 45.8% Carolina Chickadees, and 45.8% hybrids. Repertoires varied from only Black-capped Chickadee songs to a mixture of Black-capped and Carolina chickadee songs, sometimes including new, unique hybrid songs that did not fall under either category; no observed repertoires comprised solely Carolina chickadee songs. Song patterns did not actively reflect genetic identity in the hybrid zone: dawn song repertoire characteristics, in both song participation and repertoire composition, did not correlate with the proportion of Carolina Chickadee alleles. These findings support previous studies involving acoustic signaling in this chickadee hybrid zone, which have found that the genetic introgression of Carolina Chickadee alleles in the population does not coincide with a simultaneous cultural change in song repertoires towards Carolina Chickadee songs. Instead, Black-capped Chickadee songs can dominate the acoustic culture for years, even after Carolina Chickadee alleles become predominant as the hybrid zone moves northward. These findings support the hypothesis that learning environment, more so than ancestry, shapes song repertoires of individual chickadees, which could affect mating patterns and hybridization dynamics.

Poster Session: Song and Vocalizations in Birds

Comparison of Two NYC Water-quality Databases Obtained through the Government and a Citizen Science Group

David Albro (St. Francis College, Brooklyn, NY) and Kathleen Nolan (St. Francis College, Brooklyn, NY)

Abstract - The New York City Water Trails started its Citizens' Water Quality Testing Program (CWQTP) in 2011 in response to an unprecedented sewage leak from the North River Wastewater Treatment Facility in Manhattan. The program has grown and expanded through the years, and has continued to add sampling sites. St. Francis College was added as a sampling site in 2018. Despite the pandemic, the CSWQTP proceeded, albeit at less locations. The CSWQTP uses an USEPA-approved Enterolert system from IDEXX Laboratories that samples for enterococci, which can live and thrive in brackish as well as fresh water. The NYDEP uses a boat for sampling dissolved oxygen (DO), chlorphyll, clarity, nitrogen, and salinity as well as bacteria. This study will be a comparison between the CSWQ program and the NYC Department of Environmental Protection (NYDEP) sampling program in terms of methods used, variables measured, and values reported for specific sites.

Poster Session: Human Impacts and Urban Ecology

Using Nanotag Technology to Identify Landscape-scale Habitat Use of Multiple SGCN in New England

Todd Alleger (Willistown Conservation Trust/Northeast Motus Collaboration, Newtown Square, PA)

Abstract - The New Hampshire Fish and Game Department is leading a collaboration of 4 state wildlife agencies and 5 non-governmental organizations in employing automated radio telemetry technology (Motus Wildlife Tracking System [WTS]) to document the regional movements of species of greatest conservation need (SGCN). Working in 2021 and 2022, an array of 50 strategically sited automated telemetry receiver stations will be established throughout inland New England, closing a major geographic gap in the current Motus WTS and complementing previous and current partner efforts underway in the mid-Atlantic states. Research collaborators will use nanotag transmitters to study post-breeding dispersal, migratory routes and timing, and stopover behavior of *Falco sparverius* (American Kestrel) and *Danaus plexippus* (Monarch Butterfly), both of which are regional- and state-level SGCN. Receiver stations will be sited to serve these field projects and provide maximum coverage of recognized and potential flyways within the region in order to maximize detection of other nanotagged SGCN moving through the region. The project also will include evaluation of various receiving-station components to determine maximum effectiveness in preparation for full project implementation and routine maintenance for existing receiving stations within the region.

Poster Session: Using Trail Cameras and Other Technolgy to Document

Influence of Spring and Summer Rainfall on Breeding Populations of Lark Buntings in Colorado

Dylan Allenback (Colorado State University – Pueblo, Pueblo, CO), **Diego Duran** (Colorado State University – Pueblo, Pueblo, CO), **Elise Lokey** (Colorado State University – Pueblo, Pueblo, CO), and Claire Varian Ramos (Colorado State University – Pueblo, Pueblo, CO)

Abstract - Recent studies have revealed that many species of North American birds have been in sharp decline in recent years. One of these declining birds is the Colorado State Bird, *Calamospiza melanocorys* (Lark Bunting). Anecdotal evidence suggests that Lark Bunting populations and breeding success in a particular location are influenced by the amount of precipitation that the area gets. Recent studies have also shown how low amounts of precipitation can affect breeding behavior of Lark Buntings, and climate change is predicted to lead to more frequent and more severe drought in Colorado, which may be a possible explanation for the steady decline observed in populations. Lark Buntings are considered a nomadic species and may choose locations to breed based on yearly variation in spring and summer rainfall. In this study, we combined 52 (1967–2019) years of publicly available information on yearly Lark Bunting abundance from the Breeding Bird Survey and rainfall data from the National Weather Service to investigate how variation in spring and summer rainfall may impact Lark Bunting abundance in Colorado. Our results suggest that higher rainfall in April and May is correlated with higher Lark Bunting breeding populations. These results may assist in understanding how drought caused by climate change may influence the distribution and success of Lark Buntings in a rapidly changing world.

Poster Session: Avian Population Biology

The Challenge of Anthropogenic Noise to Songbird Communication

Oshane Annon (Saint Peter's University, Jersey City, NJ), **Xiomara Nunez** (Saint Peter's University, Jersey City, NJ), and Katherine S. Wydner (Saint Peter's University, Jersey City, NJ)

Abstract - Anthropogenic noise, which is widespread in urban and suburban locations, is a sensory pollutant that presents a significant impediment to the efforts of birds to communicate. Noise from sources such as roadway traffic, airplanes, construction equipment, and landscaping equipment interrupts the flow of information between a sender and receiver with survival and fitness consequences. Songbirds' vocalizations (songs, calls) are essential for purposes such as courtship, establishing territories, warning of predators, and maintaining contact between family members. A number of studies have presented evidence that birds in noisy environments alter the frequency (pitch) of their songs and calls to rise above the generally lower pitch of anthropogenic noise sources. We review selected previous studies and present our own preliminary data obtained from urban, suburban, and rural areas of northern New Jersey. Our aim is to test the hypothesis that songbirds change their vocal behavior in environments with high levels of anthropogenic noise. We processed recordings of bird vocalizations made with professional sound-recording equipment using Raven software to generate and analyze spectrograms of selected bird species from a range of urban, suburban, and rural habitats. We used a sound-level meter to measure real-time noise levels at locations where recordings were made. Since widespread reductions in human activity and noise due to COVID-19 shutdowns altered the soundscape at many locations over the past year, it will be interesting in future studies to compare whether the vocalizations of birds have changed in response.

Poster Session: Urbanization and Human Presence—Effects on Birds

The Impact of Host Diversity on *Ranavirus* Prevalence in Vermont Amphibian Communities

Lauren V. Ash (University of Vermont, Burlington, VT) and Nicholas J. Gotelli (University of Vermont, Burlington, VT)

Abstract - In disease systems, the dilution effect predicts that an increase in host species richness will lead to a decrease in pathogen prevalence because the number of competent hosts decreases as more species are added. Ranaviruses are deadly amphibian pathogens that provide a good test for the dilution effect because they differentially infect a large number of amphibian host species. We sampled 31 Vermont wetland amphibian assemblages from 2016 to 2019, collecting a tissue sample from every amphibian species encountered in any life stage. We extracted and amplified viral DNA a from over 2000 samples across the 4 sampling years and tested for the presence and amount of *Ranavirus* using quantitative PCR. Contrary to our expectations, the amphibian communities did not exhibit the dilution effect and instead demonstrated an overall "amplification effect": in all 4 years of sampling, there was a positive relationship between amphibian species diversity (species richness and evenness) and *Ranavirus* prevalence. *Pseudacris crucifer* (Spring Peeper) had the highest *Ranavirus* prevalence and its abundance was positively associated with total site prevalence. *Notopthalmus viridescens* (Eastern Newt) and *Lithobates clamitans* (Green Frog) exhibited a dilution effect within their own populations, but it was not strong enough to diminish the overall positive relationship between prevalence and host diversity. The amplification effect caused by a few high-prevalence hosts likely increases the abundance of inoculum sources, which may override any potential negative effect of adding less competent hosts.

Poster Session: Herpetology

Influence of Elevation on Canada Warbler Population Dynamics in the Central Appalachian Mountains

Stephanie H. Augustine (West Virginia University, Morgantown, WV) and Christopher T. Rota (West Virginia University, Morgantown, WV)

Abstract - *Cardellina canadensis* (Canada Warbler) is a Nearctic-Neotropical migratory songbird that has exhibited apparent declines in abundance over recent decades. This species occupies a wide variety of environmental conditions throughout their range but lack substantial data regarding elements driving variation in demography and the strength of population migratory connectivity. The aim of this research is to (1) determine the relationship between demography and environmental conditions along an elevation gradient and (2) ascertain migratory route and wintering locations of a population of *C. canadensis* breeding in the central Appalachian Mountains. Our research takes place at 6 study sites spanning an ~130-km north–south gradient within the Monongahela National Forest, WV, varying in elevation from 526 to 1282 m. We will estimate apparent survival with a 3-year mark–recapture study; in 2019, we marked 104 birds, of which 33 were observed in 2020. We also marked an additional 107 birds in 2020, and we will re-sight banded birds again in 2021. We will model survival as a function of elevation and additional environmental variables, which will elucidate the region-specific habitat–demography relationship. To determine migration strategies, we deployed 32 adult males with light-level geolocator tags in 2020 and will retrieve tags from returned individuals in 2021. By tracking the individuals in this population, we will establish a baseline for full annual-cycle modeling of this species for the future. This presentation will include results from the first 2 field seasons of the project.

Poster Session: Avian Population Biology

The Influence of Temperature on the First Egg Laying Date in Three Cavity-nesting Songbirds

Andrew P Bosche (Biology, Kutztown University, Kutztown, PA) and Todd J Underwood (Biology, Kutztown University, Kutztown, PA)

Abstract - Several species of birds have been found to lay their eggs earlier in spring due to rising temperatures. These trends have been documented on a large geographic scale across North America and at select local sites. We determined whether temperature and any changes in temperature over 2008–2019 have influenced egg-laying dates of 3 species of cavity-nesting songbirds, *Tachycineta bicolor* (Tree Swallow), *Troglodytes aedon* (House Wren), and *Sialia sialia* (Eastern Bluebird), on a local scale in Kutztown, Berks County, PA. We found that average first egg-laying dates of Tree Swallows and Eastern Bluebirds were significantly related to the average monthly temperature of the month they begin nesting, with eggs laid earlier in years with warmer average temperatures. However, we found no significant trends in temperature or egg-laying dates of these 3 species over the 12 years of this study. These results suggest that 2 common songbirds have the potential to be influenced by climate change because their egg-laying dates are directly related to average spring temperature. Further years of nest monitoring are needed to fully evaluate the potential effects of climate change on the breeding biology of these cavity-nesting birds in Berks County, PA, because climate-related trends are difficult to detect over such a relatively short time period.

Poster Session: Breeding and Nesting Biology of Birds

Social-network Structure in Winter Flocks Involving Chickadees and Titmice in New York

Margaret N. Boyle (Villanova University, Villanova, PA), David N. Bonter (Cornell Lab of Ornithology, Ithaca, NY), and Robert L. Curry (Villanova University, Villanova, PA)

Abstract - In the winter season, passerines form mixed-species flocks. Previous studies have focused on the importance of analyzing social structures within these flocks, including European flock systems with *Cyanistes caeruleu*s (Eurasian Blue Tit) and *Parus major* (Great Tit). In the northeastern United States, 2 nuclear species, *Poecile atricapillus* (Black-capped Chickadee [BCCH]) and *Baeolophus bicolor* (Tufted Titmouse [TUTI]), interact at feeders; however, no previous study has investigated the interactions between the 2 species or how said interactions can affect the social structure. This will be the first study to investigate the social network of Tufted Titmice and Black-capped Chickadees. We used radio-frequency identification (RFID) methods to monitor visits during the nonbreeding season to feeding stations in Ithaca, NY, between 2009 and 2012 by birds marked with passive integrated transponder (PIT) tags. The dataset comprised 507,830 visits by 138 Black-capped Chickadees and 271,999 visits by 36 Tufted Titmice. We constructed social networks from these visitation data to investigate flock composition of the 2 species. Although both species co-occur in geographically similar networks, community analysis suggests that Tufted Titmice are more central than Black-capped Chickadees; both the former and latter appear to be more tightly connected to conspecifics than to heterospecifics beyond co-occurrence in larger flocks across separate feeder locations. Network separation may reflect responses by Black-capped Chickadees to aggression from dominant Tufted Titmice. Investigating the relationships between 2 interacting species may help us understand the dynamics between them; Tufted Titmouse aggression may constrain Black-capped Chickadee foraging opportunities, yet Black-capped Chickadees may benefit by gaining information from Tufted Titmice.

Poster Session: Avian Behavior and Parental Care

Energetic Condition and Refueling in Two Species of Thrushes at a Fall Stopover Site on Lake Ontario

Alexandra Bros (School of Life Sciences, Rochester Institute of Technology, Rochester, NY) and Susan Smith Pagano (School of Life Sciences, Rochester Institute of Technology, Rochester, NY)

Abstract - Long-distance migratory passerines embark on extraordinary journeys between breeding and wintering grounds each year, and this energetically expensive migratory behavior requires substantial preparation in the form of fat deposition. Small songbirds, like thrushes, require frequent stops to rest and refuel along their route. The habitats near the south shore of Lake Ontario serve as an important site for birds in both spring and fall. Landscape and stopover sites have likely changed over the years by means of anthropogenic factors, including introduction of invasive species and possibly destruction of suitable stopover sites, making this trip even more risky for these populations. Introduction of invasive plants may also impact the diet of the birds during fall migration, depending on the nutritional value of the introduced species. We analyzed thrushes at the Braddock Bay Bird Observatory in upstate New York during their fall-migration stopovers. We captured, banded, and took blood samples from *Catharus ustulatus* (Swainson's Thrush) and *C. guttatus* (Hermit Thrush). We performed plasma metabolite assays to measure concentrations of triglyceride, an indicator of fat deposition, in recent seasons to assess variation in stopover refueling at this site. Changes in metabolite concentrations over time may correlate with a change in the habitats required by these birds, which can impact the migrants' ability to refuel and continue migration.

Poster Session: Avian Migration

Transitioning Field Ecology Courses to Remote Instruction

Emma Brown (University of Rhode Island, Kingston, RI)

Abstract - I have undertaken an analysis of online instruction of hands-on plant identification skills to statistically determine the most effective teaching techniques utilized in plant materials courses during the COVID-19 pandemic, an adaptation in response to global safety precautions. I distributed a survey to professors and students of botany, biology, ecology, and environmental science disciplines. I will use Likert scale and matrix table comparisons to evaluate the methods used. I expect the results to shed light on optimizing the instruction process in the digital age to best accommodate student needs, and to inform future teaching and learning strategies across the natural sciences.

Poster Session: Science Education

Eye Morphology and Activity Pattern in *Ammospiza* Sparrows

Miles Buddy (University of North Carolina – Wilmington, Wilmington, NC), Raymond Danner (University of North Carolina – Wilmington, Wilmington, NC), and Carol Plautz (University of North Carolina – Wilmington, Wilmington, NC)

Abstract - Although birds live highly audiovisual lives, relying on well-developed eyesight for foraging, flight, and mating signals, many eyesight-dependent behaviors in birds remain understudied. For example, *Ammospiza* sparrows are secretive and globally threatened birds native to the marshes of eastern and central North America. Recent radiotelemetry studies suggest that *Ammospiza maritima* (Seaside Sparrow [SESP]) and *Ammospiza caudacatus* (Saltmarsh Sparrow [SALS]) are more likely to forage after dusk than other Passerellidae (New World sparrows). Here, we propose a method for the study of eye morphology and allometry as it relates to activity pattern within the *Ammospiza* genus. W recorded preliminary corneal diameter measurements and allometry data from live *Ammospiza nelsoni* (Nelson's Sparrow [NESP]), as well as SESP and SALS. We determined mean corneal diameter measurements for all 3 species. Additionally, we compared eye measurements of various bird species from several families using the nocturnal *Bubo virginianus* (Great Horned Owl) as a test group. By dissecting the eyes of these birds, we searched for a reflective tapetum lucidum and obtained accurate lens diameter and corneal diameter measurements. Our findings on whether any tested allometric measure of eye size relates to activity pattern were inconclusive, but the concept of lens size as a predictor of activity pattern warrants further investigation. We intend to compare the relative abilities of lens diameter and corneal diameter to predict nocturnal activity patterns in birds. We predict that due to their observed activity, *Ammospiza* sparrows will show eye morphology more consistent with a nocturnal or crepuscular activity pattern as compared to other Passerellidae.

Poster Session: Avian Morphology and Physiology

Benthic Macroinfauna Community Composition in a Partially Restored Back-barrier Salt Marsh Lagoon on Cape Cod National Seashore, MA

Megan Cahill (Antioch University New England, Keene, NH), Rachel Thiet (Antioch University New England, Keene, NH), Sophia Fox (National Park Service, Cape Cod National Seashore, Wellfleet, MA), Sarah Towne (National Park Service, Cape Cod National Seashore, Wellfleet, MA), and Kelly Medeiros (National Park Service, Cape Cod National Seashore, Wellfleet, MA)

Abstract - East Harbor is a back-barrier salt marsh lagoon in North Truro, MA that was partially restored by Cape Cod National Seashore in 2002 after being isolated from tidal flow for over 100 years. Impoundment in 1868 reduced salinity in East Harbor to near-freshwater conditions, resulting in extirpation of native salt marsh biota. Tidal flow was partially restored by opening a culvert connecting the southeast basin of the system (Moon Pond) to Cape Cod Bay. Numerous mollusk species colonized East Harbor within 2 years of partial restoration; however, the system also experienced several extreme and deleterious events, including severe fluctuations in nutrient load, water temperature, benthic infauna abundance, and macroalgae blooms. Since then, regular benthic sampling has identified a fairly diverse shellfish assemblage that has become more homogenous across the system, but which still varies considerably from year to year. Here we present results from our sampling of benthic macrofauna in 2018. That year, we collected benthic macroinfauna samples throughout East Harbor during spring (n = 18), summer (n = 50), and fall (n = 19) using a Ponar grab. We collected 3 replicate samples at each sample point, each season. Samples were stained with rose bengal and stored in 70% ethanol until we manually separated invertebrates (>1 mm) from the sediment and identified them to the lowest possible taxon. The data presented here represent more than 30,000 molluscan and gastropod specimens collected from 47 of the points sampled in summer and all 19 points sampled in fall. Our findings demonstrate diverse and robust molluscan and gastropod community assemblage throughout all 3 sub-basins of East Harbor, dominated by *Gemma gemma* (Amethyst Gem Clam), commercially and recreationally valuable *Mya arenaria* (Soft-shell Clam) and *Mercenaria mercenaria* (Quahog), and the macroalgal grazer *Ilyanassa obsoleta* (Eastern Mud Snail). Our results suggest that the system is finally experiencing greater equilibrium and resembling a less-degraded salt marsh. This conclusion is supported by our observations of the development of a more complex estuarine food-web at the site, which includes estuarine predators such as *Carcinus maenas* (European Green Crab), *Limulus polyphemus* (Atlantic Horseshoe Crab), and *Euspira heros* (Northern Moon Snail).

Poster Session: Marine and Coastal Ecology

Exploring Object Neophobia in Wild Nesting House Wrens

Mariana E. Carro (INIBIOMA-CONICET-UNCOMA, San Martín de los Andes, Neuquén, Argentina) and Gustavo J. Fernández, (INIBIOMA-CONICET-UNCOMA, San Martín de los Andes, Neuquén, argntina)

Abstract -Neophobia is an aversive behavior towards novel objects or places. Many animals show some degree of aversion to novelty, and neophobia can shape their responses to the environment. Here, we examined the individual variation in the response of nesting *Troglodytes aedon bonariae* (House Wren) to a novel object, and assessed the relationship of these responses with the individual aggressiveness and the risk-taking responses when there was a potential threat near the nest. Also, we evaluated the effect of age, body size, and condition on the responses of individuals. The study was conducted in General Lavalle, Buenos Aires province, Argentina, during the 2014 and 2015 breeding seasons (September–January). A total of 17 breeding pairs were tested. The individuals used in these experiments were captured, banded (those that were not previously marked), and weighed and we measured their tarsus. We used playback experiments to characterize the aggressive response of males and exposed the nests to a threat during egg-laying to assess the aggressive response of females. During the nestling-rearing period, when nestlings were 10-days old, we placed a piece of white paper around the entrance of the nest. We measured the latency to enter of both males and females as a measure of avoidance to the novel object. The response to a potential risk near the nest was measured as the latency to enter the nest of males and females when an observer was positioned 10 m from the nest. Males and females differed in their response to the novel object. The response of males was positively related to their response to a threat to the nest. In addition, individuals with larger body sizes have shorter latency to enter the nest in presence of the novel object. The response of females was mostly explained by the age of the individuals, as older females are less likely to explore the novel object. The results show that neophobia seems to respond not only to individual characteristics but may also be influenced by life-history strategies, responding to the relative costs and benefits for each sex.

Poster Session: Avian Behavior and Parental Care

Diet Composition of Hudsonian Godwit in a Coastal Wetland of Patagonia Argentina

Joanna M. Castillo (Universidad Nacional de Mar del Plata, Instituto de Diversidad y Evolución Austral - CONICET, Puerto Madryn, Argentina), Luis O. Bala (Instituto de Diversidad y Evolución Austral - CONICET, Puerto Madryn, Argentina), and Rodolfo Elías (Instituto de Investigaciones Marinas y Costeras, Universidad Nacional de Mar del Plata - CONICET, Mar del Plata, Argentina)

Abstract - Understanding the dietary requirements in stopover and wintering areas is a key to conservation of shorebirds and their habitats. One of the most emblematic American shorebirds is the *Limosa haemastica* (Hudsonian Godwit). This species breeds in the Artic and spends non-breeding periods in different sites of South America. The Patagonian wetlands within the Atlantic coast offer an important feeding area for many shorebird species. We determined the dietary composition of Godwit by analysis of fecal samples collected on different dates during 2018 and 2019 in Caleta Malaspina, Patagonia, Argentina.We identified prey items to the lowest taxonomic level possible through the analysis of remnants. We calculated the prey occurrence frequency and performed comparisons with a multivariate analysis of similarities (ANOSIM). Although the taxonomic composition showed slight variations among dates, the Hudsonian Godwit consumes mainly polychaetes, especially those of Neredidae, Orbiniidae and Onuphidae families. Also, the Hudsonian Godwit consumes in lower frequencies small clams and intertidal fishes. These results are the first records of diet composition of the Hudsonian Godwit in the area, and are coincident with diet records from other stopover and wintering sites.

Poster Session: Avian Diets and Habitat

Fire at the Flat Rock: Wildlife Response to Wildfire in a Northern New York Jack Pine Barrens

Hannah Cave (SUNY Plattsburgh, Plattsburgh, NY), Taylor Peet (SUNY Plattsburgh, Plattsburgh, NY), Tristan Jaeger (SUNY Plattsburgh, Plattsburgh, NY), Matthew Adams (SUNY Plattsburgh, Plattsburgh, NY), Lloyd Staats (SUNY Plattsburgh, Plattsburgh, NY), Danielle Garneau (SUNY Plattsburgh, Plattsburgh, NY), and Mark R. Lesser (SUNY Plattsburgh, Plattsburgh, NY)

Abstract - Natural disturbances are an integral part of forested ecosystem function and successional pathways. In many forested ecosystems, wildfires are a disturbance critical to shaping composition and structure, which in turn has major implications on wildlife usage and behavior. The Altona Flat Rock is a ~2000-ha sandstone pavement *Pinus banksiana (*Jack Pine) barrens located in northern New York. The pine barrens consists of a Jack Pine overstory and a dense understory of primarily *Vaccinium angustifolium* (Lowbush Blueberry) and *Gaylussacia baccata* (Huckleberry), and represents a unique habitat nested within a northern hardwood-dominated landscape. In July 2018, a wildfire burned 225 ha of the pine barrens, thereby presenting the opportunity to study how wildlife would respond to the immediate effects of disturbance and how that response would change through time as recovery progressed. We deployed game cameras from September 2018 to September 2020, as a non-invasive survey at 2 reference sites (unburned) and 2 disturbed sites (burned) within the Flat Rock. We analyzed total occurrences, and occurrences by season, to determine how usage differed between disturbed and reference conditions, and with time since disturbance. Additionally, for the most common predator, *Canis latrans* (Coyote), and prey, *Odocoileus virginianus* (White-tailed Deer) and *Lepus americanus* (Snowshoe Hare), species, we looked at daily activity patterns and overlap to determine how predator–prey relationships differed between conditions, and with time since disturbance. Over 730 days, a total of 1048 wildlife occurrences were captured, with 23 species recorded. Fifty-seven percent of all occurrences were at reference sites, with over 100 more occurrences than disturbed sites; however, differences were most pronounced immediately following the fire, and overall occurrences have grown more similar between the sites over time. Specifically, deer and hare were found more often at reference sites immediately following the fire, but shifted to using both conditions equally as understory vegetation recovery has increased forage and cover in the disturbed condition. Conversely, Coyotes initially spent more time in disturbed areas, perhaps due to increased sightlines, even though prey was scarcer. This study provides wildlife management guidance on use of and response to disturbance for this unique habitat.

Poster Session: Fire Ecology

Early Bird Gets the Worms: Prevalence and Intensity of *Syngamus trachea* in European Starling (*Sturnus vulgaris*) at Four airports in New Jersey and New York

Zhuoxue Chen (Department of Ecology and Evolution, Rutgers University-New Brunswick, NJ) and Suzanne C. Sukhdeo (Department of Ecology, Evolution, and Natural Resources, Rutgers University-New Brunswick, NJ)

Abstract - This study measured the prevalence and intensity of the nematode parasite, *Syngamus trachea* (Gapeworm) in *Sturnus vulgaris* (European Starlings) in New Jersey. Starlings were collected as part of the normal bird depredation effort to prevent bird/aircraft collisions by US Fish and Wildlife and Port Authority at 4 airports (Newark Liberty International Airport (EWR), Teterboro Airport (TEB), John F. Kennedy International Airport (JFK) and LaGuardia Airport (LGA)) in 2018 and 2019. A total of 370 and 403 Starlings were collected in 2018 and 2019, respectively, but monthly sample sizes among the 4 airports varied considerably. The starlings collected were all first-year fledglings with mean weight across all 4 airports of 65.01 ± 0.43 g in 2018 and 65.9 ± 0.40 g in 2019. Prevalence in 2018 varied from 0.25 to 0.48, with the highest at TEB. Prevalence in 2019 varied from 0.52 to 0.67, with the highest at LGA. Mean intensity in 2018 varied between 1.36 ± 0.10 and 2.19 ± 0.37, lowest at EWR and highest at JFK. Both prevalence and intensity were higher at all 4 airports in 2019 when compared to 2018. Between May and September in both years, prevalence and mean intensity generally trended downwards at the end of the summer. Such high prevalence and intensity of *S. trachea* in Starlings at urban settings in northeast Unites States have not been previously documented, and this pathogen can present an epizootic problem for small, backyard poultry producers.

Poster Session: Contaminants, Parasites, and Disease in Birds

Impact of Japanese Knotweed on Eastern Red-backed Salamanders and Macroinvertebrates

Rory Christian (Bronxville High School, Bronxville, NY), Justine McClellan (Bronxville High School, Bronxville, NY), and Stephen Kovari (Bronxville High School, Bronxville, NY; Vassar College, Poughkeepsie, NY)

Abstract - *Fallopia japonica* (Japanese Knotweed) is an invasive, perennial herbaceous plant that is native to eastern Asia and spreads primarily in riparian areas and fragmented edges of habitats. Japanese Knotweed can harm biodiversity by forming dense thickets of vegetation that outcompete native plants, negatively impact wetlands and riparian areas, and reduce native species groundcover. In other recent studies, amphibian species such as *Rana clamitans* (Green Frog) have suffered in riparian and wetland areas with knotweed. Japanese Knotweed invasions break down terrestrial habitat quality by reducing arthropod abundance, a critical food source. Like the Green Frog, *Plethodon cinereus* (Eastern Red-backed Salamander) also feeds on arthropods, meaning an abundance of knotweed may reduce habitat quality for salamanders. Studying the number of salamanders present at sites with and without Japaneses Knotweed might reveal how salamanders respond when in the presence of an invasive species. To examine the impact of the invasive plant species Japanese Knotweed on Eastern Red-backed Salamander abundance and macroinvertebrate species richness, we placed 9 plywood boards among and away from knotweed at 6 sites along the Bronx River in December of 2019. Between the winter of 2019 and the winter of 2020, we conducted little research due to disrupted sites and the coronavirus outbreak. In the spring of 2021, we will visit sites to measure the weight, length, and number of any salamanders under the boards. To collect data on macroinvertebrates, we will gather leaf litter from randomly selected 0.25-m plots within each site and calculate species richness and diversity. We will compare he number of macroinvertebrates and salamanders in the knotweed plots to those in the non-knotweed plots to examine if there is a correlation between salamander abundance and macroinvertebrate abundance. We expect a smaller number of salamanders and macroinvertebrates to be in the knotweed plots due to anticipated habitat breakdown.

Poster Session: Invasive Species

Broad-winged Hawks Overwintering in the Neotropics: Landscape Composition and Threats in Their Wintering Areas

Sandra Cuadros (Hawk Mountain Sanctuary, Orwigsburg, PA and Conservacción, Lima, Peru), Rebecca A. McCabe (Hawk Mountain Sanctuary, Orwigsburg, PA), Laurie Goodrich (Hawk Mountain Sanctuary, Orwigsburg, PA), and David Barber (Hawk Mountain Sanctuary, Orwigsburg, PA)

Abstract - *Buteo platypterus* (Broad-winged Hawk) is an obligate long-distance migrant that breeds in deciduous and mixed forests of North America and migrates to Neotropical regions to overwinter. Despite advances in understanding the breeding ecology and migration of this species, the overwintering period and associated threats remain understudied. We used telemetry data to quantify land-cover composition and threats during the overwintering period of 7 female Broad-winged Hawks affixed with Argos solar-powered transmitters between 2014 and 2018. Broad-winged Hawks in our study nested in Pennsylvania, USA, and overwintered in Colombia, Brazil, and Peru. Overwintering areas varied in size (average = 243.6 ± 101.2 km^2) and were composed of evergreen sub-montane forests, lowland non-flooded forests, and lowland flooded evergreen forest. In general, the loss of forest cover in all areas used by Broad-winged Hawks in our study did not exceed 10% of the total overwintering area used, suggesting Broad-winged Hawks may select wintering areas with little forest disturbance. Illegal mining was a common disturbance in areas used by Broad-winged Hawks overwintering in southern Peru, and forest fires were the prevalent disturbance in the overwintering area of Mato Grosso in western Brazil. These results provide the first analysis of land-cover composition and threats of Broad-winged Hawks during the overwintering period. Although more data are needed to determine specific habitat selection for this species, our study suggests large forested areas in the Neotropics are key to ensure the conservation of the Broad-winged Hawk during the overwintering period, an understudied stage of its annual cycle.

Poster Session: Avian Migration

Long Island Sound *Limulus polyphemus* (Horseshoe Crab) Density: What Happens When a Dominant Population Declines?

Natane Davis (Sacred Heart University, Fairfield, CT), **Ilona Farkas** (Sacred Heart University, Fairfield, CT), Jennifer H. Mattei (Sacred Heart University, Fairfield, CT), and Jo-Marie Kasinak (Sacred Heart University, Fairfield, CT)

Abstract - The *Limulus polyphemus* (Horseshoe Crab) population in Long Island Sound has been steadily declining over the past 4 decades, while the population in Delaware Bay remains plentiful. Habitat degradation and overharvest are the likely causes for the decline of this once dominant species. In 2006, the Connecticut Department of Energy and Environmental Protection set aside 3 spawning beaches as "no-harvest zones" in hopes that the spawning population would increase. Every spring since 2008, undergraduates from Sacred Heart University and citizen scientists (i.e., trained volunteers) count spawning Horseshoe Crabs on high-tide events during full and new moons in mid-May–June. Similar counts are also conducted in Delaware Bay where it has been reported that the annual spawning index (SI) fluctuates from 0.8 to 1.0 average spawning females/m^2/yr. The annual data collected from spawning sites across Connecticut beaches shows a very low SI (0.02 females/ m^2/yr) and it has remained low for the past 12 years. As a dominant species in estuarine habitats, high population abundance of spawning Horseshoe Crabs is crucial for maintaining high biodiversity and biomass. By comparing eBird data (a citizen science bird observation database) from beaches in Delaware to beaches in Connecticut and from our own observations, we have found that with declining numbers of Horseshoe Crabs, no shorebirds have been observed feeding on Horseshoe Crab eggs in Long Island Sound. The ecological role that Horseshoe Crabs play in beach and estuarine communities has been severely limited in Long Island Sound, and we are just now realizing the extent of that loss.We recommend that the management strategy of no-harvest zones needs to be expanded to all Connecticut spawning areas until the population levels increase.

Poster Session: Crab Population Biology

Distinguishing Between Invasive and Native *Phragmites australis* Haplotypes Using DNA Barcoding

Raena K. Davis (University of Saint Joseph, West Hartford, CT) and Michelle Kraczkowski (University of Saint Joseph, West Hartford, CT)

Abstract - The University of Saint Joseph has a uniquely rich and diverse campus, with about 1/3 of the campus considered wetlands; therefore, protecting these important habitats is of primary concern to the University's biology department and the surrounding communities. A species of *Phragmites* plants have been identified on the campus, but they are isolated in a specific area. Their isolated presence provides the opportunity for a precise removal or containment project, if needed. To determine if isolation is appropriate, the *Phragmites* that currently exist on campus must first be identified as either native or non-native haplotypes using genetic sequencing, or DNA barcoding. A project like this has not been attempted on the University's campus before, so it is possible that through barcoding, we may identify both species types for the *Phragmites* plant genus and implement the correct practices to contain the spread of invasive haplotypes or support the growth of the native haplotypes. With the accurate information, best management practices can be implemented, which can ultimately contribute to overall enrichment of species presence on campus in these important wetland habitats. If they are found to be of the non-native/invasive haplotype, removal would leave substantial room for other plant species (native or non-native) to thrive, but if they are native haplotypes, then removal is not warranted as they would add to the current species richness provided of plants on campus.

Poster Session: Invasives Management Techniques and Strategies

Effects of Burn Severity on Diversity of Arthropod Communities in Pinelands Ecosystems

Julia DeFeo (Rutgers University, Camden, NJ), John Dighton (Rutgers University, Camden, NJ), Angélica L. González (Rutgers University, Camden, NJ), Michael R. Gallagher (USDA Forest Service, Northern Research Station, Silas Little Experimental Forest, New Lisbon, NJ), and Alexis Everland (Tall Timbers Research Station, Tallahassee, FL)

Abstract - The role of ecological disturbance in shaping the structure and function of ecological communities is widely recognized but poorly understood across different functional groups, which can have contrasting responses to environmental change and stress. For soil- and ground-dwelling arthropods, fire events are known to cause local extinctions and subsequent rapid colonization by regional community members with high dispersal ability. This ongoing research study will characterize the effect of fire severity on the taxonomic and functional diversity of surface-dwelling arthropods in the New Jersey Pinelands, a high-disturbance ecosystem. Preliminary results indicate that taxonomic diversity peaks at moderate disturbance intensity, in accordance with Connell's Intermediate Disturbance Hypothesis. Additional analyses will include determination of body size, dispersal mode, and trophic guild for each genus. We hypothesize that moderate disturbance intensity will also correspond to peak functional richness via maximized dispersal ability and reduced competition, when compared to plots with low and high severity of fire.

Poster Session: Fire Ecology

Tweetspeak: An Interdisciplinary Experience in Ornithology and Digital Journalism for Undergraduates

Kerri Cornell Duerr (Westminster College, New Wilmington, PA) and Bradley Weaver (Westminster College, New Wilmington, PA)

Abstract - Communicating with digital media is important for disseminating scientific knowledge to the general public. Undergraduate students are often formally trained in either science or in digital production, but rarely in both. As part of a liberal-arts curriculum at a small, undergraduate college, we married 100-level courses in Ornithology and Digital Media Essentials to promote interdisciplinary learning. We called it "Tweetspeak" with the goal of teaching science and digital media literacy. Ornithology was a lab-based course that focused on basic bird biology, evolution, conservation, and the process of science. Through weekly field trips, students became citizen scientists studying species identification, adaptation to local habitats, and spring migration. Students of ornithology also became bloggers, using their smartphones to document and report their experiences with the world. The process of learning digital media essentials included best practices for photography and digiscoping, posting on social media, and shooting and editing videos on smartphone apps. All student-produced content connected back to the birding curriculum as students engaged in experiences that included interviewing, podcasting, and reporting on the environment and ornithology. Student productions appeared on Facebook, Twitter, Instagram, personal and college-owned websites, and our college-owned broadcasting network. Our interdisciplinary program is a unique approach to teaching science literacy and digital media literacy and can be applied broadly to other curriculums. Modifications of our platform could include travel or service-learning experiences.

Poster Session: Science Education

Variation in the Ability of Suburban Wetlands to Provide Habitat for Odonates

Jessica Dupont (Siena College, Dept. Environmental Studies and Sciences, Loudonville, NY) and Mary Beth Kolozsvary (Siena College, Dept. Environmental Studies and Sciences, Loudonville, NY)

Abstract - Wetlands are highly productive ecosystems that provide numerous benefits to humans (e.g., flood control, nutrient and sediment removal) and key habitat for a diversity of species. The diversity and extent of the benefits vary among wetlands and depend on specific characteristics such as wetland type, size, location in the watershed, connections to other water bodies (e.g., ground water, streams), and overall landscape setting. In urban areas with a high proportion of impermeable surface area, wetlands can be especially valuable for stormwater runoff and flood control. However, the extent of the value of urban or suburban wetlands for supporting biological diversity in human-dominated landscapes is less well understood. The objective of this study was to employ multiple sampling techniques to assess biological diversity of 6 wetlands on the suburban Siena College campus. We used aerial capture and dip-netting to document odonates (damselflies and dragonflies) species, supplemented with camera traps to document birds and mammals. Odonates were the primary target group as many species of odonates rely on wetland habitats for multiple life stages and are considered key bioindicators of ecosystem health. We sampled 6 sites twice a week, July through August 2019. Odonate species richness varied across the sites (min–max: 1–14), although most sites had similar species richness and shared many species. The exception was 1 forested site that had only 1 odonate species documented. Patterns observed could reflect differences in wetland type and habitat structure. Future work will determine if these patterns extend to other sites in a similar urban/suburban landscape.

Poster Session: Arthropod Ecology

Rebuilding of *Crassostrea virginica* (Eastern Oyster) Reefs to Restore Ecosystem Services

Joseph Eiden (Sacred Heart University, Fairfield, CT) and **Jamie Maresca** (Sacred Heart University, Fairfield, CT), Jennifer H. Mattei (Sacred Heart University, Fairfield, CT), Jo-Marie Kasinak (Sacred Heart University, Fairfield, CT), and LaTina Steele (Sacred Heart University, Fairfield, CT)

Abstract - *Crassostrea virginica* (Eastern Oyster), a foundational species, performs ecosystem services by filtering algae from the water column and is crucial for keeping our shorelines resilient with its reef-building capabilities. A complete loss of these services has occurred in the Northeast due to overharvest, human modification and destruction of coastal shoreline habitats, and the impacts of climate change. Recently, in 2014 and 2017, a living shoreline was installed along the western shore of the Housatonic River estuary in Stratford, CT. This ecological restoration included the installation of 338 cement Reef Balls® arranged in 5 segments, staggered between 23 and 46 m (75 and 150 ft) from the shoreline. Over 5 years, we performed annual counts in July of Eastern Oyster colonization of this artificial reef. No oysters were observed in 2016 due to an extremely cold winter when newly settled spat froze. The population growth of the Eastern Oysters over the course of 2017 to 2020 has increased from a total of 2647 to 49591. Additionally, we measured a subset of Eastern Oysters for size and growth in 2018 and 2020. The average height increased from 49.87 ± 19.89 (2018) mm to 64.11 ± 15.74 mm (2020). The oysters are growing in numbers and in size. The restoration of Eastern Oyster reefs allowed for offshore wave abatement, increased fine sediment deposition, and an increase in biodiversity in the surrounding community. Living shorelines provide resilience for our human coastal communities and restore the foundation species of our ecological communities by providing fish and wildlife habitat.

Poster Session: Marine and Coastal Ecology

Patterns of Change: Potential Effects of Land-cover Change on Raptor Species in the Great Basin Region

Alexandra G. Farrell (Department of Biology, Loyola Marymount University, Los Angeles, CA), Dylan J. Smith (Division of Biology, Kansas State University, Manhattan, KS), and Kristen M. Covino (Department of Biology, Loyola Marymount University, Los Angeles, CA)

Abstract - The effects of climate change can be seen from individual organisms to entire environmental landscapes. The Great Basin is home to a variety of avian species, but as climate change and urbanization continue, land-cover change in this region may put species at risk. We quantified the amount of land-cover change in the Great Basin region between 2001 and 2016. We then analyzed distribution data derived from the eBird database for 17 raptor species and identified each species' land-cover occurrence patterns. From this information, we highlight which raptor species are at greatest risk due to land-cover change in the Great Basin region. While many Great Basin raptors preferred land-cover types that are not dramatically changing in area, *Aquila chrysaetos* (Golden Eagle) and *Falco columbarius* (Merlin) are at risk because their preferred land-cover types of grasslands and coniferous forests are declining in total area. Additionally *Cathartes aura* (Turkey Vulture), *Circus hudsonius* (Northern Harrier), and *Falco lagopus* (Rough-legged Hawk) are at potential risk due to their preference for only low or limited amounts of urban and barren land cover, both of which are increasing in size. While the complexity of land-cover associations and preferences are nuanced, we identify clear patterns of risk and call for future research that uses both occurrence data for species along with landscape patterns of land-cover change.

Poster Session: Avian Diets and Habitat

First Record of an Adult Sharptail Mola in Massachusetts and Notes on Ocean Sunfish Strandings

Cory Farrelly (New England Coastal Wildlife Alliance, Middleboro, MA), Carol (Krill) Carson (New England Coastal Wildlife Alliance, Middleboro, MA), Katherine Bemis (NOAA National Systematics Laboratory, National Museum of Natural History, Smithsonian Institution, Washington, DC), Karsten Hartel (Harvard Museum of Comparative Zoology, Ichthyology, retired), and Andrew Williston (Harvard Museum of Comparative Zoology, Ichthyology)

Abstract - *Masturus lanceolatus* (Sharptail Mola) is a species of Molidae found circumglobally in tropical and temperate seas. The Sharptail Mola is poorly known, and most adult records from western North Atlantic occurrences are based on stranded individuals on beaches from North Carolina, Florida, and along the Gulf of Mexico. We describe a specimen from Cape Cod Bay that is the northernmost record of an adult Sharptail Mola in the western North Atlantic; only 1 other record from Massachusetts is known: a juvenile specimen collected in the late 1800s. On 11 October 2020, an adult Sharptail Mola was found stranded dead on Mayo Beach in Wellfleet, MA. The New England Coastal Wildlife Alliance (NECWA) documented the carcass (TL = 98.5 cm, PCL = 81.6 cm, female) while responding to strandings of *Mola mola* (Ocean Sunfish) in this same location. Wellfleet Harbor is a hot spot for strandings and 53 of 124 (42.7%) ocean sunfishes that stranded in Massachusetts in 2020 occured in this part of Cape Cod Bay. In the fall and early winter, individuals moving along the eastern shores of Cape Cod Bay are funneled into Wellfleet Harbor with its expansive outer harbor and easterly channel tucked inside the hook of Great Island. The inner harbor is shallow and difficult to navigate with extensive mudflats exposed at low tide. Strandings of Sharptail Mola in Cape Cod Bay and surrounding waters are rare in comparison to strandings of Ocean Sunfish, with only 1 Sharptail Mola recorded in comparison to 124 Ocean Sunfish in 2020. The presence of this specimen in Wellfleet may be an isolated event or could indicate a recent range extension of the Sharptail Mola in the western North Atlantic Ocean in response to the warming waters of the Gulf of Maine. The specimen is deposited at the Museum of Comparative Zoology to be prepared for further research.

Poster Session: Marine and Coastal Ecology

Nest-box Microclimate Influences Incubation Behavior: A Suburban and Rural Comparison

David Farris (Sam Houston State University, Huntsville, TX) and Diane Neudorf (Sam Houston State University, Huntsville, TX)

Abstract - Urbanization and human changes to the environment can remove critical resources like cavity-bearing trees which can be critical nesting habitat for many species of birds, but nest boxes are often used to supplement or replace lost cavities. Although nest boxes are a common tool in conservation, the microclimates can be different from natural tree cavities and may be less insulative than natural cavities. For birds in warmer climates, using potentially hotter and drier artificial cavities may influence their incubation and feeding behavior as well as fitness. This effect can be further exacerbated in habitats with less canopy cover such as found in more urban and suburban areas. By comparing nest boxes used by *Thryothorus ludovicianus* (Carolina Wren) nesting in a suburban (n = 4 nests) and a rural (n =3) habitat, we hoped to better understand how nest-box microclimates can affect incubation and feeding behaviors. We also included 1 empty nest box in each habitat as controls to see how they might differ without any nests present. We monitored temperature and humidity inside and outside the nest box for active wren nests in both habitats. Video recordings of incubation behavior and feeding behaviors were taken during morning and afternoon sessions for a two-day period for each nest. We will discuss variation in microclimates for nest boxes in both habitats and differences in wren incubation and feeding behaviors.

Poster Session: Avian Behavior and Parental Care

The Effects of Early Life Adversity during Postnatal and Adolescent Periods on Zebra Finches

Hailey Freeman (OSU, Stillwater, OK), Jennifer L. Grindstaff (OSU, Stillwater, OK), and Amanda Ayon (OSU, Stillwater, OK)

Abstract - Early life adversity, such as paternal or maternal removal, has been shown to have adverse physiological consequences in *Taeniopygia guttata* (Zebra Finch). Much research has been done to explore these effects during a single time period; however, little is known about the effects of being exposed to multiple stressors. We set up Zebra Finch families to be exposed to multiple stressors, along with a control group (n = 36) exposed to no stressors, and have measured the mass of the birds to detect physiological consequences. The stressor in early life was paternal removal, either at the beginning of the nestling period (n = 25) or at the beginning of the fledgling period (n = 33). Males Zebra Finches provide 43–45% of daytime care to nestlings; thus, removal should have consequences for offspring. For the adolescent stressor, independent offspring were separated for 2 hours per day from their social cage mate for 12 days using a screen. After 140 days post-hatch, we tested adult sensitivity to the environment through social disruption. We exposed all individuals to social disruption by moving them to new cages with same-sex cage mates. Before and after each stressor, we collected the mass of the birds. We predicted that the mass of the group exposed to multiple stressors will follow the cumulative stress hypothesis and continue to decline in mass with each stressor compared to the control group. This study will help us further understand the effects of multiple stressors and the physiological effects it has on individuals.

Poster Session: Avian Behavior and Parental Care

Estimating Nest Productivity and Identifying Sources of Nest and Chick Mortality in Least Tern Colonies in the Outer Banks

Erin E. Gallagher (University of North Carolina Wilmington, Wilmington, NC) and Raymond M. Danner (University of North Carolina Wilmington, Wilmington, NC)

Abstract - *Sternula antillarum* (Least Terns) is a beach-nesting species whose breeding sites are especially vulnerable to both human and non-human impacts. Least Terns are listed as a species of special concern in North Carolina. We are assisting the National Park Service at Cape Hatteras National Seashore to evaluate the efficacy of their existing Least Tern protection protocols by measuring daily survival rates for Least Tern nests and unfledged chicks and identifying human and non-human sources of nest and chick mortality. We collected data and observations in the summers of 2019 and 2020 utilizing 2 monitoring methods: ground-nest counts and incubating-adult counts. Along with nest fate, we recorded data on potential sources of human and non-human nest mortality. We calculated daily survival rate (DSR) for Least Tern nests using nest-survival analyses included in the R package 'RMark'. We recorded known fates for 35 nests in 2019 and 291 nests in 2020. Sites surveyed in 2019 included Cape Point West (n = 25) and Cape Point East (n = 10). These sites had an overall hatched percentage of 74.3%. Sites surveyed in 2020 at Cape Hatteras included Cape Point (n = 55), South Beach (n = 92), Ramp 23 (n = 22), and north of Ramp 23 (n = 4). Additional sites in Pea Island National Wildlife Refuge included Pole 47 (n = 28), Pole 57 (n = 24), and Oregon Inlet (n = 66). In 2020, there was an overall hatched percentage of 74.2%; 71% of nests hatched in Cape Hatteras compared to 80% in Pea Island. Preliminary estimates of DSR were near 1 for each season. This result is as expected given the relatively high rate of hatching success observed in the field. In 2021, we will implement additional methods to reduce potential sources of bias and increase sample sizes, and also monitor chick movements and mortality, which will further our understanding of overall colony productivity. Using both field observations and DSR analyses to identify the influence of human and non-human factors may help management agencies plan conservation actions at individual colonies and promote a better understanding of the greater meta-population dynamics at play regarding Least Tern nesting sites.

Poster Session: Breeding and Nesting Biology of Birds

Urban Coyote (*Canis latrans*) Habitation on Long Island and its Implications

Cara Galli (Mianus River Gorge Wildlife Technician Program, Bedford NY) and Christopher Nagy (Mianus River Gorge, Bedford NY)

Abstract - This study explored the habitat-size requirements of urban *Canis latrans* (Coyote) and possible habitation sites. Previous data regarding land-cover use, maximum habit size, and urban Coyote sites were used. We performed a moving window test n the computer program ArcGIS using the National Land Cover Database's information for forest and grassland as that was what Coyotes were found to use most. We tested to see how much forest and grassland was in a 14-km^2 area. We used this size area as it was found to be the farthest a Coyote traveled to obtain the necessary materials in their home range. We then created a heat map of forest and grassland measured, focusing on the Long Island region. The more forest and grassland in an area, the more likely it is to be habituated by Coyotes. We then measured all sites (8) where Coyotes were found for forest and grassland and classified them based on Coyote breeding. We calculated the averages of all breeding sites and all non-breeding sites and then compared them to the heat-map locations. In conclusion, both hypotheses were supported: Coyotes can live in a wide spectrum of conditions and patch sizes, and sites where Coyotes were directly observed scored higher on the model. The information from this study provides potential sites Coyotes may inhabit in the future and allows people to be more aware of where Coyotes are likely to inhabit to ensure the safety of the community, the pets of the residents, and the Coyotes. This study also allows scientists to know where Coyotes are most likely to be seen and guides researchers to places where camera traps will be most effective in spotting Coyotes.

Poster Session: Human Impacts and Urban Ecology

Lead Concentrations in Black Vultures at Two Solid Waste Management Facilities in Mississippi

Anna E. Gamblin (Department of Wildlife, Fisheries, and Aquaculture, Mississippi State University, MS), Adrián Naveda-Rodriguez (Department of Wildlife, Fisheries, and Aquaculture, Mississippi State University, MS), and Scott A. Rush (Department of Wildlife, Fisheries, and Aquaculture, Mississippi State University, MS)

Abstract - Birds of prey, including New World vultures, are highly susceptible to issues associated with assimilation of lead (Pb). This study focuses on Pb levels in *Coragypus atratus* (Black Vulture; hereafter Vultures) captured and sampled at 2 landfills, located 120 km apart in Lowndes and Lauderdale counties, MS, during February 2020–October 2020. We collected blood samples from trapped Vultures and determined the age and sex of birds for each trapping event. Among the 74 Vultures sampled in 11 capture events (mean = 4.1, SD = 5.1 birds per trapping event), we found mean blood-lead concentration of 8.33 µg/dL (SD = 6.38). Lead concentrations differed between sampling sites (t = -2.85, df = 64.17, $P < 0.01$) but did not differ between the sexes of birds sampled. Pb concentrations increased with the age of birds at both locations, with young (hatch year) birds showing an average of 7.94 µg/dL (SD = 7.49) and adult birds (after hatch year) showing an average of 8.39 µg/dL (SD = 6.27). Age ratios between young and adult Vultures were 1:6.56 (9:59 individuals) across all sampling events, making adult Vultures the more prevalent age group. Ratios of hatch year to adult Vultures were 1:5.67 (6:34 individuals) at 1 study site and 1:8.33 (3:25 individuals) at the other site. Male birds were more common than females at one site (1:1.13 [25:22 individuals]) while female birds were more common than males at the other site (1:2 [9:18 individuals]). The ratio of male to female birds captured changed across seasons, with an equal ratio of males to females during the winter and summer (1:1 winter, 1:1 summer) but more females than males in spring (males:females = 1:3) and fall (males:females = 1:2.5). Collectively, these results illustrate that Pb concentrations in Vultures can differ among locations within a landscape and there is variation in the age and sex ratios of birds at locations across time.

Poster Session: Contaminants, Parasites, and Disease in Birds

The Effects of Human Disturbance on Foraging Behavior of Wintering Sanderlings

Kaitlyn Gannon (Salve Regina University, Newport, RI)

Abstract - *Calidris alba* (Sanderling) is a shorebird whose population is in decline due to possible climate change, induced inclement weather on breeding grounds, and a loss of prey at migratory stopover habitats. This species is a common winter resident, often seen chasing the surf along the Newport and Middletown, RI, beaches. They forage the intertidal region probing and pecking at sand crabs, other invertebrates, insects, marine worms, and small mollusks. I studied whether human disturbance on the nonbreeding grounds negatively affects foraging efficiency, thereby further impacting the population decline. In the winter of 2020–2021, I surveyed sandy beaches of Middletown and Newport, RI, for foraging Sanderlings. I measured flock size, bill probes per minute with a stopwatch and tally counter, as well as the amount of time it took to begin foraging once disturbed by humans. An experimental procedure was implemented on randomly assigned flock encounters whereby I examined the impact of human disturbance on flock dynamics, foraging intensity, and spatial scale influence. To observe the effects of human disturbance, I utilized a volunteer who walked towards the flock along the surfs edge while I took video footage of the behavioral changes of Sanderlings. The observations were recorded at 2 different beaches over a period of 15 days totaling 30 surveys, all during low tide when ideal weather conditions allowed for it. Nonbreeding populations of shorebirds require a suitable habitat and lack of human disturbance to obtain enough prey to survive the nonbreeding season. The undisturbed foraging of Sanderlings results in an ideal mass prior to migration which assures flocks arrive at the breeding grounds in good physiological condition

Poster Session: Urbanization and Human Presence—Effects on Birds

Potential Distributions of Greater Fritillaries in the Eastern US using Ecological Niche Modeling

Emily A. Geest (Oklahoma State University, Stillwater, OK) and Kristen A. Baum (Oklahoma State University, Stillwater, OK)

Abstract - Four *Speyeria* spp. (Greater Fritillaries) occur in northeastern North America: *S. idalia* (Regal Fritillary), *S. cybele* (Great Spangled Fritillary), *S. atlantis* (Atlantis Fritillary), and *S. aphrodite* (Aphrodite Fritillary). A fifth species, *S. diana* (Diana Fritillary), occurs predominantly in the southeast. The Regal Fritillary, Diana Fritillary, Atlantis Fritillary, and Aphrodite Fritillary have undergone severe population declines within the last few decades, while the Great Spangled Fritillary is considered globally secure. Using citizen science data and photo-sharing websites, we collected occurrence data for all 5 species. We then used occurrence data to create ecological niche models for each of the 5 species. Ecological niche models are able to identify important response variables that can be used to predict climate change effects. Additionally, ecological niche models can determine potential suitable habitat distribution for a species that can be used to direct conservation efforts. For the eastern United States, climate-and environmental-response variables differed among Greater Fritillaries species. The most important climate-response variables for Great Spangled Fritillaries were minimum temperature of the coldest month and annual precipitation, wheereas Regal Fritillaries responded to temperature seasonality, Diana Fritillaries responded to maximum temperature of warmest month, and both Atlantis Fritillaries and Aphrodite Fritillaries responded to minimum temperature of the coldest month. The most important environmental-response variables were land use for all species except the Regal Fritillary and average annual relative humidity for all species except the Great Spangled Fritillary. Greater Fritillary species have differing climate and habitat needs, with climate-change implications for each species. Additionally, citizen science and photo-sharing websites are valuable for evaluating species distributions and should be considered when creating ecological niche models.

Poster Session: Arthropod Ecology

Extrinsic and Intrinsic Factors Influence Energetic Condition of *Catharus* Thrushes at a Northern Stopover Site

Michelle L. Gianvecchio (SUNY College at Brockport, Brockport, NY) and Mark E. Deutschlander (Hobart and William Smith Colleges, Geneva, NY)

Abstract - Passerine migration is an energetically costly endeavor that requires sufficient fuel reserves. Most passerines pause migration at stopover sites to rest or refuel. Stopover behaviors (e.g., length of stay, foraging) often depend on individual condition upon arrival, which itself is influenced by both extrinsic factors (e.g. timing, season) and intrinsic factors (e.g. age, sex). We used path analyses to study the potential direct and indirect effects of season, arrival date, hour captured, age, and sex on predicting variation in energetic condition upon arrival. Our study species included *Catharus guttatus* (Hermit Thrush), *C. ustulatus* (Swainson's Thrush), and *C. fuscescens* (Veery). We analyzed bird-banding data from individuals mist-netted during spring and autumn migration from 1999 to 2016 at Braddock Bay Bird Observatory (BBBO), Monroe County, NY. Multi-group analyses revealed season as a significant grouping variable; therefore, we generated separate models for spring and autumn. The Swainson's Thrush models had the greatest explanatory value with sex (determined by wing chord) being the strongest predictor variable for energetic condition, followed by arrival date and then age. Females were in better condition than males as were sub-adults compared to adults, in both spring and autumn. Birds that arrived later in the season were also in better condition than individuals arriving earlier in both spring and autumn (when all other factors were held constant). The positive relationship between arrival date and energetic condition was consistent and significant across all species and seasons. However, the arrival date was a stronger factor in predicting condition in spring than in autumn for both Swainson's Thrush and Hermit Thrush. In contrast, the arrival date was an equally important predictor of condition for both seasons for Veery. Contrary to Swainson's Thrush and Veery models, age was not a significant predictor of arrival date or energetic condition in Hermit Thrushes. We found that individuals caught later in the day were in better energetic condition. However, the hour captured was not a good predictor of condition, and in many cases was not a significant factor.

Poster Session: Avian Habitat Use and Ecology

Examining the Blood Lead/age Dynamic of a Songbird in Michigan Following the Water Crisis in Flint

Kenneth J. Glynn (Eastern Michigan University, Ypsilanti, MI), Dorothy L. Zahor (Eastern Michigan University, Ypsilanti, MI), and Jamie M. Cornelius (Oregon State University, Corvallis, OR)

Abstract - The urban environment is a novel ecosystem, likely presenting fitness tradeoffs to wildlife that involves exposure to anthropogenic pollution. The water crisis that occurred in Flint, MI, exposed the city's residents to lead-contaminated drinking water through corrosion of lead-lined infrastructure, but this exposure may also have extended to the urban ecosystem through irrigation practices. Lead contamination may accumulate in soil invertebrates (such as earthworms) posing a threat to higher trophic predators. *Turdus migratorius* (American Robin) is a songbird common to urban environments that forages heavily on earthworms during the breeding season and preferentially feeds worms to developing nestlings and young juveniles. Lead is a neurotoxin, and is thus an extremely dangerous pollutant for organisms to ingest, especially during the early life stages when extensive neural structuring is occuring. We captured Robins at watered sites within Flint (10 adults, 9 juveniles, and 8 nestlings), and a watered reference site in Ypsilanti (27 adults, 3 juveniles, and 31 nestlings). Blood lead levels and body condition from nestlings, juveniles, and adults were compared at both locations to evaluate age-related differences and to measure fitness consequences of lead exposure. Average blood lead across all age groups was highest at watered sites in Flint, and juveniles exhibited higher blood lead levels on average compared with adults and nestlings. These findings suggest that juvenile Robins in Flint are facing an elevated exposure risk due to anthropogenic lead, which may have negative impacts on survival given that juvenile birds establish learned behaviors during this early life stage that are important for survival to adulthood. Further, blood lead correlated negatively with body condition in juveniles and adults, suggesting immediate impacts on health.

Poster Session: Contaminants, Parasites, and Disease in Birds

Comparing Song Repertoires in Urban vs. Rural Northern Cardinals

Brooke D. Goodman (SUNY Oswego, Oswego, NY) and Daniel T. Baldassarre (SUNY Oswego, Oswego, NY)

Abstract - Anthropogenic noise may force animals to adjust aspects of their vocalizations like frequency, syllable usage, and speed. The impacts of human-generated noise pollution must be studied in order to mitigate possible negative effects in the future. *Cardinalis cardinalis* (Northern Cardinal) is an ideal subject for this study because they have a song that is masked by anthropogenic noise like traffic and human speech, and frequently rely on their song to intimidate other males, claim a territory, or attract a female. The placement of automatic recording units (ARU) on male Northern Cardinal territories in urban (Barry Park, Syracuse, NY) and rural (Rice Creek Field Station, Oswego, NY) field sites yielded 30 hours of audio from each focal male. This data included 11 males at Rice Creek Field Station and 12 males at Barry Park. We are in the process of separately analyzing each bird's audio recordings using Kaleidoscope Pro, a program that can be trained to detect different cardinal song types. We are differentiating song types based on syllable type/usage and trill type/usage. Preliminary results have yielded an urban male singing 12 song types and a rural male singing 7 song types. Future analyses will consist of building song repertoires for each recorded Northern Cardinal, comparing repertoire size, and analyzing the impact a change on repertoire size has on male fitness. We predict that urban Northern Cardinals will sing more song types to increase communication efficacy in response to anthropogenic noise.

Poster Session: Song and Vocalizations in Birds

Decline in Population Density and Body Size of the Invasive Asian Shore Crab on Cape Cod, Massachusetts

Alexis Gouthro (Bridgewater State University, Bridgewater MA), Allyson Tolles (Bridgewater State University, Bridgewater MA), Haley McCusker (Bridgewater State University, Bridgewater MA), Taylor Farber (Bridgewater State University, Bridgewater MA), and Christopher P. Bloch (Bridgewater State University, Bridgewater MA)

Abstract - Invasive species often experience an extended period of rapid population growth, followed by a substantial decline, a phenomenon known as boom–bust dynamics. There are multiple potential causes of such a decline, including accumulation of natural enemies and depletion of preferred prey. *Hemigrapsus sanguineus* (Asian Shore Crab) was observed in the United States for the first time in 1988. Thereafter, it rapidly replaced *Carcinus maenas* (Green Crab) as the dominant crab in rocky intertidal habitats in most of New England. Recent evidence, suggests that it may be entering the bust phase of boom–bust dynamics at some sites in southern New England and Long Island Sound, but long-term observations at multiple sites are necessary to confirm whether this is a general pattern. Long-term data, collected annually at Town Neck Beach, Sandwich, MA, on the north side of Cape Cod by a combination of transect and quadrat methodologies since 2003, reveal that population density of *H. sanguineus*, which declined by >70% from 2012 to 2015, has recovered to nearly half of its 2012 peak, but mean body size has decreased significantly. Concurrently, both abundance and mean body size of a preferred prey species, *Mytilus edulis* (Blue Mussel), has increased substantially. Additional data are needed to determine the mechanisms for these changes, and whether they represent a transient stage in population dynamics or a persistent decline of the invasive species and recovery of its prey.

Poster Session: Crab Population Biology

Variation in Feather Sizes used in Tree Swallow (*Tachycineta bicolor*) Nest Construction and Relationship to Reproductive Success

Lauri Green (Bloomsburg University, Bloomsburg, PA) and Gabrielle Leonard (Bloomsburg University, Bloomsburg, PA)

Abstract - Many avian species utilize feathers during nest construction because they may provide parasite protection and thermoregulation for chicks. Due to their use of nest boxes and relative tolerance of human disturbance, *Tachycineta bicolor* (Tree Swallow) are among the most-studied birds that use feathers to line their nests. Despite this, little is known about the sizes of feathers used in nest construction. In 2019, we placed nest boxes within 3 constructed wetlands near Bloomsburg, PA. Sites varied in their size, vegetation, and waterfowl populations. We placed each nest box on a free-standing post and installed a predator guard beneath each box. In May–July 2020, we estimated the reproductive success of Tree Swallows by quantifying numbers of eggs and hatchlings as well as the percent of chicks fledged. In December of 2020, when Tree Swallows were no longer present, we collected 41 nests. Feathers were separated from dry vegetation and photographed. Using ImageJ, we quantified the number, area, length and width of all the feathers. We calculated total feather area by the sum of all feather areas within each nest. We compared feathers across sites using analysis of variance (ANOVA) in JMP. We also regressed feather measurements and estimates of reproductive success. Mean total feather area varied across sites (620.1–746.2 cm^2) but was not significantly different. However, feather length, width, and area of individual feathers were significantly different. Total feather number per nest was nearly significant among sites. There were no significant relationships between feather measurements and reproductive success. Variation in the sizes of feathers used at each site suggests differences in feather availability, but relative consistency in total feather area may reflect instinctive behavior. Evaluating patterns in feather use and reproductive success over time and across sites will help determine whether total feather area represents a fixed-action pattern or a response to environmental factors.

Poster Session: Breeding and Nesting Biology of Birds

Mountain Migration: Elevational Range Shifts by Tree Species in the Adirondack Mountains

Sophia Griffiths (SUNY Plattsburgh, Plattsburgh, NY) and Mark Lesser (SUNY Plattsburgh, Plattsburgh, NY)

Abstract - Climate change is expected to change species' range limits across the world. In mountainous areas, these changes may be more profound due to the steepness of the environmental gradient. Climate change may cause tree species to shift upslope if they are tracking temperature. To determine if tree species distributions are shifting, we conducted a study in the High Peaks region of the Adirondacks in northern New York. On Lower Wolfjaw Mountain, we established transects every 100 m of elevation between 500 and 1000 m asl, along which we sampled the sapling and mature individuals by species using the point quarter method at 10 locations. We determined density, dominance, and importance values for each species. Additionally, we used logistic regression to model the frequency distribution of sapling and adults for the 5 most common species—*Abies balsamea* (Balsam Fir), *Picea rubens* (Red Spruce), *Fagus grandifolia* (American Beech), *Acer pensylvanicum* (Striped Maple), and *Acer saccharum* (Sugar Maple)—to determine if the species was migrating up- or downslope. Contrary to climate-related expectations, Balsam Fir and Red Spruce are both shifting their range downslope, indicated by sapling frequencies peaking at elevations lower than mature tree frequency peaks.. For Balsam Fir, this shift was only ~10 m, but for Red Spruce it was much more pronounced at ~200 m, perhaps a response to decreasing acid deposition. American Beech, Striped Maple, and Sugar Maple are all shifting their distributions upslope, with sapling frequencies peaking at elevations higher than mature tree frequency peaks. For American Beech, this shift is minimal and is potentially confounded by beech bark disease, which causes extensive root suckering and an increase in saplings. For Striped Maple and Sugar Maple the upward shift was ~100 m, suggesting that climate change may be influencing these species distributions. Overall, our study indicates that the composition of Adirondack forests is being altered by multiple factors (e.g., climate change, land-use management, atmospheric deposition) that may lead to a very different forest in the future.

Poster Session: Forest Ecology

Seasonal and Species Differences in Feather Mite Intensity in Eight Songbirds

Margret I. Hatch (Penn State Scranton, Dunmore, PA) and Robert J. Smith (University of Scranton, Scranton, PA)

Abstract - We compared seasonal intensity (number of mites per individual) of Acari: Astigmata (Feather Vane Mites) across 8 species of songbirds captured in northeastern Pennsylvania. Species included 7 migrants: *Geothlypis trichas* (Common Yellowthroat; $n = 506$), *Dumetella carolinensis* (Gray Catbird; $n = 1204$), *Setophaga magnolia* (Magnolia Warbler; $n = 185$), *Seiurus aurocapilla* (Ovenbird; $n = 180$), *Vireo olivaceus* (Red-eyed Vireo; $n = 191$), Catharus fuscescens (Veery; $n = 165$), and *Zonotrichia albicollis* (White-throated Sparrow; $n = 374$) and 1 resident species: *Poecile atricapillus* (Black-capped Chickadee; $n = 188$). An index of mite intensity was higher for all species in the spring than in the fall ($P < 0.02$), most likely due to molting of feathers in the fall. Gray Catbirds, Ovenbirds, and Veery had the highest intensity of mites while we recorded the lowest intensity of mites on Black-capped Chickadees and Magnolia Warblers. We propose these differences may be related to the ecology of the songbird species, such as whether they are migratory or resident and their foraging strategy. Further analyses will include estimates of mite prevalence (percent of individuals examined with mites) for each species, whether there are age or sex differences in mite intensity, and whether mite intensity is related to body condition.

Poster Session: Contaminants, Parasites, and Disease in Birds

Evaluating Standardized Approaches to Identifying Priority Invasive Species for the Town of Colonie

Jaimie Henderson (Siena College, Department of Environmental Studies and Sciences, Loudonville, NY), **Laura Bornt** (Siena College, Department of Environmental Studies and Sciences, Loudonville, NY), and Mary Beth Kolozsvary (Siena College, Department of Environmental Studies and Sciences, Loudonville, NY)

Abstract - One of the greatest threats to biodiversity is invasive species. The introduction and spread of non-native invasive species causes tremendous ecological and economic harm at multiple scales, from local to international. There is great interest and pressure to slow the spread of invasive species, or eradicate them if possible. Unfortunately, land managers have limited funds and, thus, it is important for managers to prioritize their efforts. New York State Partnerships for Invasive Species Management (PRISMs) have developed priority tier lists to aid managers in determining which species should be targeted for early detection/prevention; eradication; containment; or local control. Recently, iMapInvasives researchers have been working with iMapInvasives data to develop a standardized way of creating these priority tier lists. This methodology has been used at both the state-level and regional PRISMs, but not at the local level. We applied the basic methodology of creating tier lists for the local level. We used data on iMapInvasives locations, species invasiveness rankings, and socio-economic rankings of species. We compared priority tier lists using this standardized methodology with 3 sets of iMapInvasive data: raw species locations, and using GIS clustering techniques to determine number of populations using 50-m and 100-m thresholds. Although the 3 sets of iMapInvasives data yielded different rankings of individual species, the priority tier lists were similar. We demonstrate that this standard methodology is useful in identifying species priority lists at the local level.

Poster Session: Invasives Management Techniques and Strategies

Ecological Effects of Utility-Scale Solar Arrays on Macrofauna in New England

Flynn Hibbs (Hampshire College, Amherst, MA), Sarah Partan (Hampshire College, Amherst, MA), Blair McLaughlin (Hampshire College, Amherst, MA), Natalie Baillargeon (Smith College, Northampton, MA), and Seeta Sistla (California Polytechnic State University San Luis Obispo, San Luis Obispo, CA)

Abstract - The growth of utility-scale solar energy development allows for a much-needed reduction of fossil fuel emissions. However, the large land-use needs present potential impacts on wildlife populations. Few studies have empirically investigated how utility-scale photovoltaic solar arrays alter wildlife populations and behavior. This study used a total of 24 camera traps to monitor mammals and birds inside and outside 4 utility-scale solar arrays in New England through multiple seasons over a 3-year period. We explored differences in species diversity and relative abundance of mammals and birds inside and outside the solar arrays. Preliminary results suggest solar arrays support a wide variety of species; we found similar levels of species diversity inside and outside the arrays. Shannon and Simpson species diversity indexes show a slightly higher diversity of mammals outside 3 of the 4 sites and slightly higher bird diversity outside 2 of the 4 arrays. These findings will help researchers and energy companies mitigate any potential negative ecological effects of the solar arrays and set industry standards on appropriate conservation measures to apply alongside USSE installation.

Poster Session: Using Trail Cameras and Other Technolgy to Document

Evaluation of a University Campus as a Woodpecker Conservation Site in the Southeastern US

Timothy J. Hinton (University of North Carolina at Pembroke, Pembroke, NC) Jenna K. Larkins (University of North Carolina at Pembroke, Pembroke, NC), and Katherine K. Thorington (University of North Carolina at Pembroke, Pembroke, NC)u)

Abstract - Anthropogenic change leads to habitat fragmentation and habitat loss impacting forest birds. Woodpeckers are a good bioindicator of a healthy forest ecosystem. They require forested habitat that has plenty of shelter, roosting and nesting sites, snags, vegetation, and insects. Examining woodpecker habitats and behavior in close proximity to human activity can inform preservation efforts. We aimed to evaluate the University of North Carolina at Pembroke (UNCP) campus, located in the southeastern part of the US, for woodpecker diversity along an urban agricultural gradient. We split the campus into 2 study sites of 17 ha each and conducted weekly walking surveys during which we mapped woodpecker locations and behaviors. Forested area within the north site totaled 11 ha, and the forested area in the south site total 1.6 ha. Fall data showed that UNCP supports a diverse population of woodpecker species establishing their own territories. We found that the *Melanerpes carolinus* (Red-bellied Woodpeckers) had 4 territories in the north site. The *Dryobates pubescens* (Downy Woodpecker) has one territory in the north site. In the south site the Downy Woodpecker, *Colaptes auratus* (Northern Flicker), and *Melanerpes carolinus* (Red-Bellied Woodpecker) each established 1 territory. We will continue our data collection by mapping breeding territories this spring. We predict there will be more territories in both sites this spring due to the upcoming mating season and competition for nesting and roosting areas. By evaluating the locations of the woodpecker territories, we can study what other species of birds share the same habitat as the woodpeckers. Fall species richness in the North site was 46, while in the South site it was 26. We predict in the spring species richness will increase in both sites due to the breeding season. The Northern site is likely to remain more species rich as it appears to contain habitat that is more bird friendly. Using both our fall and spring data, we will present our assessment of the woodpecker and bird biodiversity on the UNCP campus and test our hypothesis that woodpeckers are a good bioindicator on an urban–agricultural gradient.

Poster Session: Urbanization and Human Presence—Effects on Birds

Physiological Condition of Passerines During Fall Migration Stopover Near Lake Ontario

Rachael Hoh (School of Life Sciences, Rochester Institute of Technology, Rochester, NY), Erica Delles (School of Life Sciences, Rochester Institute of Technology, Rochester, NY), Molly Border (School of Life Sciences, Rochester Institute of Technology, Rochester, NY), and Susan Smith Pagano (School of Life Sciences, Rochester Institute of Technology, Rochester, NY)

Abstract - The migratory period for passerines is a very energetically demanding time. Migratory birds often use the habitats near the Lake Ontario shoreline as stopover sites on their migration south from breeding grounds in Canada. Over time, the surrounding area has been urbanizing, which may impact the habitats and resources required by these birds for refueling. This study seeks to examine the physiological condition of birds stopping at the Braddock Bay Bird Observatory (BBBO), an important location for migration birds near Rochester, NY. We have assessed the chronic stress levels of 3 species of thrushes using blood smears from sampled birds in fall seasons since 2016. Specifically, a manual leukocyte count of a blood smear from a bird provides insight into whether a bird is experiencing an immune response, or undergoing stress based on the ratio of heterophil:lymphocyte ratio. We examined patterns in the heterophil:lymphocyte data over time for each species to evaluate whether or not the stress levels for these passerines is variable at this site. Potential sources of this variation include urbanization in the local landscape, changes in key food resources, or other habitat and environment changes. The results obtained may be important for managing a healthy environment for these passerines in order to preserve their populations during a stressful period of their annual cycle.

Poster Session: Avian Migration

Nest Success and Nest-site Characterization in Gray Catbirds

Bethany Hollenbush (Penn State Schuylkill, PA) and Lucas Redmond (Penn State Schuylkill, PA)

Abstract - Nest predation is an important selective pressure on nesting habits of birds. Nest-site characteristics such as height and concealment can influence the likelihood of nest predation and, thus, should be related to nest success. We studied nest success and nest-site selection in *Dumetella carolinensis* (Gray Catbird) during the breeding seasons of 2016 to 2019 in southeastern Pennsylvania. Catbirds begin arriving at our study site, which is located on and around the Penn State Schuylkill campus, in early to mid-May and begin nesting by late May through early June. Once catbirds arrive, we conducted daily surveys of the study site to locate as many breeding pairs and nests as possible. Once found, nests were checked every 3–4 days until they were either successful or failed. After nest fate was determined, w conducted nest-site surveys to measure characteristics of the nest site and surrounding habitat. Characteristics measured included height and diameter at breast height of shrubs where nests were placed, nest height, nest orientation, nest concealment (4 cardinal directions, above, and below), and canopy area. We used program MARK to estimate daily survival rates and understand how nest success varied. Across the period of this study, ~47% of catbird nests were successful, and our MARK analysis indicated that daily survival rates of catbird nests varied yearly (2017/2019 > 2016/2018) and tended to decline as the breeding season progressed. Our characterization of nest sites indicated that catbirds on our study site primarily utilized 3 species of invasive woody shrubs: *Rosa multiflora* (Multiflora Rose), *Lonicera tatarica* (Tatarian Honeysuckle), and *Ligustrum* sp. (Privet). Nest height exhibited some difference among these 3 species, with nests placed in privet being higher than those in rose, while nests in honeysuckle were intermediate in height. Aside from these findings, we found no other consistent differences in nest placement among the 3 species of shrub used. In the future, we plan to combine the MARK analysis with the nest-site characteristics to determine if any of the nest-site characteristics had an influence on nest success.

Poster Session: Breeding and Nesting Biology of Birds

Highly Variable Seasonal Movements of Individual Snail Kites in South America

Alex E. Jahn (Smithsonian Migratory Bird Center, Washington, DC; Indiana University, Bloomington, IN), Evan Buechley (Smithsonian Migratory Bird Center, Washington DC; HawkWatch International, Salt Lake City, UT), Leandro Bugoni (Universidade Federal do Rio Grande, Rio Grande, Brazil; Waterbirds and Sea Turtles Lab, Rio Grande, Brazil), Joaquín Cereghetti (Universidad Nacional de La Pampa, La Pampa, Argentina), Márcio Repenning, (Universidade Federal de Rio Grande, Rio Grande, Brazil; Waterbirds and Sea Turtles Lab, Rio Grande, Brazil), Peter P. Marra (Smithsonian Migratory Bird Center, Washington DC; Georgetown University, Washington, DC), and Thomas B. Ryder (Smithsonian Migratory Bird Center, Washington, DC; Bird Conservancy of the Rockies, Fort Collins, CO)

Abstract - Although hundreds of birds migrate in South America, we still understand relatively little about their seasonal movements, or even which species are migratory. We used satellite transmitters to study the movement ecology of 10 *Rostrhamus sociabilis* (Snail Kite) captured in southern Brazil. W tracked the birds over the course of 2 years (beginning in 2017 until 2019). We detected highly variable movement patterns, with some kites migrating up to 4000 km to the mouth of the Amazon River, whereas others exhibited nomadic/facultative movements, moving different distances and to different sites between seasons and years. Overall, Snail Kites spent most of the migration period on stopover, moving at a higher speed and using fewer stopovers in austral spring than fall. We provide the first evidence that Snail Kites in South America move large distances and connect major watersheds, and suggest that Snail Kites in the Neotropics are highly flexible in how they track resources over time and space. The complex movements and variable migratory behavior we detected among Snail Kites points to the need for more detailed research on the behavioral ecology and risks to survival across the annual cycle of this poorly studied species.

Poster Session: Avian Migration

A Northern Forest Atlas Sampler

Jerry Jenkins (Northern Forest Atlas Foundation, Lake Placid, NY)

Abstract - This poster is a sampler of work—published and forthcoming—from the Northern Forest Atlas Project. It includes micro, macro, and landscape images, comparison charts, identification diagrams, ecomaps, ecological process diagrams, biostructure diagrams, and page layouts from books. In the last 9 years, the Northern Forest Atlas Project has taken over 20,000 high-resolution images of plants, and prepared 3 photo-guides, 3 digital atlases, 3 sets of folding charts, 10 ecological lessons, and several dozen large-format wall charts. Our published guides, lessons, and atlases total about 3500 pages and include over 5000 photos. The paper books and charts are sold through Cornell University Press. The digital works—atlases, lessons, wall charts, articles—are available as free downloads from our website, and may be printed and used for personal, educational, or nonprofit purposes without charge.

Poster Session: Forest Ecology

Empire State Native Pollinator Survey: Saproxylic Hover Flies within Rare Old-growth Forest Habitats of New York State

Gloria Keal (SUNY Cobleskill, Cobleskill, NY) and Carmen Greenwood (Associate Professor, Department of Fisheries, Wildlife, and Environmental Science, SUNY Cobleskill, Cobleskill, NY)

Abstract - The Empire State Native Pollinator Survey included the goal of a targeted bioassay of 120 Syrphidae species. Flies in the family Syrphidae provide various ecosystem services, including pollination and pest suppression. There are ~900 species of Syrphidae, of which ~120 are saproxylic and inhabit tree holes in old-growth forest. Old-growth forests are declining, mainly due to anthropogenic impacts. Much of the remaining old-growth forest habitat exists at high elevations, on isolated mountain tops, which creates the potential for limited gene flow between already declining populations of saproxylic hover flies. Our objective was to assess the status of these 120 different saproxylic Syrphidae species, representing 25 genera within New York and ultimately to assign an s-rank categorization to each species. From 2017 to 2020, we had 17 sampling sites selected for their favorable ecology. Our sites were statewide with locations in western New York, including Alleghany State Park, Zoar Valley, and Letchworth State Park. Camillus, located in Central New York, provided a unique ecotone. Lastly, the Eastern New York sites included various locations in the Adirondacks, Catskills, and Clayton. At each site we placed 1 malaise trap that we checked weekly from late May to early July. We also conducted a selective sweep of the area within a 20-m radius around the malaise traps. The collected specimens were sorted, pinned, and identified to species. We collected a total of 50 species representing 17 genera. Identified genera such as *Sphegina*, *Psilota*, *Brachyhopa*, *Blera*, and *Myolepta* are considered to be rare in New York and possibly declining in numbers. The two *Psilota thatuna* that were collected from the Catskills are a new NYS record. New county records included *Blera nigra* and *Brachyopa notata*. The genera *Xylota*, *Chalcosyrphus*, and *Temnostoma*, can be commonly caught throughout New York but are steadily declining. The new records indicate possible range shifts northward, perhaps due to climate change. Our inability to detect 70 target species could simply be due to our very targeted sampling technique. Further research is needed to understand the current status of saproxylic hover flies.

Poster Session: Pollinators

A Comparison of Mammal Diversity and Abundance in Two Forests in Massachusetts

Sean King (Bridgewater State University, Bridgewater, MA), **Drew Rezendes** (Bridgewater State University, Bridgewater, MA), Alexandra Bebko (Bridgewater State University, Bridgewater, MA), and Caitlin Fisher-Reid (Bridgewater State University, Bridgewater, MA)

Abstract - As part of a nationwide mammal survey, Snapshot USA, we conducted a 2-month long camera-trap survey in a suburban campus setting in September and October 2019, and again in September and October 2020. During both Snapshot seasons, 8 cameras were deployed at least 200 m apart. During the 2019 sample period, each camera observed 2–11 unique mammal species, and we observed 13 unique mammal species across the entire forest. *Sciurus carolinensis* (Eastern Grey Squirrel) was found to be the most abundant mammal, with 636 captures over 517 camera days (relative abundance index of 123), followed by the *Tamias striatus* (Eastern Chipmunk; relative abundance index of 40). Our 2020 data is still undergoing data processing and quality control, but it was qualitatively similar to 2019. Given the relatively high diversity observed in 2019, we expanded this project to compare our campus forest to a second forest in southeastern Massachusetts. In June 2020, we deployed 6 additional cameras in the John Tate Place Conservation Area in Wrentham, MA. This conservation land is bordered by residential communities, and we expected similar or higher diversity compared to our campus forest in Bridgewater, MA. In Bridgwater, we deployed 6 cameras in the Great Hill Forest on the Bridgewater State University campus. Cameras in both sites were unbaited, and deployed 0.5 m above the ground for a total 517 trapping days (June–August 2020). We used eMammal to process photographs by tagging all identifiable mammals. We excluded photographs which contained unidentifiable mammals, birds, humans, or domestic animals (e.g., cats, dogs) from our analyses. Contrary to our expectations, we observed higher species richness in Bridgewater (n = 14 species) compared to Wrentham (n = 8 species). In both locations, *Sciurus carolinensis* (Eastern Grey Squirrel) was the most abundant mammal, and both locations had the same top 5 most abundant mammals. The difference in species richness at the 2 sites may be partly due to a smaller sampling area in Wrentham. We are continuing to monitor both forests to better understand these patterns of mammal abundance and diversity.

Poster Session: Forest Ecology

Creating Learning Opportunities and Community Partnerships to Advance Invasive Species Awareness and Management

Mary Beth Kolozsvary (Siena College, Department of Environmental Studies and Sciences, Loudonville, NY) and Jean C. Mangun (Siena College, Department of Environmental Studies and Sciences, Loudonville, NY)

Abstract - The introduction and spread of non-native species cause tremendous ecological and economic harm. Despite efforts to educate the public on invasive species issues, there remains a general lack of understanding of the magnitude of invasive species' negative effects on natural communities. To address this lack of understanding, the Department of Environmental Studies and Sciences at Siena College has collaborated with community partners (e.g., NYS Department of Environmental Conservation, New York Natural Heritage Program, Capital-Mohawk Partnerships for Regional Invasive Species Management, and Town of Colonie Conservation Advisory Council) and have offered numerous research, internship, and outreach and education opportunities for undergraduates. These efforts have involved: designing courses on Invasive Species; learning modules and projects in related courses (e.g., Ecosystem Ecology, Conservation Biology, Environmental Interpretation); research on assessment and distribution of invasive species on campus; and exploratory and greenhouse studies on abiotic and biotic determinants on distribution of *Alliaria petiolata* (Garlic Mustard). Students in Environmental Interpretation designed lesson plans for K–12 students, created educational posters, and held a public educational event on invasive species. Several student internships involved working with community partners in the Town of Colonie to map invasive species on key natural areas and make priority management recommendations. The topic of invasive species has been an ideal framework to provide numerous experiential learning opportunities for undergraduates while expanding community partnerships.

Poster Session: Invasives Management Techniques and Strategies

Assessment of Key Pollinator Habitat on a Suburban College Campus

Mary Beth Kolozsvary (Siena College, Dept. Environmental Studies and Sciences, Loudonville, NY) and Anna Kuhne (Siena College, Dept. Environmental Studies and Sciences, Loudonville, NY)

Abstract - Pollinators are essential for transferring pollen from flower to flower, ensuring successful fertilization and reproduction for a variety of plant species. We rely on healthy and diverse populations of pollinators to ensure success of the agriculture industry, human health, and to maintain biologically productive ecosystems. In recent years there has been a growing concern about declines in many pollinator species, yet we lack comprehensive knowledge of the current distribution of native pollinators in New York state. As such, the New York Natural Heritage Program (NYNHP) initiated a multi-year survey of native pollinators. In 2018, we partnered with the NYNHP to (1) contribute to understanding of pollinator distribution in the state, (2) assess the contribution of a suburban college campus to populations of native pollinator, and (3) identify key habitats on campus and make recommendations to enhance habitat for native pollinators on campus. We surveyed pollinators using standardized bee-bowl and sweep-net protocols in forest, meadow, roadside, wetlands, and rain gardens on the Siena College campus. The number of native pollinator species were similar across habitats (min–max: 18–26), but the community similarity between habitats differed (Jaccard similarity index; min–max: 41.0–63.3%). The pollinator composition of the 2 rain gardens differed the most form other habitats, whereas the pollinator composition in the forest and wetlands were the most similar to other habitats. The Siena College campus provides important habitats for key native pollinator species and contributes to overall regional biological diversity. A mixture of natural habitats, combined with human-created habitats (e.g., rain gardens), can help boost the diversity of pollinators in human-dominated suburban areas.

Poster Session: Pollinators

Comparative Physiology of Two Cardinalid Species in a Heavily Modified Habitat

Kevin J. Krajcir (Arkansas State University, Jonesboro, AR), Emily R. Donahue (Arkansas State University, Jonesboro, AR), Jennifer L. Terry (Arkansas State University, Jonesboro, AR), Lorin A. Neuman-Lee (Arkansas State University, Jonesboro, AR), and Than J. Boves (Arkansas State University, Jonesboro, AR)

Abstract - Adult passerines, like all organisms, must partition their finite energy budgets among daily activities (e.g., foraging, immunity, tissue repair, preening) and non-overlapping, life-history events (i.e. reproduction, feather molt, and, for some species, migration). In addition to expected events, unpredictable perturbations (e.g., parasitic infection, adverse weather events, human disturbance) may require rapid energy mobilization. These events threaten an organism's fitness when insufficient energy resources remain to properly respond to such stressors. In considering energetic tradeoffs, we wanted to explore: (1) how physiological metrics may contextually vary between birds with unique life-history strategies, and (2) what influence feather mites and other symbionts have on a bird's physiological condition. To answer these questions, we performed physiological assessments on breeding adults of 2 related members of Family Cardinalidae with different migratory strategies - *Cardinalis cardinalis* (Northern Cardinal; a resident species) and *Spiza americana* (Dickcissel; a Neotropical-Nearctic migrant). Both species are common and abundant breeders in the Arkansas delta region, which consists of heavily modified and fragmented agricultural habitat. For each individual, we assessed the following immune system characteristics: (1) heterophil to lymphocyte ratios, (2) bacteria-killing ability, and (3) acute stress response. We also censused abundance of feather mites on the wing and tail flight feathers and noted the presence of other symbionts on the body and in the blood opportunistically. Using these multiple physiological metrics, our data suggest that there are interspecific differences in immune abilities as well as sex-specific immune responses in Northern Cardinals. We also found evidence that some birds appear to be chronically stressed. In regards to symbionts, abundances of feather mites varied within and among these species, and the hosts also demonstrated co-infections with parasites such as lice and *Haemoproteous* spp. This study provides physiological insight into how these species may differentially allocate their energetic resources into certain activities while coping with unexpected perturbations in these heavily modified breeding habitats.

Poster Session: Avian Morphology and Physiology

Soil Microarthropod Abundance and Diversity in Native Meadows which have Transitioned from Agricultural Crop Production

Emily Krsnak (SUNY Cobleskill, Cobleskill, NY) and Carmen Greenwood (SUNY Cobleskill, Cobleskill, NY)

Abstract - Soil provides a habitat for a variety of organisms. These organisms provide many ecosystem services including nutrient cycling and decomposition of organic matter. Microarthropods, specifically oribatid mites, are sensitive to changes in soil quality, positively affiliated with organic matter, and are often used as indicators of soil health. Our study examined microarthropod abundance and diversity, proportion of oribatid mites, and community composition of soil-dwelling microarthropods within 4 native meadows recently transitioned from agricultural production. We collected data from native wildflower mix (23 spp. of native flowers and 1 sp. of native grass), native grass mix (80 % native grass spp., small proportion of native flowers), fallow, and hay (triticale and pea mix) fields located at the Hudson Valley Farm Hub (HVFB) in Hurley NY, during June, July, and August of 2020. We measured soil moisture and organic matter content with each sampling event. We collected a total of 2182 organisms representing 46 different taxa, including 20 different types of mites, with 9 representing oribatid mites. Overall, the hay field yielded the highest abundance (50.17± 6.01, 51.33± 8.97, 34.50± 10.15) and organic matter percentage(3.87 ± 0.32, 3.60 ± 0.26, 3.26 ± 0.15) for all 3 months, respectively. Taxa richness levels were highest in the hay field in June (12.67 ± 1.15) and August (9.83 ± 1.96) and in the native wildflower planting in July (13.33 ± 1.45). Shannon's diversity was also highest in the hay regime in June (2.14 ± 0.14) and August (1.91 ± 0.17) and in the native wildflower planting in July (2.31 ± 0.08). Soil Moisture content was highest in the native grasses planting in July (21.0 ± 3.68) and fallow field in June (14.37 ± 0.53) and August (32.4 ± 1.08). When organic matter was compared to oribatid mite percentage, we found 2 negative linear relationships in the hay and fallow fields and a positive linear relationship between the native wildflower and native grasses plantings. Different soil types between the plots may have influenced these results. This study is part of a larger study comparing the biodiversity of multiple communities within these native meadows to develop regional guidance for growers wanting to increase biodiversity on their farming systems.

Poster Session: Arthropod Ecology

Nuthatch Territories on The University of North Carolina at Pembroke Campus

Jenna K. Larkins (University of North Carolina-Pembroke, Pembroke, NC), Timothy J. Hinton (University of North Carolina-Pembroke), and Katherine K. Thorington (University of North Carolina-Pembroke)

Abstract - *Sitta Pusilla* (Brown-headed Nuthatch [BHNU]) and *Sitta Carolinesis* (White-breasted Nuthatch [WBNU]) are year-round resident species of climate concern. Documenting territory locations facilitates our understanding if and how their territories shift on the local scale in response to climate change and the increase in human development. We split the UNC Pembroke campus into two 17-ha sites, north and south, in which we conducted regular surveys of all identifiable bird species found while simultaneously mapping Nuthatch locations in ArcGIS. Regular surveys consisted of weekly counts following walking routes designed to systematically survey the sites as accurately as possible. We used the ArcGIS map to estimate the Nuthatch population density and territories numbers. Our fall data shows that the north, more rural, side of campus is more densely populated with Nuthatches compared to the south, more urban, side of campus. This fall, our observations on the north campus varied from 0 to 6 (average 2.3) BHNU per visit and 0 to 2 (average of 0.5) WBNU per visit, while our observations on the south campus varied from 0 to 4 (average 1.6) BHNU per visit and 0 to 1 (average 0.1) WBNU per visit. We found 3 BHNU territories in the north campus site and 2 territories in south campus site. The north campus had at least 2 BHNU territories and 1 WBNU territory this fall. The south campus had at least 2 BHNU territories and no WBNU territories. This spring, we will focus on documenting breeding territories during our surveys. Spring data collection is expected to yield similar bird-density results on campus and have more defined territory numbers and boundaries. We are currently expanding the project to include several off-campus sites for comparison. Data collected this school year provides a baseline for continued work studying Nuthatch demography and space use across the urban–agricultural gradient on campus.

Poster Session: Urbanization and Human Presence—Effects on Birds

Assessing The Nutrient-Removal Potential of Floating Treatment Wetlands In A Mesocosm Field Experiment

Brandon Lenberger (SUNY Plattsburgh, Plattsburgh, NY) and Mary Alldred (Assistant Professor, SUNY Plattsburgh, Plattsburgh, NY)

Abstract - Inputs of nutrients (e.g., nitrogen and phosphorous) to aquatic ecosystems lead to increased algal production and create anoxic conditions for organisms, often resulting in negative consequences for aquatic ecosystems and human health. Treatment wetlands offer one sustainable solution for removing excess nutrients and maintaining downstream water quality. Here we report the findings of a field experiment, wherein we monitored nutrient uptake and plant growth for 3 floating treatment wetlands (FTWs), relative to a non-vegetated control, under field conditions on Long Island, NY. Our design was based on previous work by others, but miniaturized to accommodate replicated experiments. We planted 3 replicate FTWs with native wetland plant species representing a variety of functional groups, and also created 1 FTW that contained only soil. After planting, the FTWs were allowed to equilibrate for several days and then exposed to site-collected water from Lake Ronkonkoma. We collected 50-mL water samples daily from each mesocosm for 11 days. We kept samples frozen until using a Seal AQ2 Discrete Analyzer to determinee nitrate, phosphate, and ammonium concentrations following standard colorimetric techniques. We measured species-specific plant height, percent cover, and root length on Days 0, 11, and 22. Aboveground and belowground biomass and new root growth were harvested, dried, and weighed to determine total production and to estimate potential nutrient removal for each plant species and for the plant community of each mesocosm. Preliminary results indicate great potential for nutrient removal in plant biomass. In the future, we plan to quantify in situ rates of nutrient-removal processes.

Poster Session: Human Impacts and Urban Ecology

Assessing the Impact of Dam Removal on Growth of *Anguilla rostrata* (American Eel)

Timothy Lengel (Bridgewater State University, Bridgewater, MA), Rianna Tamulynas (Bridgewater State University, Bridgewater, MA), and Kevin Curry (Bridgewater State University, Bridgewater, MA)

Abstract - The threatened *Anguilla rostrata* (American Eel) develops in freshwater but migrates to the Sargasso Sea to breed at the end of its life cycle. Anthropogenic obstacles can impede their movement by restricting them in stream habitats where they continue to grow larger. American Eels have substrate preferences that can offer shelter from predators, and larger eels prefer larger stream substrate. Thus, it is likely that eels will be larger on average in habitats that have large rocks as substrate. We conducted surveys using 3-pass block-net and stream-length sampling at sites on the Mill River in Bridgewater, MA, and Town River in Taunton, MA, carried out in 2018 and 2020. We calculated the mean size of the largest rocks of each sampling site using 3 ten-foot transects, taking 5 samples along each transect. In 2020 and 2018, the average size of the eels at Mill River, where 3 dams have been removed in the last 10 years, were found to be smaller than that of the eels at Town River, which is still obstructed by dams, despite the substrate being of similar size. We hypothesize that the process of habitat restoration following the removal of the dams may have been a significant factor in the difference in average eel size we found between the 2 rivers.

Poster Session: Freshwater Ecology

Potential Niche Differentiation During the Breeding Season Among Two Generalist Insectivores: Eastern Bluebird and House Wren

Audrey Lindsteadt (Missouri Western State University, Saint Joseph, MO) and Julie Jedlicka (Missouri Western State University, Saint Joseph, MO)

Abstract - Interspecific competition for food resources can be high during the breeding season, as many bird species provision nestlings and themselves with arthropod food resources. We investigated whether 2 generalist insectivores foraging in the same habitat exhibit dietary differences in the arthropods they feed to their young during the breeding season. Missouri Western State University's campus sits on 293 ha (723 ac) of land and is home to 62 nest boxes for cavity-nesting avian species. The majority of the nests we monitored were *Sialia sialis* (Eastern Bluebird) nests and *Troglodytes aedon* (House Wren) nests. In the summer of 2020, we collected fecal samples from nestlings twice a week from April through August. After DNA extraction in the fall, we sent 45 samples to a lab for further analysis using DNA metabarcoding and generalist arthropod primers to uncover dietary items. With these results expected in March, we hope to understand more about what different avian species feed their young when they are in the same, semi-urban environment. Molecular scatology is a growing field in ornithology and is a useful tool while studying community ecology. This approach to understanding the diet of birds is less intrusive than previous sampling methods.

Poster Session: Avian Habitat Use and Ecology

Nutritional Quality of Native and Non-Native Fruits for Migratory Songbirds

Cynthia Loi (School of Life Sciences, Rochester Institute of Technology, Rochester, NY) and **Victoria Kwasinski** (School of Life Sciences, Rochester Institute of Technology, Rochester, NY), Jenifer Rosete (School of Life Sciences, Rochester Institute of Technology, Rochester, NY), and Susan Smith Pagano (School of Life Sciences, Rochester Institute of Technology, Rochester, NY)

Abstract - Annual migration for birds is energetically taxing and they require adequate nutrients to make sure that they are healthy enough to survive their journey. Wild fruits are a common food source for migrating birds during fall as they stop to rest and refuel at stopover sites. The fruits that these birds eat must be comprised of enough fat, sugar, and energy to support refueling. The goal of this study is to compare the nutritional composition of native and non-native fruits eaten by fall migratory birds at an important migration stopover site near Lake Ontario. We collected ripe fruits from local native and invasive plants during peak migration and measured energy density and key nutrients in the fruit pulp, including crude fat, %ADF, and % sucrose. We also conducted a pilot study to determine the physiological impact of invasive fruit consumption on thrushes. Our results suggest that if invasive fruits outcompete natives at important stopover sites, then birds may be left with less nutritious options in fruits of the non-native species. In addition, our data indicates a trend of native fruits having higher energy density and higher crude fat compared to non-native fruits. These findings may impact the quality of habitats for stopover refueling of birds that rely on fruits as a food resource in the fall.

Poster Session: Avian Diets and Habitat

Determining the Diversity of Native Insect Pollinators in Nonagricultural Landscapes within the Mianus River Gorge Preserve

Sydney Lonker (White Plains High School, White Plains, NY) and **Madeline Buehrer** (Pelham Memorial High School, Pelham, NY)

Abstract - Past research has presented evidence suggesting the decline of pollinator populations, which is now apparent on a global scale. As more attention is being focused on the influence of land-use change regarding agricultural production and resource availability, researchers are looking towards sampling pollinators to further understand their current population dynamics. By following the Empire State Native Pollinator Survey's protocols, we used pan-trapping and intensive netting to sample bees and other pollinators within the Mianus River Gorge over June, July, and August of 2019 and 2020. For both pan-trapping and netting, we surveyed varying meadows and types of sites within each meadow depending on each year's floral patterns. Each of the pan-trap transects contained 15 traps laid out 3 m apart for a minimum of 5 hours on partly cloudy to clear days above 21 °C (70 °F); w conducted this type of trapping once a month, alongside supplemental hand netting. We compared a diverse set of meadows in order to gain a better understanding of what vegetation composition attracts a more favorable population of pollinators to improve the meadows' pollination and growth rates. Additionally, we used a program called iNaturalist to identify the insects within the meadows. We recorded the quantity and variety of insects and made comparisons among the pan-trapped meadows regarding habitat type and meadow name. We sent all of the information collected to entomologists for confirmation of identification and will be entered into New York State pollinator's database to help researchers gain a stronger understanding of NY's pollinators.

Poster Session: Pollinators

Causes and Consequences of Nest Predation in Northern Cardinals (*Cardinalis cardinalis)* in Rural and Urban Habitats

Shyla Luna (SUNY Oswego, Oswego, NY) and Daniel T. Baldassarre (SUNY Oswego, Oswego, NY)

Abstract - For birds, nest-site selection may be a major factor in the type and frequency of predation. For species such as *Cardinalis cardinalis* (Northern Cardinal) that experience intense and variable predation, measuring the variation in nest-site characteristics vs. nest-success rates may assist in understanding models of avian reproductive success. We monitored nests in rural (Rice Creek Field Station, Oswego, NY) and urban (Barry Park, Syracuse, NY) habitats, resulting in nest data from 34 different pairs. We analyzed characteristics such as nest height, vegetation height, and nest visibility for significant relationships with nest success over the nesting season. Preliminary results suggest that there may be a relationship between both height and visibility and nest success. Further observation of Northern Cardinal populations in rural and urban habitats will be important to show how these trends might be affected by increasing urbanization.

Poster Session: Urbanization and Human Presence—Effects on Birds

Campus Resources for Natural History Education: Development, Benefits, and Outreach

Alexandra Machrone (Binghamton University, Binghamton, NY), Weston Strubert (East Stroudsburg University, East Stroudsburg, PA), Jessica VanWhy (East Stroudsburg University, East Stroudsburg, PA), Catherine T. Klingler (East Stroudsburg University, East Stroudsburg, PA), Terry Master (East Stroudsburg University, East Stroudsburg, PA), and Emily Rollinson (East Stroudsburg University, East Stroudsburg, PA)

Abstract - Natural history collections and curated local field guides can enhance both biological education and community engagement with natural history. East Stroudsburg University has developed a series of educational resources to strengthen natural history training in STEM majors, including a curated museum collection and 2 campus field guides. The Schisler Museum of Wildlife and Natural History and McMunn Planetarium together serve as a regional center for natural history and science education, beginning at the K–12 level and continuing through university academic programs and a broad range of community groups. The museum houses over 140 wildlife specimens from around the world, presented in interpretive habitat displays. The ESU Arboretum Guide highlights labeled tree species found on campus, providing identifying characteristics and details of natural history. The ESU Bird Checklist provides information on bird species found on campus, including seasonal abundance and habitat preferences. Each supports natural history education at 3 levels. First, they provide a service-learning opportunity for students working as museum facilitators and creating the guides. Environmental Club students developed the Arboretum Guide, and the Bird Checklist was compiled as a graduate research project. Student facilitators employed in the museum gain skills in natural history education and museum studies. Secondly, several ESU STEM courses have incorporated the museum and guides into assignments and class activities. Finally, the museum and guides support education and engagement in the broader community. The Schisler Museum hosts over 10,000 visitors each year who attend educational events and tours provided by ESU student facilitators. The campus arboretum has supported a number of community outreach events for local environmental and gardening groups. Together, these resources provide teaching tools and outreach opportunities for local and global natural history.

Poster Session: Science Education

Assessment of Bird Community Stability in the Hudson Highlands West Important Bird Area, New York

Terryanne Maenza-Gmelch (Barnard College Department of Environmental Science, New York, NY)

Abstract - Black Rock Forest (1584 ha [3914 ac]) and surrounding preserves in the Hudson Highlands of New York were designated as an Important Bird Area (IBA) by Audubon New York in 2016. The region has a high diversity of both species and habitat due to toposequences and chronosequences. The forest is also part of a network of several large connected preserves. The IBA area was originally surveyed for the IBA application in 2012 by members of Black Rock Forest, Barnard College, Orange County Land Trust, and Mearns Bird Club. The area was resurveyed by teams of birders in 2018 in order to assess bird community stability. Point counts (circles with a 50 m radius; surveyed for 5 to 10 minutes each) and traveling counts were conducted in spring and summer of 2012 and 2018 throughout the IBA area. Species richness, birds per minute, status of sensitive species, 10 most abundant year-round resident forest bird species, 10 most abundant open-habitat birds, changes between 2012 and 2018, etc., were examined as a way to assess community stability. Species richness (105 and 107) and birds per minute (1.009 and 0.996) were similar between 2012 and 2018. The 10 most abundant year-round resident forest birds were the same between years. Eight of the 10 most abundant open-habitat birds were the same, but *Dolichonyx oryzivorus* (Bobolink) and *Sturnella magna* (Eastern Meadowlark) were not detected in 2018. Birds of interest to the IBA application appear on both years' lists except *Setophaga cerulea* (Cerulean Warbler) was not detected in 2018. Additional analyses are underway. Since the Black Rock Forest region is heavily forested in general and many of the preserved areas are connected, it may be that the bird communities are stable in these resilient lands despite the challenges posed by climate change. Future research will include repeat surveys every 5 years as a continuation of this assessment.

Poster Session: Avian Population Biology

Bidwell Street Open Space Wildlife Surveillance Project

Sophia Marler (University of Saint Joseph, West Hartford, CT)

Abstract - I conducted a general wetland surveillance between the dates of 18 May 18th and 14 August 2020 on the Bidwell Open Space in Glastonbury, CT, to determine what different species of wildlife are using the area. Birds, insects, mammals, and amphibians that were found to be present in the wetland and woodland as documented by the use of wildlife cameras, fecal analysis, track plates with scent lures, insect traps, and wildlife observations. I found a total of 136 different species in the wetland and woodland areas. There were 5 species of amphibians, 24 different species of birds, 92 species of arthropods, and 15 different species of mammals. I found 114 species in the wetland and 50 in the woodland. The great variety of species documented just between the months of May and August indicate that the area is a healthy one that is not only serving as a rainwater runoff catchment area, but also an important habitat for wildlife. The comparison of the 113 species found in the wetland versus the 50 that were found in the woodland shows that the presence of the wetland ecosystem could be attracting more wildlife than would be in the area if it was just a wooded area.

Poster Session: Using Trail Cameras and Other Technolgy to Document

Songbirds Provide Pest-control Services on New England Farms

Samuel J. Mayne (University of Massachusetts Amherst, Amherst, MA), Jeremy Andersen (University of Massachusetts Amherst, Amherst, MA), Joseph Elkinton (University of Massachusetts Amherst, Amherst, MA), and David King (USDA Forest Service Northern Research Station, Amherst, MA)

Abstract - Songbird control of agricultural pest populations through predation has the potential to aid small-scale farming operations, representing a rare win–win situation where wildlife conservation directly benefits agricultural productivity. Agricultural lands account for nearly half of global land use, and chemically intensive, industrialized farming poses a serious threat to many wildlife populations. However, low-intensity agricultural lands can play a key role in landscape conservation efforts by supporting protected areas while maximizing ecosystem services to remain agriculturally productive. Songbird populations on small, diversified farms in New England may play an important role in mitigating pest damage and outbreaks, but the extent to which this is true and the songbird species most responsible is unknown. Using DNA metabarcoding of songbird fecal samples, we analyzed the diets of common songbird species on New England agricultural lands to determine their role in insect pest reduction. Additionally, w used exclusion of songbirds from crops to determine the magnitude of reduction of agricultural pests through songbird predation. Preliminary findings suggest that songbirds do reduce insect pest populations through direct predation. These findings suggest that by ensuring robust songbird populations, agricultural pest-removal services can be enhanced. Thus, conservation practices such as maintaining vegetation in field margins can provide a dual benefit, improving pest suppression and enhancing wildlife habitat.

Poster Session: Avian Diets and Habitat

Boom–Bust Dynamics of Asian Shore Crabs in Southeastern New England

Haley McCusker (Bridgewater State University, Bridgewater, MA), Taylor Farber (Bridgewater State University, Bridgewater, MA), Alexis Gouthro (Bridgewater State University, Bridgewater, MA), Allyson Tolles (Bridgewater State University, Bridgewater, MA), Jacob Munafo (Bridgewater State University, Bridgewater, MA), and Christopher P. Bloch (Bridgewater State University, Bridgewater, MA)

Abstract - Invasive species often follow a boom–bust dynamic, in which the population grows to outbreak levels (boom), followed by a dramatic decline (bust). This trend may mirror the intensity of impacts on the invaded ecosystem. *Hemigrapsus sanguineus* (Asian Shore Crab) is an invasive species that was first observed in the United States in 1988 on Cape May, NJ, and is now the dominant brachyuran in rocky intertidal habitats throughout most of New England. Recent evidence suggests that *H. sanguineus* may be in bust phase at some sites in Long Island Sound and southern New England, but abundance and population dynamics are often spatially variable, so data from additional sites is necessary to determine if these apparent bust dynamics represent a general pattern. In this study, populations of *H. sanguineus* were observed for evidence of decline at 12 rocky intertidal habitats in Massachusetts and Rhode Island from 2014 to 2020. Data were collected using quadrat sampling once annually at each site. Sampling occurred between July and October, during the reproductive season of *H. sanguineus*. Abundance of *H. sanguineus* varied considerably even across relatively small spatial extents. Three basic patterns of population dynamics were observed: generally increasing, generally decreasing, and peaking, followed by a decline. These results suggest that local conditions may mediate regional trends in population dynamics of *H. sanguineus*, but longer-term data will be necessary to confirm these patterns, and especially to determine the significance of the apparent peaks in density.

Poster Session: Crab Population Biology

Gray Catbird Parental Care

Joseph Medica (PSU Schuylkill, Schuylkill Haven, PA) and Lucas J. Redmond (PSU Schuylkill, Schuylkill Haven, PA)

Abstract - Birds typically provide intensive parental care to their young throughout the nest cycle in the form of incubation, brooding, provisioning of young, and nest sanitation. These behaviors represent trade-offs because although they represent a cost to the parents in both time and energy, they increase the chance of successful reproduction. Although some of these behaviors may be exhibited by both sexes (e.g., nest sanitation, provisioning), some behaviors may only be performed by one of the sexes (e.g., only females incubate eggs in many species). Furthermore, some of these behaviors may be primarily performed by one sex and not the other. For example, females of some species may provision offspring at higher rates than the males they are paired with. We studied parental care during the nestling phase of the nest cycle in a population of *Dumetella carolinensis* (Gray Catbird) in southeastern Pennsylvania from 2017 to 2019. Catbirds are socially monogamous, multiple-brooded, open-cup–nesting songbirds that exhibit biparental care. We used remotely placed cameras at catbird nests (n = 16) to record and quantify feeding rates of males and females. Based on patterns observed in other songbirds, we predicted that female catbirds would feed at higher rates than males. We found no difference in feeding rates among years, and within years, feeding rates did not change across the breeding season. There was no difference shown in the feeding rate throughout a given year when analyzing individual pairs, nor was there any difference in average feeding rate years. Male catbirds fed their young at rates ~1.5 times greater than the females they were paired with. Further, male feeding rates were positively related with nest success. Our results suggest that the male catbirds have a much larger role in the parental care than was previously anticipated, as well as an integral role in determining the fate of their young.

Poster Session: Avian Behavior and Parental Care

The Effects of Biological Controls on Soil Seedbanks and the Habitat Restoration of a Secondary Successional Forest

Anna Meichenbaum (SUNY Geneseo, Geneseo, NY) and Suann Yang (SUNY Geneseo, Geneseo, NY)

Abstract - Invasive plant species are a major threat towards the biodiversity of a habitat. Biological controls, on the other hand, have been implemented in such areas to eradicate or reverse the effects of invasive plant species. *Capra hircus* (Goat) are being used increasingly as biological controls for eradicating invasive plant species from natural areas. We investigated the magnitude to which Goats can alter the dominance of invasive plant species in a secondary successional forest environment near Conesus Lake in Lakeville, NY. To measure this extent, we compared the soil seedbank to the seed rain at our site, along a gradient of browsed to unbrowsed plots along 2 transects (n = 20) that were 18 m apart laterally and 46 m apart longitudinally. We quantified the soil seedbank by identifying the seedings that emerged from soil samples extracted using a soil augur to a depth of 15 cm at each plot. We also collected the seed rain using 25 cm x 25 cm Astroturf seed traps at each plot. Our preliminary results, such as a higher amount of *Alliaria petiolata* (Garlic Mustard) in the seedbank than in the seed rain, indicate that the use of Goats as biological controls is effective, yet the alteration is not as rapid as it might seem because regeneration from soil seedbanks. Comparing and quantifying plant species results found above and below ground in the presence or absence of biological controls may aid in managing the restoration of an area. Future considerations may include revisiting this area over a longer time frame (in years) to examine if implementation of biological controls can completely eradicate invasive species in a habitat.

Poster Session: Invasive Species

Evaluating the Use of Artificial Nests by Native Bees

Allison A. Menendez (SUNY Geneseo, Geneseo, NY) and Jennifer L. Apple (SUNY Geneseo, Geneseo, NY)

Abstract - Many cavity-nesting native bees are important pollinators. These bees rear their brood in hollowed-out stems or other similar holes. We evaluated relationships between bee abundance and artificial-nest occupation across several locations on the SUNY Geneseo campus. Starting in spring 2020, we monitored nest boxes consisting of ~40 hollow 6-mm or 8-mm tubes aggregated in wooden frames at 4 locations on campus that likely differ in bee fauna. A wooden frame (the "bee barn") that supported 11 nest boxes was established in spring 2019 among the native plant gardens of the Spencer J. Roemer Arboretum, with a twelfth box added for this study. We placed 6 boxes, isolated into 3 sets of 2, in 4 locations on campus: (1) the Arboretum wildflower garden area, which is rich in flowers that bloom from early spring through late fall; (2) the back meadow area of the Arboretum, which is managed to promote the growth of wildflowers; (3) the no-mow zone, which is a patch of land left unmanaged; and (4) the eGarden which has a low availability of flowers from food gardens. We observed nest-building activity by recording the tube-filling material for each cavity in the nest boxes and the types of insects seen utilizing nest tubes. We sampled insects with bee bowls, blue-vane traps, and net surveys of each site. This study provided an understanding of which bee species are supported in artificial-cavity nests, how artificial-nest occupants compare to the surrounding bee fauna, how nesting cavities are filled throughout the season, and whether bees prefer high density over isolated nesting sites. The insect genera utilizing artificial cavity nests were a subset of the insect fauna at each location. The bees that most often utilized the artificial nesting cavities were in the *Megachile* and *Osmia* genera, including several non-native species. In each site as time progressed, the tube-capping materials got more diverse, and more tubes were filled. Bees utilized tubes in the bee barn more than the isolated boxes, indicating that cavity-nesting insects show preference for high-density nesting sites.

Poster Session: Pollinators

From Fillets to Fish Natural History

Joshlyn Mensah (St. Francis College, Brooklyn, NY) and Kathleen A. Nolan (St. Francis College, Brooklyn, NY)

Abstract - Our research couples a study of aspects of fish biology such as life history, the effects of pollutants on fish, and habitat and habitat usage with a study of fish as a part of a healthy diet. Healthy omega 3 oils are found in a variety of fish such as salmon, mackerel, and tuna. Conversely, fish taken from certain bodies of water contained methylmercury, which can offset the health benefits from the omega-3 fatty acids. Women in western Massachusetts reduced their consumption of fish by 17% after being informed about the dangers of mercury. Fish collected from the Great Lakes and Hudson River have shown substantial contaminants such as organic pollutants, dioxins, and dioxin-like compounds. One encouraging study in lake trout fillets showed a reduction in polychlorinated bi-phenyls (PCBs; 5200 ng/g to 100 ng/g) and dioxins (16 pg/g to 9 pg/g) in Lake Ontario, and a reduction of mercury (0.9 ug/g to 0.2 ug/g) over a 40-year period from 1970 to 2010. This study proposes to answer the following questions: How do these pollutants become concentrated in certain fish, and why is this dangerous? How does the fish's natural history affect their health, and then, ultimately, the health of the humans who consume them?

Poster Session: Science Education

Describing Genetic Diversity in a Non-Native Ant-Mimicking Spider

Cassidy Mills (SUNY Geneseo, Geneseo, NY) and Jennifer L. Apple (SUNY Geneseo, Geneseo, NY)

Abstract - The ant-mimicking spider *Myrmarachne formicaria* (Salticidae) is a species native to Eurasia and was first identified in North America in 2001. It has since been found in many locations in the Northeast including western New York, western Pennsylvania, northeastern Ohio, and southern Ontario. Little is known about its introduction to North America and how it has dispersed since. By characterizing the mitochondrial genetic diversity of this species, we can learn about its introduction history and dispersal patterns in North America. Sequencing of a 600-bp mitochondrial DNA gene region spanning the 16s rRNA, leucine tRNA, and part of the ND1 gene from 26 specimens collected from 14 localities in New York, Pennsylvania, and Ohio yielded no genetic polymorphisms. Comparisons with sequence data available with GenBank for other salticid species (*Myrmarachne erythrocephala* and *Habronattus ustulatus*) have shown that within-species divergence in this mitochondrial DNA region is found in other spiders, so *M. formicaria's* lack of variation is likely unusual. Our current data are consistent with a single invasion of *Myrmarachne formicaria* from 1 source locality, but data from additional loci and samples would help to confirm this conclusion.

Poster Session: Arthropod Ecology

Genus *Elliptio* Importance and Relationship to Zebra Mussels in Lake Champlain

Caleb Moffett (Saint Michael's College, Colchester, VT) and Declan McCabe (Saint Michael's College Biology Department, Colchester, VT)

Abstract - *Elliptio complanata* (Eastern Elliptio) is a native freshwater mussel and important component of the Lake Champlain food web. It is important to understand the species' impact on the lake's ecosystem and how it is impacted by the introduction of the invasive *Dreissena polymorpha* (Zebra Mussel). To determine these relationships, we took lakebed samples using ponar dredges and box cores and collected all macroinvertebrates. In the lab, the macroinvertebrates were identified, and the average total abundance, richness, dominance, and evenness were calculated. Our results show that when living Zebra Mussels occured in our samples, the number of dead Eastern Elliptio rose. Samples with living native mussels that were collected at shallow depths had the highest total abundance of macroinvertebrates, whereas samples with no native mussels generally had the lowest. There were no obvious trends with evenness and dominance. Samples with live native mussels had higher richness than samples lacking live mussels, but this difference was not statistically significant. These results have important implications for the impacts of Zebra Mussels on endangered native mussels and how this interaction may impact benthic diversity.

Poster Session: Freshwater Ecology

Drills do not Access Oyster Prey in Artificial Cages by Climbing Up Pilings

Michael G. Mongiello (Science Department, SUNY Maritime College, Bronx, NY), Michael Kanarian (Science Department, SUNY Maritime College, Bronx, NY)), Robert Crafa (The Waterfront, SUNY Maritime College, Bronx, NY), Andrew V. Michelson (Science Department, SUNY Maritime College, Bronx, NY)

Abstract - New York harbor used to have a thriving *Crassostrea virginica* (Eastern Oyster) population, but by the early 20th century, the oysters were nearly extirpated due to overharvesting and nutrient pollution. The oyster adaptation of filter-feeding can extract pollutants from water, however, enabling their use as a remediation tool. In 2014, the Billion Oyster Project formed to reintroduce Eastern Oysters back into New York Harbor. Their goal is to place one billion oysters in select locations throughout the harbor by 2035 so the oysters can filter out pollutants. One of its largest sites was installed at SUNY Maritime College in 2019 and now harbors more than one million adult and juvenile oysters. Over the ensuing 2 years, the mortality rate of these oysters remains high due to predation by *Urosalpinx cinerea* (Atlantic Oyster drill). These muricid predators leave a tell-tale sign: a perfectly circular indentation close to the hinge in the unattached oyster valve. We hypothesized oyster drills access prey by climbing up pilings used to stabilize campus waterfront infrastructure. We measured oyster mortality and number of drills in 6 cages: 3 cages were suspended equidistance more than 2 m between 2 pilings (1255 oysters across 3 cages), while 3 other cages were nearly touching a piling (0-0.7 m from nearest piling; 632 oysters in all 3 cages). Data collection took place over 6 weeks with the help of civilian scientists. Contrary to our expectation, we found significantly fewer drills in cages close to pilings with a mean of 36 drills per cage close to pilings and a mean of 69 drills per cage far from pilings. The result was 8% of oysters were killed by drills far from piling, while only 5% were killed per cage close to pilings. These drills may represent self-sustaining populations co-occurring with their prey inside installed oyster cages. Care must be taken to ensure artificially installed oyster cages do not become attractants for natural predators.

Poster Session: Marine and Coastal Ecology

Data Compilation and Spatial Mapping of Biodiversity in Suburban Natural Areas

Sean Moore (Siena College, Department of Environmental Studies and Sciences, Loudonville, NY) and Mary Beth Kolozsvary (Siena College, Department of Environmental Studies and Sciences, Loudonville, NY)

Abstract - The current rate of loss of biological diversity is alarming, and conservation biologists work to find ways to reverse those trends. However, with more than half the world's population in urban areas, many people are disconnected from nature and do not understand or appreciate the importance of stemming the loss of biological diversity. What is the importance of urban and suburban habitats to biodiversity? In particular, what role can natural areas on a suburban college campus provide in terms of supporting a diverse array of biodiversity habitat? This research project had 2 primary objectives: (1) compile existing records of species for targeted taxonomic groups (e.g., birds, mammals, amphibians, reptiles, insects) on Siena College's campus, and (2) create a spatial database and map to facilitate identifying key natural areas that support biodiversity. We compiled biodiversity data for several taxonomic groups and uploaded the information to a standardized database. We created a mechanism for uploading additional biodiversity data from a variety of sources (e.g., iNaturalist, research projects). This spatial database has created a useful tool for mapping, visualizing, and identifying key natural areas that support biodiversity.

Poster Session: Conservation and Biodiversity

***Spartina alterniflora* (Smooth Cordgrass): What is Gained When a Foundation Species is Restored?**

Max Morrill (Sacred Heart University, Fairfield, CT) and **Victoria Morales** (Sacred Heart University, Fairfield, CT), Jennifer H. Mattei (Sacred Heart University, Fairfield, CT), Jo-Marie Kasinak (Sacred Heart University, Fairfield, CT), and LaTina Steele (Sacred Heart University, Fairfield, CT)

Abstract - Long Island Sound, an urban estuary, has lost the majority of the area once covered by foundation species that supported the ecological health of the Sound. Human activity (e.g., shoreline armoring, nitrogenous waste and other pollution) has degraded and led to the loss of coastal habitats. The installation of living shorelines, restoring functional ecological communities, is imperative! *Spartina alterniflora* (Smooth Cordgrass) is a foundation species that supplies numerous ecosystem services if allowed to grow in abundance. Its fibrous root system holds sediments, prevents erosion, improves water quality, and promotes biodiversity. Recently, in 2014 and 2017, a living shoreline was installed along the western shore of the Housatonic River estuary in Stratford, CT. Shoreward of each 45-m-long section of artificial reef constructed of Reef Balls®, thousands of Smooth Cordgrass plugs were planted in the barren cobble substrate. Over the course of 6 years, undergraduate research assistants from Sacred Heart University helped measure the growth and recovery of this fringing marsh habitat. By July 2020, average stem height of Smooth Cordgrass reached 78.8 cm. The average stem density increased significantly from 32.3 m^2 to 307.1 m^2 in 2020. The biodiversity and biomass of fish and wildlife has increased dramatically in the area since the restoration was completed in 2018. The following list is an example of some of the shorebirds and waders that have been observed feeding at the site: *Haematopus palliatus* (American Oystercatcher), *Pluvialis squatarola* (Black-bellied Plover), *Charadrius semipalmatus* (Semipalmated Plover), *Actitis macularius* (Spotted Sandpiper), *Tringa semipalmata* (Willet), *Ardea herodias* (Great Blue Heron), *Egretta thula* (Snowy Egret), *Nycticorax nycticorax* (Black-crowned Night Heron), and *Butorides virescens* (Green Heron). The area is particularly vulnerable to the impacts of climate change including increased sea-level rise, flooding, and shoreline erosion. An adaptive management plan has been developed by a team of restoration/conservation ecologists for the site that includes expanding the living shoreline and conserving the natural coastal habitats including oyster reefs and saltmarsh.

Poster Session: Marine and Coastal Ecology

Breeding Phenology, Movements, and Diet of Barn Owls (*Tyto alba*) in Mississippi

Natasha K. Murphy (Mississippi State University, Starkville, MS), Catherine Paul (Mississippi State University, Starkville, MS), and Scott A. Rush (Mississippi State University, Starkville, MS)

Abstract - Within the US, the *Tyto alba* (Barn Owl) is listed as Endangered in 10 states and listed as a species of special concern in 11 others. Reasons for such declines (e.g., habitat loss, agricultural intensification) support the need for quantitative assessments of population size, prey use, and landscape use in other locations throughout North America. This study aims to address these key knowledge gaps by focusing on a population in Mississippi where there are an estimated 820 individual Barn Owls. We build, install, and monitor nest boxes at locations where landowners report owl activity and evidence of owls are found. We studied nesting phenology, movements, and diet between September 2019 and January 2021 in the Black Belt region of Mississippi. This presentation reports the findings from 1 location (Prairie Wildlife, MS) where there are 7 nest boxes. During this period, owls nested year-round, with peaks of laying in February/January and August. Owls averaged 4.2 eggs and 32 days incubation per clutch during the study period. The minimum recorded distance between nests was 0.41 km. Owls nested in various structures, including shooting houses, traditional barns, and a covered bridge. During the study period, we deployed 7 GPS loggers, the data from which revealed an average home-range size for females (n = 4) of 1.75 km^2. Home ranges were generally small, with some long-range movements. For example, we recorded a movement of ~40 km from the nest site where a adult female was captured (Clay County, MS) to Pickens County, AL, where it was relocated. GPS fixes suggest that Barn Owls utilize landscapes dominated by pasture and hay (53.1% of fixes), with some use of evergreen woodlands (18% of fixes), cultivated crop fields (13.7%), and emergent herbaceous wetlands (9.9%). Barn Owl home ranges, on average, comprised an area of 52% pasture and hay, reflecting the high use of these areas by GPS-tagged individuals. Home ranges comprised of 20% cultivated crop fields, 5% evergreen forests, and 3% emergent herbaceous wetlands. Pellets and prey remains were collected from nests and roosts throughout the year. Diet was comprised primarily of *Sigmodon hispidus* (Hispid Cotton Rat), with the percentage of birds and insects varying between seasons. We found in pellets the remains of 2 bird species—*Passer domesticus* (House Sparrow) and *Melospiza georgiana* (Swamp Sparrow)—that were previously undescribed in the diet of Barn Owls in Mississippi.

Poster Session: Breeding and Nesting Biology of Birds

Introduction of Native *Podostemum ceratophyllum* Michx. (Podostemaceae, Hornleaf Riverweed) into the Norwalk River, Wilton, CT

Kelly Nealon (Western Connecticut State University, Danbury, CT), C. Thomas Philbrick (Western Connecticut State University, Danbury, CT), and James Wood (West Liberty University, West Liberty, WV)

Abstract - *Podostemum ceratophyllum* (Hornleaf Riverweed; Podostemaceae), is a native aquatic flowering plant that occurs only attached to rocks in river rapids. Over the last several decades, the species has notably declined in numbers, largely a result of human-induced factors. The ecological importance of *P. ceratophyllum* in rivers is well documented. Herein we report on the first attempts to transplant the species into a river where it was not known to occur, with the goal of helping to mitigate the loss of populations. The plant was taken from 2 "donor" rivers where the species grows naturally, and moved into the Norwalk River (Wilton, CT), as well as between the 2 rivers of origin. Relative growth rate was significantly impacted by the location the plants were moved to, but not by the source-river plants were moved from. Transplanted *P. ceratophyllum* grew in each of the 3 rivers, although the growth rate was notably lower in the Norwalk River. Results from 1 field season shows that the methodology used to transplant *P. ceratophyllum* was successful, as the plants survived and grew during the 4–5 month monitoring period. Details of methodology will be discussed as well as plans for future study.

Poster Session: Freshwater Ecology

Enhancing Ecological Pedagogy with Individual Mandala Projects

Mark Norris (Stevenson University, Owings Mills, MD)

Abstract - I utilized a mandala project to enhance comprehension and flexibility in an elective ecology course this academic year. The project was based on David Haskell's concept of a forest mandala in his book, *The Forest Unseen*, in which he studied the ecology and natural history of a 1-m^2 "mandala" in an old-growth forest throughout an entire year. My ecology students were permitted to select their own mandala and given greater freedom in defining their mandala space. This approach allowed great flexibility during the Covid-19 era such that in-person students could establish their mandala in the natural habitats on campus, while remote students selected parks near their home or even in their backyard. I based a substantial portion of the course assessments on these mandalas. Students were expected to visit their mandalas and record observations every few weeks in a notebook and then use these observations to complete guided journal assignments. Journals were evaluated in lieu of exams, requiring students to apply their personal observations to class material to demonstrate content comprehension and synthesis. The mandala projects culminated in a semester-end Mandala Symposium in which every student presented the ecological story of their mandala. This pedagogical approach allowed for novel and individualized connection to the course material. Students overwhelmingly had a positive response to the project, unanimously saying that they strongly/agreed that the mandala helped them better understand class concepts and that they increased their understanding of how nature works. Several students made particular note of the mental health benefit of sitting and watching nature. Given their feedback and my own assessment of the students' mandalas, I anticipate making this project a permanent requirement in this course and recommend this or similar ideas for related courses.

Poster Session: Science Education

Baseline Understanding of Mesocarnivores in the Downeast Lakes Community Forest

Kendall O'Connell (Western Connecticut State University, Danbury, CT)

Abstract - Mesocarnivores are important species to consider when managing forests in northeastern United States. This study looked at baseline information regarding mesocarnivore presence in the Downeast Lakes Community Forest (DLCF) in northwestern Washington County, ME. I placed 20 Bushnell Trophy Cam HD Aggressors in the DLCF in a stratified randomized method with management designation and forest cover type as limiting factors. These cameras remained present year round from 2016 to 2020 and were checked at minimum twice year when accessibility allowed. I coded the images from SD cards after each trail camera check, and conducted data analysis using the software PRESENCE. There were 10 different mesocarnivore species detected. Naïve occupancy rate saw a general increasing trend over the years and there was not a statistically significant change in detectability over time, although a slight increase in detectability was observed in 2020. This study provided useful initial insights about these species from a land-management perspective and baseline information for future research endeavors to further explore mesocarnivore presence in this location.

Poster Session: Using Trail Cameras and Other Technolgy to Document

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

Ayodele C. O'Uhuru (Department of Environmental Conservation, University of Massachusetts, Amherst, MA), Bethany A. Bradley (Department of Environmental Conservation, University of Massachusetts, Amherst, MA), and Toni Lyn Morelli (Department of Environmental Conservation, University of Massachusetts, Amherst, MA; Northeast Climate Adaptation Science Center, US Geological Survey, Amherst, MA)

Abstract - As climate change makes sweeping adjustments to our landscapes and ecosystems, there is increasing concern that new invasive species threats will arise. As temperatures rise, species that have been introduced into the United States from warmer environments are likely to find even more suitable habitats. With the northeastern US projected to become wetter and warm faster than the global average, climate change is likely to cause invasive species to shift their ranges northward and may awaken "sleeper" invasive species. Sleeper species are currently naturalized species that could become invasive (i.e., begin spreading and having negative impacts) with climate change. Because sleeper species are not currently invasive, eradicating naturalized populations now is a management option. To focus limited management resources on naturalized species posing the greatest threats, we identified sleeper species that will cause various degrees of harm, using a list from the US Department of Agriculture PLANTS database. We further refined our prioritization list of 670 unique species in the region (New England plus New York) based on introduced species regulated in the Northeast and regulated elsewhere in the lower 48. From the yielded 670 species, 55 were regulated elsewhere, 15 species were regulated in the region, and 600 were nonregulated. Next we conducted Web of Science literature reviews and assessed species using the IUCN- supported protocol called the Environmental Impact Classification of Alien Taxa (EICAT). With EICAT, we assessed the magnitude of ecological and presence of socio-economic impacts using an impact scale from minimal to massive concern. Using this system, we created a list of plant species that previously were not a threat but could become invasive to this region due to climate change. The overall goal of this research is to identify high-risk sleeper species that could be eradicated prior to becoming invasive.

Poster Session: Invasives Management Techniques and Strategies

Success of Batesian Mimicry in the Ant-mimicking Spider *Myrmarachne formicaria*

Julia Ophals (SUNY Geneseo, Geneseo, NY), **Niaomi VanAlstine** (SUNY Geneseo, Geneseo, NY), and Jennifer L. Apple (SUNY Geneseo, Geneseo, NY)

Abstract - *Myrmarachne formicaria* (Salticidae) is an ant-mimicking spider native to Eurasia which arrived in North America fairly recently, first noted in Ohio in 2001. It is important to understand how *M. formicaria* will impact other species as it spreads throughout North America. *Myrmarachne formicaria* spiders mimic ants in both their body shape and their movements. These spiders move their forelegs to mimic ant antennae, as well as bob their abdomen. The goal of this study was to evaluate the success of Batesian mimicry in this spider through experiments that staged encounters between *M. formicaria* and another salticid spider that has the potential to be a predator. We placed the predator spiders in a small petri dish with either *M. formicaria* or a non-mimic salticid spider of a different species; we conducted 33 trials of each set up. We recorded the trials for 4 minutes each or until an attack was recorded. *M. formicaria* was attacked less frequently by the predator compared to the non-mimic (P = 0.045). By using BORIS event logging software, we scored the frequency of behaviors in the ant-mimics including abdominal bobbing and movement of their enlarged chelicerae. Preliminary analysis of the videos showed that ant-mimics benefit from some of these movements as individuals that were not attacked exhibited a longer duration of chelicerae movement. We found no significant difference in abdomen movement between ant-mimics that were attacked or not. Ant-mimics do seem to benefit from a lower incidence of attack. Whether this is a result of the spider's appearance, behavior, or both, further investigation is needed to understand the benefit that Batesian mimicry provides for these spiders.

Poster Session: Arthropod Ecology

Regen at the Rock: Fine-Scale Patterns of Jack Pine Regeneration at Altona Flat Rock, NY

Mikayla Osmer (SUNY Plattsburgh, NY), Mark Lesser (SUNY Plattsburgh, NY), and Harleigh Green (SUNY Plattsburgh, NY)

Abstract - Disturbance is essential for shaping and maintaining ecosystems. For species with adaptations to a specific disturbance regime, changes in the intensity, duration, and interval of the disturbance may have adverse effects on resilience and recovery. *Pinus banksiana* (Jack Pine) is a fire-dependent species relying on fire to (1) open its serotinous cones allowing seed to release, and (2) create seedbeds by exposing mineral soil and removing understory competition. The Altona Flat Rock in northern New York is home to a globally rare sandstone pavement Jack Pine-dominated barrens. In 2018, a wildfire burned ~200 ha of the Flat Rock forest providing us the opportunity to study post-disturbance recovery of Jack Pine at this location. Jack Pine seedlings began germinating within a month following the wildfire, and in spring of 2019, there were on average 275,000 seedlings/ha across the burned area compared to a pre-fire stand density of ~5000 stems/ha, suggesting that significant mortality will occur in coming years and/or decades as individuals grow and mature. The goal of this study was to track seedling survival and growth at very-fine spatial scales (10 cm^2) to determine how microsite conditions affected success. In fall of 2018, we established 3 random sites within the burned area, each site consisting of three 1-m^2 plots. We established a 10-cm^2 grid in each plot and determined the rooting substrate and percent cover of competing vegetation, along with the number of Jack Pine seedlings in each grid cell. We monitored seedlings each fall and spring since 2018 for survival and since fall 2019 for height growth. Initial seedling densities in fall 2018 varied from 1,070,000 to 353,000 seedlings/ha across the 3 sites. Continued germination through 2019 has offset mortality and maintained the initial density at 1 site; however, significant mortality has occurred at the other 2 sites, reducing densities by 50–90%. In further analysis, we will model survival and height growth against the measured variables to elucidate relationships between seedling success and microsite factors.

Poster Session: Fire Ecology

Veery (*Catharus fuscescens*) Nest Composition and Structure

Sienna C. Paulsen (Environmental Studies Department, Massachusetts College of Liberal Arts, North Adams, MA) and Daniel P. Shustack (Environmental Studies Department, Massachusetts College of Liberal Arts, North Adams, MA)

Abstract - We collected 7 *Catharus fuscescens* (Veery) nests in July 2020 from a deciduous forest in western Massachusetts, after the birds' nesting attempts were completed. Nests were comprised of 4 distinct layers that we designated the lower outer layer, upper outer layer, inner layer, and cup lining. We dried the nests in an oven, and then subsequently dismantled them. For each nest layer, we separated and weighed the leaves, twigs, bark strips, and small, unidentifiable pieces of litter. The total nest mass varied from 37.2 to 68.1 g, with an average mass of 47.7 g. Identifiable leaves included those of *Fagus grandifolia* (American Beech)*, Quercus* spp. (oak) and *Acer* spp. (maple). Most leaves were skeletal, fragmented, and attached to mud, thus indicating they were plant remains from previous growing seasons that nest-building Veeries likely retrieved from the ground. Other identifiable materials included twigs of *Lonicera* spp. (Honeysuckle), *Berberis thunbergia* (Japanese Barberry), and *Rosa multiflora* (Multiflora Rose), as well as bark strips taken from *Vitis* spp. (Grape vines). These bark strips were concentrated in the nests' inner linings and made up 23.6–51.0% (mean = 39.8%) of a nest's entire weight. Each nest also contained large amounts of dried mud and unidentifiable plant fragments, most of which was located between the inner and outer nest layers and appeared to hold the bark fragments together. This mud and unidentifiable plant matter averaged 12.4 g and made up 9.6–42.2% (mean 25.8%) of a nest's entire weight.

Poster Session: Breeding and Nesting Biology of Birds

Entomopathogenic Nematodes as Biological Control Agents of the Invasive Brown Marmorated Stink Bug

John A. Pipino (SUNY Cobleskill, Cobleskill, NY) and Carmen Greenwood (SUNY Cobleskill, Cobleskill, NY)

Abstract - For nearly 20 years, *Halyomorpha halys* (Brown Marmorated Stink Bug) has been considered an agricultural pest in the United States. With the ability to overwinter, the capability to reproduce in high numbers, and with no specificity of a particular food source, this extremely mobile insect has eluded pest-management strategies from coast to coast. With many studies conducted on the application of entomopathogenic nematodes to other insect pests as a means of biological control, we hypothesized that the terrestrial Brown Marmorated Stink Bug would succumb to entomopathogenic nematode applications in infection trials in the laboratory. Through soil sampling and bioassay techniques, we discovered 2 entomopathogenic nematode species in New York State, *Steinernema carpocapsae* and *Steinernema feltiae*, which we utilized in the infection trials of reared 2nd instar Brown Marmorated Stink Bugs. We applied 2 ml of 151 IJ/ml *Steinernema carpocapsae* and 140 IJ/ml of *Steinernema feltiae* dilutions to the 2nd instar stink bugs, with 2 ml of tap water applied to our control groups. The results of our bioassay uncovered that prevalence of both entomopathogenic nematode species were highest in an Unadilla silt loam soil type. *Steinernema carpocapsae* prevalence exceeded that of *Steinernema feltiae* in all field-cover types except in subplots planted with wildflowers. We found that over a 17-day infection trial, both the *Steinernema carpocapsae* and *Steinernema feltiae* infection groups demonstrated an increase in mortality percentages throughout our study. Our 151-IJ/ml *Steinernema carpocapsae* application showed average mortality rates at 47% after 7 days. In our postmortem dissections of all the 2nd instar stink bugs used within our trials, we found no entomopathogenic nematodes present in the cadavers. We conclude that although no nematodes were present upon dissection of our stink bug cadavers, we cannot rule out *Steinernema carpocapsae* or *Steinernema feltiae* as the cause of death of the 2nd instar Brown Marmorated Stink Bugs in our trials.

Poster Session: Invasive Species

Exploratory Behavior of Urban and Desert House Finches

Sarah Polekoff (Arizona State University, Tempe, AZ), Wan Rong Chua (Arizona State University, Tempe, AZ), Ray Pressman (Arizona State University, Tempe, AZ), and Pierre Deviche (Arizona State University, Tempe, AZ)

Abstract - Urban animals face evolutionary novel environmental conditions. Past avian studies reported behavioral and physiological effects of urban living, but the mechanisms that underlie these effects remain poorly understood. In particular, behavioral and physiological differences between environments may reflect either adaptation to urban environments or phenotypic adjustments to local conditions that are related, e.g., to food availability. In addition, results of previous studies vary across species and cities. For example, urban birds are often more exploratory than rural birds, but some studies found the opposite or no habitat-related differences in exploratory behavior. Our research investigated exploratory behavior and morphological correlates in urban- and desert-dwelling *Haemorhous mexicanus* (House Finch). We predicted urban House Finches to show more exploratory behavior than their desert counterparts. To test this prediction, we are sampling House Finches at an urban site (Arizona State University, Tempe campus) and a nearby Sonoran Desert site (McDowell Mountain Regional Park) during the non-breeding seasons of 2020 and 2021. We are capturing finches using seed-baited traps. All the finches are bled, measured, and marked with tarsal color bands for identification purposes before release. We are testing exploratory behavior in the field using a mobile, collapsible wooden chamber with pegs inside. Blood samples will be used to determine endocrine status and oxidative status.

Poster Session: Urbanization and Human Presence—Effects on Birds

Is There Vocal Recognition of Conspecific Juveniles by Adults in Two Avian Brood Parasites?

Rocio Prieto (University of Buenos Aires, Argentina), M. Cecilia De Márs ico (University of Buenos Aires, Argentina), Juan Carlos Reboreda (University of Buenos Aires, Argentina), and Romina C. Scardamaglia (University of Buenos Aires, Argentina)

Abstract - In avian brood parasites, juveniles need to locate and recognize their conspecifics to continue their life cycle after being raised by individuals of another species. However, little is known about the mechanisms and cues involved in this critical stage of their lives. One possible mechanism is that adult female parasites facilitate the early socialization of juveniles by interacting with them. During those interactions, the juveniles could learn and/or reinforce the necessary cues to recognize conspecifics. In birds, one of the main communication channels is acoustic; therefore, if facilitation does exist, adult females are expected to be able to recognize and respond positively to the vocalizations of juveniles of their own species. To test whether adult females of *Molothrus bonariensis* (Shiny Cowbird) and *M. rufoaxillaris* (Screaming Cowbird) are able to recognize juvenile conspecifics based on acoustic signals, we carried out 2 experiments: 1 in semi-captivity and 1 in the field. In both cases, 3 types of playbacks were presented sequentially and in random order to adult males and females of both cowbird species: vocalizations of Shiny Cowbird juveniles, vocalizations of Screaming Cowbird juveniles, and white noise as a control. The vocalizations corresponded to begging calls of birds between 13 and 20 days old. In the experiment in semi-captivity, no significant differences were found either between the type of playback or sex of the individual for any of the 3 response variables we measured: duration of the response, latency to approach the speaker, and number of interactions with the speaker. In the field experiment, no conspecifics approached the area during the playback. In all cases, the recruited individuals were the hosts of the species whose playback was being played. Our results suggest that adult females of the Shiny Cowbird and the Screaming Cowbird are not capable of recognizing juvenile conspecifics through acoustic signals, at least not through the type of signals used in these experiments.

Poster Session: Song and Vocalizations in Birds

Zebra Mussels: Are They Truly Harmful?

Nadia Racz (Saint Michael's College, Colchester, VT) and Caleb Moffett (Saint Michael's College, Colchester, VT)

Abstract - The goal of this project was to determine the effect of *Dreissena polymorpha* (Zebra Mussel) on macroinvertebrates in Lake Champlain. Samples were taken from 225 benthic sites throughout the Inland Sea, the northeastern portion of Lake Champlain that is separated from the main lake by a chain of islands. We took samples using box corers and petite Ponar dredges. Macroinvertebrates were processed through a 0.5-mm sieve and preserved and identified along with Zebra Mussels. Our results showed a trend of increasing macroinvertebrate diversity with increasing Zebra Mussel numbers. This study is important because it is essential that we understand the influences of well-established populations of exotic Zebra Mussels on benthic communities.

Poster Session: Freshwater Ecology

The Effects of the Highlands Conservation Act on Landscape-Scale Conservation and Protection of At-risk Species

Lauren Ramos (American Conservation Experience, US Fish and Wildlife Service, Wildlife and Sport Fish Restoration Program, Hadley, MA), Jason Rasku (US Fish and Wildlife Service, Wildlife and Sport Fish Restoration Program, Hadley, MA), Kyle Welsh (US Fish and Wildlife Service, Wildlife and Sport Fish Restoration Program, Hadley, MA), and Renee Farnsworth (US Fish and Wildlife Service, Science Applications, Hadley, MA)

Abstract - The Highlands Conservation Act (HCA) authorizes the US Fish and Wildlife Service to provide financial assistance to state agencies in Connecticut, New Jersey, New York, and Pennsylvania for land conservation within the Highlands Region, a 1,376,000-ha (3.4-million-acre) landscape of Appalachian ridges, hills, and plateaus that stretch from northwest Connecticut to eastern Pennsylvania. State agency partners are required to provide 50% matching funds for HCA land-acquisition grant awards. Projects that protect important wildlife habitat, conserve forest and water resources, add to previously conserved land, and expand recreational opportunities are ranked highest for funding. Since the passage of the HCA in 2004, more than 4047 ha (10,000 ac) have been permanently protected adjacent to one of the most densely populated regions in the country. Conservation of critical habitat is imperative for at-risk species, but landscape connectivity is also necessary to facilitate species dispersal across the landscape, which may be integral for annual survival and population recovery. In addition, climate-change impacts are likely to make a connected natural landscape even more important for successful range shifts and species survival. Accordingly, it is important to understand the impact the HCA has had on landscape-scale conservation and to see if the grant program has resulted in positive impacts on landscape connectivity and species conservation. To understand the impact of this grant program on landscape connectivity, we analyzed HCA projects within the context of existing conserved lands in the Highlands Region. Additionally, we analyzed the overlap between HCA projects and data on federally listed and at-risk species to infer the impact of the grant program on species protection. Understanding the effect of the HCA grant program on landscape conservation is needed to affirm the value of federal financial assistance for high-priority landscapes and can be used to inform future land-conservation efforts, such as the goal to protect 30% of land and water within the United States by 2030 as set forth by President Biden in the Executive Order on Tackling the Climate Crisis at Home and Abroad.

Poster Session: Conservation and Biodiversity

Variables Affecting the Growth of the Invasive Plant, *Microstegium vimineum*, in Bedford, New York

Kristen Reiss (North Salem High School, North Salem, NY) and Budd Veverka (Mianus River Gorge Preserve, Bedford, NY)

Abstract - Japanese Stiltgrass, *Microstegium vinemium,* is a plant species native to Asia and invasive to New York state, where it outcompetes native species. Past studies done in the southeastern United States have shown that environmental factors, such as exposure to light and canopy coverage, contribute to the rapid growth of Japanese Stiltgrass. This study aimed to see if variables studied in the southeastern United States have the same effect on Japanese Stiltgrass in Bedford, NY(specifically, in the forests surrounding the Mianus River). In the first year of data collection (summer 2019), at each of 6 sites, we created fifty 1 m x 1 m plots spaced 5 m apart along 5 parallel transects that were 45 m in length and spaced 10 m apart. We marked each plot with a flag. We estimated percent coverage of *Microstegium vimineum* and measured the amount of light (light meter), canopy coverage (densiometer), soil pH (pH meter), and soil moisture (soil moisture meter) at each plot. From the first year results, there was no statistically significant trend between the percent coverage of Japanese Stiltgrass and the environmental factors due to many limitations, including varying weather and reading bias in the densiometer. For the second year of data collection (summer 2020), we used newer technology to better measure if canopy coverage affects Japanese Stiltgrass in Bedford, NY. Using the Nikon Coolpix 4500 (camera) with Nikon Fisheye Converter Lens attached, a picture was taken at each 1 m x 1 m plot at every site. The second year, Japanese Stiltgrass coverage was still estimated by percentage, but was then placed into ranks (1: <25%; 2: 25–50%; 3: 50–75%; 4: >75%). Using Simon Fraser University's Gap Light Analyzer software, we then analyzed the pictures were for % of canopy openness. There was a trend that with more canopy openness, there was greater coverage of Japanese Stiltgrass, but it was not statistically significant. More experiments should be conducted on Japanese Stiltgrass in the Northeastern United States to better understand how the invasive grass spreads.

Poster Session: Invasive Species

Correlations Between Free-ranging Domestic Cat Activity and Land-Cover Type across an Urban Gradient

Fanny Riand (University of Massachusetts Amherst, Amherst, MA), Aaron Grade (Clark University, Worcester, MA), Sebastian Moreno (University of Massachusetts Amherst, Amherst, MA), Susannah Lerman (USDA Forest Service Northern Research Station, Amherst, MA), and Paige Warren (University of Massachusetts Amherst, Amherst, MA)

Abstract - The free-ranging *Felis catus* (Domestic Cat) has been estimated to kill 1.3-4.0 billion birds each year, making it the single greatest source of anthropogenic mortality for birds in the United States. This loss is particularly significant given that wild bird populations in the continental US and Canada have declined by almost 30% since 1970. However, a limited number of studies have identified the landscape-level features that may influence the presence of free-ranging cats in an area. We explored the relationship between cat activity and surrounding land-cover type based on a camera-trapping survey across an urban gradient in western Massachusetts. We calculated the proportion of major land-cover types within a 400-m radius of each camera trap for 36 sites. Based on linear models, cultivated land had a positive correlation with cat activity, while evergreen forest had a negative correlation with activity. These results align with previous studies, which have found that unowned cats frequent more farmsteads in the fall and winter than expected, as well as more grassland and urban areas throughout all seasons. This research can be used to refine and better target management and outreach efforts to reduce the negative impacts of free-ranging cats on birds and other wildlife.

Poster Session: Human Impacts and Urban Ecology

Observance and Eradication of Incised Fumewort in the Bronx River Watershed

Isabella Rice (Bronxville High School, Bronxville, NY), Stephen Kovari (Bronxville High School, Bronxville NY; Vassar College, Poughkeepsie, NY), and Justine McClellan (Bronxville High School Bronxville, NY)

Abstract - Invasive species cause damage to ecosystems by outcompeting native flora and reducing biodiversity, making it a priority to prevent the emergence of new invasives. *Corydalis incisa* (Incised Fumewort) is an emerging invasive species in Westchester County, NY, whose potential impact on the ecosystem is currently unknown. Originally from Japan, China, and Korea, Incised Fumewort was first documented around the Bronx River in 2005, likely introduced through horticulture. Incised Fumewort is a biennial plant, blooming purple flowers in early spring. Seeds are waterproof and disperse via rivers and streams, creating a high risk of spread in the Bronx River watershed, especially due to higher rates of flooding in recent years. The new-emergence stage provides a unique opportunity to prevent the species from becoming permanently established. A combination of outreach and education, natural history observations, and volunteer efforts are used with the goal of eradicating Incised Fumewort. Education and outreach, in coordination with the Bronx River Alliance, consists of a series of informational videos and presentations. They aim to inform the community about the dangers of introducing novel species, and teach the public to recognize and report Incised Fumewort. Public reporting of Incised Fumewort patches via iNaturalist will help target areas for further study and removal. Volunteer events to pull Incised Fumewort, based partly on these observations, will occur in Spring 2021. In addition, natural history observations will occur to better understand the plant's distribution and mechanisms of dispersal. Using QGIS, an open source geographic information system, we will create a 2021 map of Incised Fumewort locations and population density, which can be compared to previous maps created by Iona College researchers over the past 2 years. The information will contribute to long-term data on growth rates, spreading patterns, and best methods of eradication. Our goal of successful removal of Incised Fumewort, and similar emerging invasive species, will involve a combination of data and assistance from the public.

Poster Session: Invasive Species

Impact of Moon Phase on Animal Activity in South Burlington, VT

Kayla Riordan (Saint Michael's College, Colchester, VT) and **Geoffrey Stewart** (Saint Michael's College, Colchester, VT), Timothy Strzepa (Saint Michael's College, Colchester, VT), and Brynn Clory (Saint Michael's College, Colchester, VT)

Abstract - We obtained data using 22 Browning trail cameras installed at the Underwood Property and by underpasses at Centennial Brook and Potash Brook in South Burlington, VT. We programmed each camera to record time on a 24-hour clock, temperature in degrees Celsius, and moon phase in an informational tag placed at the bottom of each image taken. On 16 November 2019, we secured the cameras to sturdy trees or thick bushes at knee height (~0.6 m) off the ground. At this height, the motion-sensored cameras could detect and capture images of a wide variety of sizes of animals, from rabbits to deer, that crossed in front of them. We collected the cameras on 9 February 2020. Our objective was to see if the moon phases correlated with animal activity. We tested for this relationship by finding the average animal encounters per day for each moon phase, then we split the moon phases into 2 groups: light (full moon, waxing gibbous, waning gibbous, 1st quarter), dark (new moon, waxing crescent, waning crescent, last quarter), and middle (first quarter and last quarter). The dark moon phases showed the highest average observations per day over the 86-day study, and the light moon phases showed the lowest average observations per day. This result indicates that there is some correlation between moon phases and animal abundance; however, our analysis does not take into account other factors that may influence activity such as habitat density, temperature, and weather conditions.

Poster Session: Using Trail Cameras and Other Technolgy to Document

Uncovering Bird Diets on Kenyan Coffee Farms

Bailee Romaker (Missouri Western State University, Saint Joseph, MO), Audrey Lindsteadt (Missouri Western State University, Saint Joseph, MO), Christopher Watson (Missouri Western State University, Saint Joseph, MO), and Julie Jedlicka (Missouri Western State University, Saint Joseph, MO)

Abstract - There are many unknowns when it comes to the ecosystem function of birds on coffee farms. In previous Neotropic studies, it has been determined that birds consume coffee pests to some degree. This is important, ecologically, to better understand food webs. It is also important economically and is of interest to coffee farmers. If birds are consuming coffee pests, growers may be more inclined to adopt more sustainable practices that attract more birds. This research is focused on the information we can learn about bird diets from DNA in avian fecal samples from Kenyan coffee farms. We conducted this research throughout 3 field seasons and many hours in the lab. In the field, we used mist nets to capture birds to collect fecal samples. After 365 samples were collected, we shipped them to Missouri Western State University. We used DNA extraction techniques to isolate DNA fragments in-house. Then, in December 2020, we shipped 165 samples to Jonah Ventures' environmental DNA laboratory for extensive DNA sequencing. Soon, the data will return, and we will be able to understand more deeply about the influence that birds have on the insects that occur in Kenyan coffee farms. We are interested in evaluating whether birds are providing ecological services by consuming coffee pests or disservices through the consumption of natural predators of coffee pests. I will present our methods of preparing and conducting fieldwork and our initial findings on the ecosystem function of birds on Kenyan coffee farms.

Poster Session: Avian Diets and Habitat

Repeat Photography Captures a Century of Landscape Change on Aquidneck Island, RI (1880–2020)

Caitlyn F. Rubino (Salve Regina University, Newport, RI), Jameson F. Chace (Salve Regina University, Newport, RI), and Jodie Goodnough (Salve Regina University, Newport, RI)

Abstract - Over the past 100 years, the landscapes of New England have been altered drastically due to land development by humans. Repeat photography is an essential tool for identifying landscape changes in the past century. The goals of this scientific research project were to identify the vegetation and geographic differences of specific locations on Aquidneck Island, RI, by examining archival images and re-photographing the same scene in order to make visual and, later, ground-truthed assessments. I photographed in 2020 locations that were depicted in photographs from the archives of the Newport Daily News that were originally taken in 1880-1930. My photographs were made in the same foliage season as the originals. Comparisons between photographs show 3 main trends in Newport, RI, over the past century: urban areas are more forested with urban tree planting, rural areas have become more densely developed with more tree canopy, and low-density estates are surrounded by a coastal vegetation that is more shrub- and tree-dominated and less open grassland. The resident population of Newport (currently ~25,000) has increased since 1880 (15,693), with a nearly 50% increase over the years 1920–1950. The vegetation changes do not appear to be a result of urban sprawl. Clearly evident in the repeat photography are the changes with increased interest in urban forestry and landscape horticulture over the past century in Newport, as well as increased infrastructure along major roadways. Changes in vegetation are consistent with changes in the avifauna. Shrub and tree encroachment, and likely propagation, in the maritime coastal grasslands is coincident with the decline of winter populations of grassland birds per the Christmas Bird Count, notably *Plectrophenax nivalis* (Snow Bunting), *Eremophila alpestris* (Horned Lark), *Asio flammeus* (Short-eared Owl), and notable increases in shrub-foraging winter birds such as *Junco hyemalis* (Dark-eyed Junco) and *Melospiza melodia* (Song Sparrow). Photographic analysis using repeat photography provides valuable insights into the possible causes of population change for some taxa.

Poster Session: Conservation and Biodiversity

Anthropogenic Disturbances Affect the Distribution and Abundance of Shorebirds on Long Island Sound Beaches

Tiffani Rushford (Purchase College, SUNY, Purchase, NY), Allyson Jackson (Purchase College, SUNY, Purchase, NY), and George Kraemer (Purchase College, SUNY, Purchase, NY)

Abstract - During the summer, both avifauna and humans increase drastically on Long Island Sound beaches. We conducted beach surveys along the shoreline in July and August 2020 at Sunken Meadow State Park (5 surveys), Short Beach (8 surveys), Long Beach (8 Surveys), and West Meadow (5 surveys) to compare human presence and avifauna abundance across all 4 beaches. The beaches varied from high human disturbance (Sunken Meadow State Park and Long Beach) to moderate (West Meadow) to low disturbance (Short Beach). The goal is to determine if the number of humans on the beach influences the number of birds present on the beach during the survey. There was wide variation between surveys; number of birds varied from 3 to 197 while number of humans varied from 4 to 4122. While there was a difference between beaches in number of humans counted, there was no significant difference in the number of individuals in the avian population. Our preliminary results suggest that humans negatively impact avian presence with high sound-level disturbances on the beach, but also positively impact avian presence with anthropogenic food sources.

Poster Session: Urbanization and Human Presence—Effects on Birds

Winter Raptor Abundance and Distribution in Addison County, Vermont

Jenna Schlener (Vermont Institute of Natural Science, Quechee, VT) and Jim Armbruster (Vermont Institute of Natural Science, Quechee, VT)

Abstract - While raptor migration strategies have been well documented, their winter use of the land in the Northeast is less studied. Investigating the spatial and habitat needs of these winter residents will help us understand how to better protect and conserve the area in the future. To do this, we set up a standardized route to drive 3 times a week to survey the area for raptors in Addison County, VT. We concentrated on a smaller area of northwestern Addison County that covered ~97 km (~60 mi) 2 days per week and surveyed a larger portion of the county covering 160 km (100 mi) once per week. During each survey, we noted the species, location, age if discernable, and position (flying, perched, or on the ground) of every raptor encountered. The 2 most common species were *Buteo jamaicensis* (Red-tailed Hawks) and *Buteo lagopus* (Rough-legged Hawks). The number of raptors encountered per survey varied from 35 to75 individuals for the smaller route and from 65 to 105 individuals for the larger route. In addition to the surveys, we placed GPS units on 2 local Red-tailed Hawks as part of a preliminary study on winter home-range and habitat use. We will analyze these data to determine the abundance and distribution of wintering raptors in this region, their timing of migration, and how local weather impacts these factors. The results of this study will be used to inform our educational programs and to engage with the community on habitat conservation.

Poster Session: Avian Habitat Use and Ecology

Encountering Multiple *Plethodon cinereus* (Red-Backed Salamander) Under the Same Cover Object, Spring vs. Fall

Bethany Shaw (SUNY Oneonta, Oneonta, NY), Daniel Sitch (SUNY Oneonta. Oneonta, NY), and Elizabeth Bastiaans (SUNY Oneonta, Oneonta, NY)

Abstract - The highly philopatric *Plethodon cinereus* (Red-Backed Salamander) employs territorial behavior to reduce their risk of predation and to guard food resources. This species is ubiquitous and often highly abundant in northern hardwood forests, leading to intense competition for territories and resources within the population. During most of the year, *P. cinereus* of both sexes behave agonistically toward any conspecific entering their territory. However, *P. cinereus'* agonistic behavior seems to decrease with respect to the opposite sex during the biannual mating seasons. Previous research has suggested that there might be behavioral differences in these salamanders between their spring and fall mating seasons based on female's decreased capacity to store sperm during the fall season. Since 2017, we have monitored 6 coverboard arrays in upstate New York throughout the fall and spring. Using this data, we will test whether there is a reduction of territoriality (by measuring the frequency of multiple salamanders under the same coverboard) in order to determine if this salamander exhibits behavioral differences during the spring versus the fall mating season.

Poster Session: Herpetology

Does Flight-calling Behavior Differ in Response to Conspecific and Multispecies Calling Cues?

Alex Sidare (Canisius College, Buffalo, NY), Will Vega (Canisius College, Buffalo, NY), and Sara Morris (Canisius College, Buffalo, NY)

Abstract - A conspicuous feature of avian migration is the use of flight calls during nocturnal migratory flights. Flight calls are short, species-specific vocalizations with a function that is unknown, although previous work has shown that they elicit calls from other individuals. Because the timing of many warbler species' migration overlaps, flight calls may be used for interspecific communication. The goal of this experiment was to compare responses to conspecific flight calls versus a selection of mixed species flight calls. In conjunction with the Appledore Island Migration Station (Appledore Island, ME), we used captive warblers to investigate responses to flight-call recordings in an acoustically isolated chamber. Individuals were assigned to either hear conspecific or mixed-species recordings. For each individual, we determined whether it responded, and if so, the latency (time between cue and first call) and the rate of calling (calls/min). The species we tested were *Setophaga ruticilla* (American Redstart [AMRE]; $n = 928$) and *Setophaga magnolia* (Magnolia Warbler [MAWA]; $n = 772$). Our initial hypothesis was that birds would be more likely to respond, respond more quickly, and respond with more calls in response to conspecific calls than to mixed-species calls. Our results showed both American Redstarts and Magnolia Warblers are significantly more likely to respond to conspecific calls (AMRE: $\chi^2 = 25.4$, df = 1, $P < 0.001$, MAWA: $\chi^2 = 18.3$, df = 1, $P < 0.001$). Neither species responded more quickly to conspecific than mixed-species cues (AMRE: $t_{11.6} = 1.17$, $P = 0.26$, MAWA: $t_{12.7} = 1.17$, $P = 0.26$). Whereas Magnolia Warblers displayed a higher rate of calling when responding to conspecifics than to the mixed-species cue ($t_{19.4} = 2.52$, $P = 0.02$), American Redstarts did not ($t_{12.8} = 0.25$, $P = 0.81$). Thus, our results provide some evidence that birds are responding differently to conspecific cues than mixed-species cues, although not by all metrics. The varied results may indicate that flight calling is used both for conspecific and heterospecific communication during migration.

Poster Session: Song and Vocalizations in Birds

Effects of Climate and Atmospheric Deposition on Tree Growth in a Boreal Peatland at its Southern Range Limits

Anna Skolnick (SUNY Plattsburgh, NY), Steve Langdon (Shingle Shanty Preserve and Research Station, Adirondack Park, NY), and Mark Lesser (SUNY Plattsburgh, NY)

Abstract - Boreal peatlands are major carbon sinks accounting for approximately one-third of global soil carbon. Further, they are important components of regional biodiversity, especially along their southern range limits, where they are found nested within northern hardwood forests. These peatlands are often threatened by tree encroachment brought about by climate change and atmospheric deposition. Tree encroachment into open peatland systems changes the hydrology, biogeochemistry, and community composition, ultimately altering ecosystem services. Understanding how tree encroachment into open peatlands proceeds from initial establishment events to fully mature forested bogs is essential for the long-term management of these systems. A key component of this transition appears to be the shift from shrublike mats of primarily *Picea mariana* (Black Spruce) to treelike individuals that eventually form a closed canopy. The purpose of this study was to determine the timing of this release from the shrub stage to the erect tree stage, and how that timing was related to climate and atmospheric deposition. We studied this process at Shingle Shanty Peatland, located in the west-central Adirondacks in upstate New York. We obtained 1-cm cookies from 11 recently released trees in the open bog (7 Black spruce, and 4 *Larix laricina* [Eastern Larch]). We measured annual ring widths and crossdated all samples using standard dendrochronological techniques. Tree ages varied from 40 to 76 years for Black Spruce and from 37 to 62 years for Larch. Growth patterns (ring-widths) will be modelled against climate (PRISM 4 km monthly temperature and precipitation) and atmospheric deposition (National Atmospheric Deposition Program, Huntington Site) variables to determine how these factors are associated with both release events and subsequent growth. This study has the potential to inform conservation efforts for boreal peatlands.

Poster Session: Human Impacts and Urban Ecology

Monitoring the Northernmost Black Skimmer Colony on the Atlantic Coast

Kayla Smith (BiodiversityWorks, Vineyard Haven, MA), Luanne Johnson (BiodiversityWorks, Vineyard Haven, MA), Liz Olson (BiodiversityWorks, Vineyard Haven, MA), and Carolyn Mostello (MassWildlife, Westborough, MA)

Abstract - *Rhyncops niger* (Black Skimmers [BLSK]) are at the northern extent of their breeding range in Massachusetts and have nested sporadically in the state. In 2012, BLSK were documented nesting on the island of Martha's Vineyard for the first time and since then have established a productive nesting colony on the island. We started a collaborative banding project in 2017 and placed field-readable on 3–12 chicks each season. As of the 2020 season, a total of 36 chicks have been banded and 23 individuals have been reported at least once along the Atlantic and Gulf coast after fledging. We will use re-sight information gathered from within the nesting colony and from migration and overwintering sites to better understand site fidelity, chick survival, dispersal, and population dynamics during this period of increase. This banding and re-sight effort is ongoing.

Poster Session: Avian Population Biology

Amphibian Species Richness and Distribution in Vernal Pools at Glover's Ledge, Langdon, NH

Kimberly Snyder (Antioch University New England, Keene, NH), Lisabeth Willey (Antioch University New England, Keene, NH), and Peter Palmiotto (Antioch University New England, Keene NH)

Abstract - The Glover's Ledge (GL) property in Langdon, NH, contains several vernal pools that have never been monitored or officially categorized. With the goal of better managing GL for its amphibian residents, the objectives of this study were to assess the hydrologic profile of the GL vernal pools over the duration of the breeding season, identify composition and relative abundance of amphibian species utilizing vernal pools, and provide baseline amphibian data for future monitoring and management at GL. Egg masses of *Rana sylvatica* (Wood Frog) and *Ambystoma maculatum* (Spotted Salamander) in onsite pools were monitored weekly, alongside hydrological data on the trends of pool depth, pool extent, temperature, and pH. We also recorded weather data weekly to determine input to the pools from rainfall. These baseline data are important in understanding the GL amphibian community and revealing areas where we can focus our efforts to improve future studies and management efforts.

Poster Session: Herpetology

SPARCnet Year 4: Seasonal Differences in Abundance of *Plethodon cinereus* in SE Massachusetts

Alyssa St John (Bridgewater State University, Bridgewater, MA), **Alexander O'Roak** (Bridgewater State University, Bridgewater, MA), Charles Graziano (Bridgewater State University, Bridgewater, MA), Sean King (Bridgewater State University, Bridgewater, MA), Drew Rezendes (Bridgewater State University, Bridgewater, MA), and M. Caitlin Fisher-Reid (Bridgewater State University, Bridgewater, MA)

Abstract - The Salamander Population and Adaptation Research Collaboration Network (SPARCnet) is a network of researchers located across northeastern North America studying the effects of land-use change, climate change, and other factors on the abundance and population dynamics of *Plethodon cinereus* (Eastern Red-Backed Salamander). Bridgewater State University began sampling in April 2017. This poster reports on 4 years of mark–recapture data within 6 primary plots and 3 years of mark–recapture data within 2 secondary plots started in April 2018, as well as a pilot study of microbial diversity on salamander skin. Across all 8 plots, we have observed 1935 total salamander captures (including recaptures) and have marked 920 individuals. In both 2017 and 2019, capture rates were higher in the fall compared to the spring, with fall 2019 (n = 512) capture rates being more than double spring 2019 (n = 238) capture rates, however this pattern was not observed in 2018, with fall (n = 257) and spring (n = 266) showing roughly equal capture numbers, and Spring 2020 data was not collected due to COVID-19 restrictions. From 2017 to 2020, our average recapture rate across all 8 plots is 52%. Across all 8 plots and seasons, we continue to observe strong differences in abundance (min–max = 0.17–2.80 salamanders/m^2), which may be due to habitat factors such as soil pH, soil moisture, and canopy cover. We hope to test the role these factors may play in abundance in upcoming seasons. During Fall 2020, we also piloted a protocol for sampling skin microbes on 10 individual salamanders from a single plot on the same day. We used 16S Illumina sequencing to explore microbial diversity; however we experienced a high sequencing failure rate (60% failure) despite high concentrations of extracted DNA. We plan to refine this protocol in Spring 2021 and then collect additional swabs to explore the relationship between plot density, morphology, and skin microbial community composition.

Poster Session: Herpetology

Comparison of Community Composition in Recently Restored and Natural Wetlands

Maranda B. Stech (Stevenson University, Owings Mills, MD) and Mark Norris (Stevenson University, Owings Mills, MD)

Abstract - As the human population increases, anthropogenic development is becoming more common, altering land and destroying wetland habitats. Wetlands provide many ecosystem functions that are necessary for ecological services and are critical habitats for many species. To stop further loss of ecological services, wetland restoration has become favored to reverse the deconstruction of wetlands. Our study focuses on 2 restored and 2 natural wetlands at Irvine Nature Center located in Owings Mills, MD. All sites were chosen for different biotic and abiotic characteristics. Surveys were conducted collecting data on biotic factors of vegetation presence, birds, animals, and amphibians in order to compare community composition within the restored and natural sites. Abiotic factors of temperature, shoreline complexity, and area were also collected to determine whether these factors have an effect on biodiversity in these wetlands. Sites with higher shoreline complexity showed no correlation with biodiversity. Although sites with larger areas showed a positive correlation with higher diversity. It can be concluded that all wetlands contain various characteristics and functions that lead to varying biodiversity within the sites present at Irvine Nature Center.

Poster Session: Conservation and Biodiversity

Examining Breeding Habitat of *Setophaga caerulescens* (Black-throated Blue Warbler) in Northeastern Forests

Brian R. Stokes (Tin Mountain Conservation Center, Albany, NH), Rick Van De Poll (Tin Mountain Observation Center, Albany, NH), and Katharine E. Lewis (Tin Mountain Conservation Center, Albany, NH)

Abstract - Tin Mountain Conservation Center (TMCC) has conducted point-count surveys on 2 forested sites, the Bear Paw Timberland (186 ha [459 ac]) and the Rockwell Sanctuary (59 ha [146 ac]), located in Carroll County, NH, for the past 8 years. The Bear Paw Timberlands is comprised of a mixed forest that is regularly managed using single-tree and group-selection timber harvest methods every 2–4 years. The Rockwell Sanctuary is home to a conservation center managed for educational and recreational use, where timber harvests do not occur. The Rockwell Sanctuary is also home to the northernmost *Kalmia latifolia* (Mountain Laurel) grove in North America. TMCC performed occupancy surveys for *Setophaga caerulescens* (Black-throated Blue Warbler) at 44 point-count locations during the past 8 breeding seasons (May–July). We compared vegetative characteristics at the Bear Paw Timberlands and the Rockwell Sanctuary to determine whether selective timber harvest impacts Black-throated Blue Warbler occupancy. These surveys show a positive correlation ($P \leq 0.05$) between modeled occupancy of Black-throated Blue Warblers at the site that employed selective harvest methods, areas with increased sapling cover, and areas with Mountain Laurel presence. Many studies have indicated that Black-throated Blue Warblers require dense shrubbery under continuous canopy of tall trees for breeding habitat. We considered other factors including canopy cover, basal area, and average tree diameter and found no significant impact on modeled occupancy of Black-Throated Blue Warblers. Our results indicate that the primary factors influencing Black-throated Blue Warbler occupancy relate to the forest understory. We propose that post-harvest vegetative characteristics create suitable habitat for breeding Black-throated Blue Warblers in areas where selective timber harvest is performed at regular intervals of 2–4 years. This harvest method allows for increased growth of woody understory vegetation, increasing available nesting and foraging habitat for Black-Throated Blue Warblers. While canopy cover is likely to be an important factor in determining Black-throated Blue Warbler occupancy, our data shows no statistically significant correlation ($P \leq 0.05$) between these variables.

Poster Session: Avian Habitat Use and Ecology

Impact of Temperature on the Diversity and Abundance of Animals in South Burlington, VT

Timothy Strzepa (Saint Michael's College, Colchester, VT), **Brynn Clory** (Saint Michael's College, Colchester, VT), Geoff Stewart (Saint Michael's College, Colchester, VT), and Kayla Riordan (Saint Michael's College, Colchester, VT)

Abstract - We obtained data using a total of 18 trail cameras spread amongst 3 locations—the Underwood Property and by highway underpasses at Centennial Brook and Potash Brook in South Burlington, VT—from 16 November 2019 to 7 February 2020. We were investigating to determine if there is a correlation between temperature and the number of observed animals and whether different species are more or less active depending on the temperature. We recorded observations categorized by temperature at the time the image was captured (min–max = -20–12 °C). There was greater species diversity when the temperature fell between -6 °C and 2 °C compared to at other temperatures. Greatest animal activity was recorded as temperatures were closer to 0 °C. The Browning trail cameras used in this study are designed to function at temperatures as low as -34 °C. We therefore propose that the observed pattern is due to increased animal activity when the temperature is closer to 0 ° C rather than issues to camera function. To further explore the potential issue of camera functionality we installed three cameras on a short hiking route in the Saint Michael's College Natural area. These cameras are being visited regularly and at different temperatures to test camera function.

Poster Session: Using Trail Cameras and Other Technolgy to Document

Effect of Heat-abatement Treatment on Nest-box Temperature and Reproductive Success of Eastern Bluebirds

Katie J. Stumpf (Georgia College, Milledgeville, GA), Charlie M. Muise (Institute for Bird Populations, Atlanta, GA), and Wayne Powell (Decatur, GA)

Abstract - Increasing global temperatures may affect nest-site selection, nest productivity, and long-term survival of cavity-nesting birds. Well-designed and appropriately placed nest boxes with stable internal temperatures can minimize the energetic demands on the attending adult, resulting in more and/or healthier offspring. Our objectives were to determine: (1) how heat-abatement treatment (painting or metal heat shield) affect internal nest-box temperatures and (2) the effect of temperature on nest success and nestling health. We recorded temperature every 60 minutes in 50 *Sialis sialis* (Eastern Bluebird) nest boxes at Panola Mountain State Park using iButton dataloggers and recorded hemoglobin (g/mL) from nestlings. Seventy-two percent of nests (31/43) fledged at least 1 bird from 34 nest boxes. Nest boxes that were painted light blue were less likely to be occupied than those with a foil shield (chi-squared = 7.61, $P = 0.05$) and were significantly ($F = 8.06$, $P = 0.001$) cooler (22.85 0.94 C) than the boxes with nothing (23.98 0.48 C) or boxes with the foil (23.999 0.25 C). Neither heat abatement treatment (chi-squared = 0.89, $P = 0.64$) nor average daily temperature (chi-squared = 2.42, $P = 0.11$) affected nest success in occupied nests. Average hematocrit of nestlings didn't differ significantly between foil and no treatment ($n = 15$, $t = -0.3$, $P = 0.6$) and was not associated with average daily temperature ($F = 0.46$, $P = 0.51$), though nestlings from warmer nests tended to have a lower average hematocrit. While painted nest boxes weren't less successful and didn't affect temperature or nestling hematocrit, we recommend against using them since they were occupied less frequently. Nest boxes with heat shields didn't affect nest success but did show slightly higher average daily temperatures, which was negatively associated with hematocrit, a measure of nestling health. We recommend using standard nest boxes in warm climates and only using heat shields in cooler climates where low nest-box temperatures may increase energetic demands on the incubating adult since foil shields have been shown to raise nest-box temperatures when ambient temperatures are low. Nest boxes at Panola have a higher than average success rate, so these results may have an even larger effect at sites where boxes experience a higher failure rate or where occupancy is much lower.

Poster Session: Breeding and Nesting Biology of Birds

Assessing Impact on Dam Removal on Stream Habitat and American Eels

Rianna Tamulynas (Bridgewater State University, Bridgewater, MA), Cameron Black (Bridgewater State University, Bridgewater, MA), Timothy Lengel (Bridgewater State University, Bridgewater, MA), Samantha King (Bridgewater State University, Bridgewater, MA), and Kevin D. Curry (Bridgewater State University, Bridgewater, MA)

Abstract - *Anguilla rostrata* (American Eel) is a catadromous fish listed as endangered on the IUCN red list, though not currently listed as endangered by the US Fish and Wildlife Services. The inability for larger American Eels to migrate upstream due to dams has been shown to be a factor in the decrease of eel populations. To assess impact of dam removal, we compared substrate embeddedness and total lengths of eels at 7 different sites on 2 rivers between the months of September and October. We assessed substrate embeddedness using a 22.9 cm x 22.9 cm square grid to take 10 samples across three 3-m (10-ft) transects within each 3-pass removal sample site. In Fall 2019, we discovered a significant negative correlation between percent embeddedness and eel total length. No correlation was found between density and percent embeddedness. Sites at the Mill River, Taunton, MA, were upstream and downstream of dam-removal sites. Sites at the Town River were below 2 separate dams—at High Street, Bridgewater, MA, and WAR Memorial Park, West Bridgewater, MA—that are scheduled for removal.

Poster Session: Freshwater Ecology

Osteological histology of the Cretaceous Seabird *Pasquiaornis* (Avialae, Hesperornithiformes): Implications for the Flight Ability of the Basal Hesperornithiforms

Tomonori Tanaka (Tamba Dinosaur Fossil Lab, Tamba City, Japan, and University of Hyogo, Kobe City, Japan), Ryuji Takasaki (Okayama University of Science, Okayama, Japan), and Timothy T. Tokaryk (University of Regina, Regina, SK, Canada)

Abstract - Hesperornithiformes are the oldest seabirds and flourished in the northern hemisphere during the Cretaceous (100 to 66 Ma). While the derived members of the clade (e.g., *Hesperornis*) were flightless, the process and the timing hesperornithiforms lost their flight ability remains unknown. *Pasquiaornis* is a basal hesperornithiform that was potentially volant, based on the forelimb morphologies. Here we provide the first osteohistological description of 2 *Pasquiaornis* species (*P. tankei* and *P. hardiei*) and infer their flight ability through comparisons with extant foot-propelled diving birds (volant and flightless cormorants). The dataset we used demonstrates that while the humeral relative cortical bone thickness (RCBT) is indistinguishable between the volant and flightless cormorants, the femoral RCBT is significantly higher in the flightless forms than the volant forms, with a threshold at around = 0.6 in foot-propelled diving birds. The femoral RCBT of *P. hardiei* (0.53) and *P. tankei* (0.67) suggest that *P. tankei* could have been a short-distance flying or completely flightless diver, whereas *P. hardiei* was volant. This hypothesis is also concordant with the estimated body mass of *P. hardiei* (0.7 kg) and *P. tankei* (4.5 kg), which are roughly equivalent to the volant *Microcarbo pygmaeus* (Pygmy Cormorant) and flightless *Phalacrocorax harris* (Galapagos Cormorant), respectively.

Poster Session: Avian Morphology and Physiology

Insect Community Regeneration Following a Wildfire at Altona Flat Rock Pine Barren, Altona, New York

Heather M. Thompson (SUNY Plattsburgh, Plattsburgh, NY)

Abstract - Disturbance plays a key role in governing ecosystem structure and processes. Each system impacted by disturbance regenerates in a unique way, illustrating the resilience of these ecosystems and the diverse communities they support. Wildfire is a classic example of natural disturbance, and regeneration following fire is heavily dependent upon fire severity and frequency, as well as factors like regional topography, hydrology, and connectivity to unburned patches. Insects are an often overlooked group of organisms impacted by fire, and play crucial roles in nutrient cycling and pollination, as well as many other ecosystem services. Insects are sensitive to environmental changes and can prove valuable when assessing environmental health. Studies have shown that insect abundance decreases following fire, though diversity ultimately increases. Insects have been observed exhibiting attraction to burned areas, as well as avoidance behaviors. Flying insects are particularly capable of avoiding fire, and dispersing to cleared patches, making them an interesting group to study when assessing the impacts of fire. Following a wildfire in July of 2018 at Altona Flat Rock Pine Barrens in Altona, NY, I collected samples from 1 malaise trap set at an unburned reference site and 1 malaise trap at a site impacted by the fire on a weekly basis for 1 month following the fire, and, starting earlier to collect early summer insects, then every 3 weeks throughout the summer of 2019. I identified all insects at least to Order, and identified Diptera to Family given their prevalence and diversity. Preliminary results show that in 2018 overall abundance was slightly greater at the burn site, and generalist representatives from the Dipteran superfamily Oestroidea seemed to dominate at the burn site, whereas the predatory Dolichopodidae dominated at the reference site. In 2019, the reference site had greater abundance, and each site appeared to have different dominant primary consumers (Lepidoptera at reference, Hemiptera at burn), as well as an increase in representatives from non-Dipteran pollinating groups. As sampling continues, I will see if these communities diverge or become more similar with time, and hope this study can establish a baseline for the diversity of flying insects of this pine barren and provide insight into the impacts of fire on these unique ecosystems.

Poster Session: Fire Ecology

Do Fires Change *Rhea americana* (Greater Rhea) Habitat Use? Study in the El Palmar National Park, Argentina

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Abstract - Fire avoidance was one of the first management conservation policies of El Palmar National Park (EPNP). However, this decision may have resulted in the epxansion of shrubs over the palm-tree savannas, vegetation characteristic of the protected area. Therefore, a program of prescribed fire was adopted to mimic the original natural fire regime of the zone. We hypothesize that the native *Rhea americana* (Greater Rhea), a flighless bird which is adapted to fire, might respond favorably to such a regime of periodic burning. The objective of this study was evaluating the effect on the habitat use of Greater Rhea resulting from a natural fire that occurred on ~1100 ha in March 2018 in PNEP. We recorded indirect signs such as footprints and feces in 16 band-transects of 400 m x 6 m located in different environments of the area afffected by the fire during 1 year before (April 2017 to February 2018) and after (April 2018 to March 2019) the fire. We recorded 9 landscape variables at each sampling site. Additionally, we placed 1 camera-trap per site in 5 burned sites during 40 to 85 days in each season for a year and recorded the presence, hours of use, and behavior (feeding, resting, walking) of Greater Rhea in those areas. We analyzed the association between the occurrences of Greater Rhea with the fire event, season of the year, and the landscape characteristics by means of generalized linear mixed models. This study detected the presence of Greater Rhea in all the environments in every season of the year, mainly in the open spaces such as grasslands or palm savannas. Greater Rhea did not change their habitat use of the diverse environment within the national park after this low-severity natural fire. The burned places were immediately used by this native species for feeding, breeding, and walking along all the day. These results reinforced the idea that Greater Rhea is a grassland species adapted to fires, and these events would not affect their habitat use and daily activities in the protected area.

Poster Session: Avian Habitat Use and Ecology

Anthropogenic Effects on Asian Shore Crab Densities in Southeastern New England

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Abstract - *Hemigrapsus sanguineus* (Asian Shore Crab) is an invasive species first discovered in the United States in Cape May, New Jersey in 1988. It was believed to have been introduced via ballast water. Humans are well known to facilitate the introduction of invasive species, but little is known about their impacts on population dynamics. The objective of this study was to observe the impact of human activity on the abundance of the Asian Shore Crab. We collected data from 12 rocky intertidal habitats in southeastern Massachusetts and Rhode Island. At each site, we employed quadrat sampling annually (between June and October, during the breeding season of the Asian Shore Crab) from 2014 to 2020 to estimate population density of the Asian Shore Crabs. At these sites, we estimated population density of humans, distance to the nearest paved surface, and distance to the nearest seaport to test for correlations with density of Asian Shore Crabs. Density of Asian Shore Crabs was significantly positively associated with human population density and significantly, but weakly, negatively associated with distance to a paved surface. These results are consistent with population centers being likely locations of introduction for invasive species but suggest that easy access to beaches by humans may promote trampling and environmental disturbance, thereby limiting population growth of the Asian Shore Crab.

Poster Session: Crab Population Biology

CSI Botany: Multiple DNA "Fingerprints" Resolve Identity of Urban White Water Lily

Luis R. Vega (Lehman College, Bronx, NY) and Jack Henning (Lehman College, Bronx, NY)

Abstract - *Nymphaea alba* L. (European White Water Lily), is a widely used ornamental. Horticulturally, it can both outcompete and hybridize with *N. odorata* Aiton (American White Water Lily). There is evidence that such hybrids are sterile but nevertheless capable of vigorous vegetative growth. As a result, the introduction of exotic *Nymphaea* into natural habitats in the US may stymy conservation efforts since they could outcompete the native water lily species either vegetatively or through the formation of cryptogenic, robust hybrids. Given their similar morphology, the need for an alternate approach to identify putative water lily hybrids can be explored using DNA barcoding. A recent DNA barcoding project of aquatic plants in the lake at Van Cortlandt Park (VCP), Bronx, NY, suggested the abundant white water lilies found there are the European *N. alba* on the basis of a single plastid locus, *rbcL*. If true, this would represent an unusual finding, as the European White Water Lily is not yet listed as naturalized anywhere in North America outside of British Columbia. To verify the identity of the VCP water lily, we ran a phylogenetic analysis on samples using plastid (*rbcL*) and nuclear (*ITS*) barcode markers. This molecular data was combined with Genbank accessions for comparison's sake, and analyzed using maximum likelihood and Bayesian inference. Our results show the VCP water lily is actually the native *N. odorata*, which showcases the need to combine several markers when dealing with species-level identification.

Poster Session: Invasives Management Techniques and Strategies

Using a Network Approach to Study the Co-Occurrence of Multiple Non-Native Species in Adirondack Communities

Jacob R. Walter (State University of New York at Geneseo, Geneseo, NY) and Suann Yang (State University of New York at Geneseo, Geneseo, NY)

Abstract - A plant species' invasion success may be facilitated by the presence of other plant species from the same geographic origins. This facilitation may occur because when a plant species successfully naturalizes, it may alter the environment surrounding it to make it more similar to that of its geographic origin. Plant species from the same geographic origins may benefit from the altered environment and may have a better chance at successfully invading. We investigated the extent to which co-occurring, non-native species originated from the same European plant communities (European phytosocial groups) for a variety of locations in the Adirondacks. For this research, we generated network visualizations in R to show the patterns of co-occurrence by non-native species with shared geographic history, using plant-survey data provided by the New York National Heritage Program for 6 locations around Adirondack State Park. Preliminary results indicate high rates of co-occurrence in species distributed across northeastern Europe. The European phytosocial groups identified are similar to the Adirondack communities in ecosystem structure and climate. We will also describe the European phytosocial groups that exhibit the highest rates of co-occurrence throughout the Adirondacks region. These results are important to consider when managing the introduction of new non-native species. Quantifying co-occurrence may aid in predicting the success of a single non-native plant species as well as the success of plant species from similar geographic origins.

Poster Session: Invasives Management Techniques and Strategies

Feather Coloration in *Junco hyemalis* (Dark-eyed Junco)

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Abstract - *Junco hyemalis* (Dark-Eyed Junco) is a widespread songbird throughout North America. In the northeastern United States, the slate-colored subspecies *J. h. hyemalis* breeds at higher elevations and can be found at lower elevations during migration and winter. All *hyemalis* juncos have an overall gray back, rump, and wings. Their breast and belly are white. Females tend to be a lighter gray color and younger individuals (hatch year and second year birds) tend to have more brown coloration. Further, previous studies have indicated that tertial feathers with brown edging is indicative of younger individuals. In our research on juncos, we have noticed substantial variation in coloration across individuals, especially with the degree of brown coloration in the head, back, flanks and wing coverts and tertials. Beginning in December 2020, we began to quantify junco coloration with 2 methods. We used a low-cost reflectance spectrophotometer to measure plumage coloration (hue, value, saturation and reflectance across 400–700 nm wavelengths) from 5 body regions on each bird. Second, we collected 1 tertial feather from each bird and used standardized imagery and imagery analysis software to quantify coloration of each tertial feather. So far, from 7 females and 15 males, we found that the male's hue from the upper back region is an average of 35.4° (min–max: 30.3–40.5°), with a saturation of 11.4% (min–max: 5.7–24.0%), and value of 26.6% (min–max: 24.2–29.0%). For females, hue from the back is 31.3° (min–max: 28.8–36.1°), saturation is 25.4% (min–max: 12.2–34.8%), and value is 28.6% (min–max: 27.1–29.9%). We are continuing to develop methods for describing the variation in brown and gray coloration, with the goal of describing the sources of that variation.

Poster Session: Avian Morphology and Physiology

A Meta-analysis Reveals Context Dependence in the *Spartina–Geukensia* Mutualism

Thomas Whaley (SUNY Plattsburgh, Plattsburgh, NY) and Mary Alldred (SUNY Plattsburgh, Plattsburgh, NY)

Abstract - *Spartina alterniflora* (Saltmarsh Cordgrass) and *Geukensia demissa* (Atlantic Ribbed Mussel) play a foundational role in wetland biogeochemical processes and community structure in coastal marshes throughout the Eastern United States. The relationship between *S. alterniflora* and *G. demissa* is widely considered to be a textbook example of a mutualistic species interaction. Previous research has revealed that *S. alterniflora* provide structure that promotes *G. demissa* settlement and shading that protects *G. demissa* from overheating and desiccation. In return, *G. demissa* promote the growth of *S. alterniflora* by transferring nutrients from the water column to sediments. Both species have been shown to influence biogeochemical processes by altering oxygen and carbon availability in sediments. Mutualisms often differ in strength and direction of effect depending on environmental context. If the *S. alterniflora–G. demissa* mutualism was found to be strongly context-dependent on variables such as marsh history and ambient nutrient levels, this would have profound implications for salt marsh conservation and restoration, due to the important roles *S. alterniflora* and *G. demissa* play in structuring these systems. We performed a systematic review of the literature and a meta-analysis to quantify the effects of this mutualism. We looked specifically at how *S. alterniflora* and *G. demissa* affected each other's biomass and growth, and the effects of the 2 species on marsh nitrogen-cycling processes. The data suggested the mutualism's effects were significantly stronger in nonurban systems than in nitrogen-rich urban systems, and stronger in natural wetlands than in those that have been recently constructed or restored. We also found that the *S. alterniflora–G. demissa* mutualism remains understudied in urban and restored ecosystems, and suggest that this should be the focus of future research. The variability in the outcomes of the *S. alterniflora–G. demissa* mutualism suggests that care must be taken when incorporating both species into habitat-management programs due to the mutualism's varying level of efficacy at achieving management goals.

Poster Session: Marine and Coastal Ecology

Heterogeneity in Monarch Butterfly Movement

Alexandra Wolf (Tufts University, Medford, MA)

Abstract - Butterflies, in particular *Danaus plexippus* (Monarch Butterfly), are some of the most commonly studied insects. Despite the great interest in Monarch Butterfly conservation and their host plant *Asclepias syriaca* (Common Milkweed), there are few studies on movements of Monarch Butterfly. In this study, we tracked butterfly movement and behavior through meadows with heterogeneous habitat quality. We quantified the impact of individual butterfly traits (age and sex) and habitat quality (milkweed abundance) on movement parameters. Older butterflies spent the most time at rest, while path step lengths and turning angles were fairly consistent across the age groups. Females and males did not exhibit significantly different movement parameters. Sex also did not impact butterflies' division of time among behavioral states. Butterflies took the shortest steps in high-quality habitats and longest in medium-quality habitats. Additionally, butterflies sat the longest in low-quality habitats. The effects of habitat quality on butterfly movement were weaker than shown in other studies on butterfly movement. This difference may be due to the relatively constant presence of milkweed plants in our study sites. Other studies have also found significant differences between female and male movement; perhaps our limited data on male flight paths impacted sex comparisons. Lastly, few studies exist about the impact of butterfly age on movement and behavior. Perhaps our result that older butterflies spend more time at rest is a result of increased wing wear as butterflies age. Understanding how Monarch butterflies move through heterogeneous landscapes is essential to understanding their persistence in these habitats as well as their habitat preferences.

Poster Session: Arthropod Ecology

Did the Flint Water Crisis Pollute Urban Soils? A Look at Urban Bird Blood Lead

Dorothy L. Zahor (Eastern Michigan University, Ypsilanti, MI), Kenneth J. Glynn (Eastern Michigan University, Ypsilanti, MI), and Jamie M. Cornelius (Oregon State University, Corvallis, OR)

Abstract - The drinking water crisis in Flint, MI, resulted from contamination of the city's tap water, and while consumption was advised against, irrigation practices were not subject to restrictions or guidelines. Therefore, watering lawns provided a potential pathway for lead to enter urban ecosystems and reside in soils. *Turdus migratorius* (American Robin) consume large amounts of soil during their foraging for earthworms. Robins we captured from watered lawns in Flint had higher levels of lead in their blood than Robins captured in unwatered lawns of Flint, at a reference urban site, and at rural sites. We believe this species' level of lead in the blood reflects soil lead at these sites, and that Robins may serve as a bioindicator species for urban soil-lead risks to local communities.

Poster Session: Contaminants, Parasites, and Disease in Birds