

Oral Presentation Abstracts

Listed alphabetically by presenting author. Presenting author names appear in bold. Code following abstract refers to session presentation was given in (Day [Sun = Sunday, Mon = Monday] – Time slot [AM1 = early morning session, AM2 = late morning session, PM1 = early afternoon session, PM2 = late afternoon session] – Room – Presentation sequence. For example, Sun-PM1-B-3 indicates: Sunday early afternoon session in room B, and presentation was the third in sequence of presentations for that session. Using that information and the overview of sessions chart below, one can see that it was part of the “Migratory Bird Physiology and Conservation” session. Presenters’ contact information is provided in a separate list at the end of this document.

Overview of Oral Presentation Sessions

SUNDAY APRIL 19, 2015				
Concurrent Sessions - Morning I				
	Room A	Room B	Room C	Room D
	Nanotag Tracking of Wildlife	Conservation Photography	Bird Habitat Associations and Behavior	Ticks and Tick-borne Pathogens in the Northeast / Ecology of the Pleistocene and Early Holocene
Concurrent Sessions - Morning II				
	Room A	Room B	Room C	Room D
	Urban Biodiversity	Invasive Species	Turtle and Amphibian Ecology and Conservation	Natural History and Ecology of Assassin Flies
Concurrent Sessions - Afternoon I				
	Room A	Room B	Room C	Room D
	Wildlife in a Changing World	Migratory Bird Physiology and Conservation	Landforms and Vegetation	Ecological Restoration
Concurrent Sessions - Afternoon II				
	Room A	Room B	Room C	Room D
	Are We Losing the Northern Elements of our Flora?	Invertebrate Diversity: Community Structure	Ecology of Streams and Lakes	Urban Ecology

MONDAY APRIL 20, 2015

Concurrent Sessions - Morning I

	Room A	Room B	Room C	Room D
	Natural History of Agricultural Landscapes I	Biotic Responses to Climate Change	Coastal and Marine Birds	Geospatial Models for Land Conservation

Concurrent Sessions - Morning II

	Room A	Room B	Room C	Room D
	Plenary Session: From the Arctic to the Everglades: Skills for Every Naturalist's Toolbox with Susan Morse			

Concurrent Sessions - Afternoon I

	Room A	Room B	Room C	Room D
	Natural History of Agricultural Landscapes II	Mammal Ecology	Native Bees	Citizen Science in Higher Education

Concurrent Sessions - Afternoon II

	Room A	Room B	Room C	Room D
	Fish Ecology	Northeastern Bats: Taking a Licking But Keep on Clicking	Invertebrate Diversity: Environmental Associations and Sampling	Ecology and Conservation of Snakes and Lizards

Changes in Herring and Great Black-backed Gull Nesting Distributions on Great Duck Island, Maine

John Anderson (College of the Atlantic, Bar Harbor, ME; janderson@coa.edu)

Abstract - Great Duck Island, Hancock County, ME, is one of the oldest gull colonies in the northeastern United States. Unlike many seabird colonies to the south, Great Duck was spared the worst of the ravages of the millinery trade in the 19th century, and retained a significant population of nesting *Larus argentatus* (Herring Gull) until well into the 20th century. Gull-management operations in the second quarter of the century dramatically reduced the island's population. Population levels stayed low until the late 1970s or early 1980s, after which some recovery occurred. Beginning in 1999, we mapped all gull nests at the southern end of the island into a comprehensive GIS in June of each year. This allows for the easy determination of changes in nesting density and abundance, as well as the incorporation of historical data into a more complete picture of the island's avifauna. While the overall number of nesting gulls has increased gradually, the distribution and pattern of nesting within the island has changed markedly following the conversion of the light station into a natural history field station. From fewer than 100 nests in 1999, the sub-colony in the vicinity of the field station had increased to over 600 pairs by 2014, and now comprises more than half of the total nesting population on the island. In addition, *L. marinus* (Great Black-backed Gull), which had previously restricted their nests to the northern end of the island at the greatest distance from the station, are also shifting to nest in small clusters on the station grounds. Major drivers in these changes appear to be increasing predation pressure from *Haliaeetus leucocephalus* (Bald Eagle), which prey on near-fledging gulls. Gull populations throughout the North Atlantic have declined markedly in recent years, with the most significant collapses in Maine occurring in near-shore colonies within easy reach of eagles. Long-term monitoring of surviving seabird colonies that incorporates detailed spatial and habitat data can tease out subtle shifts in behavior that may be missed in simple island-by-island censuses.

Mon-AM1-C-2

Ant Communities on Maine Islands: Effects of Island Size and Isolation

Amy E. Arnett (Unity College, Unity, ME; aarnett@unity.edu)

Abstract - Comparing species diversity among islands offers an opportunity to study the effects of island biogeography on small, biological communities. I surveyed ants on 10 Maine islands, plus mainland sites, to determine the effects of island size, isolation from the mainland, and habitat on ant community composition. During the summers of 2007 and 2014, ants were collected on islands off the coast of Maine, by staff of National Audubon Society and the US Fish and Wildlife Service. Ants were sampled using grids of 25 pitfall traps where possible, plus hand collections. The islands are primarily managed for seabird colonies and vary in size, habitat, latitude, longitude, and distance from the coast. During the two summers of ant collecting, 3764 individual ants were collected, representing 7 genera and 14 species, including one non-native, invasive species, *Myrmica rubra*. Stratton Island had the most species (9), followed by Pond Island (8). Both of these islands are fairly large, close to the mainland and have multiple habitats including seabird colonies. My results show that the number of species decreased significantly with increasing latitude ($P < 0.001$), and increased with increasing longitude ($P < 0.001$), and that larger islands had more ant species than small islands. Accumulation curves suggest that more sampling might reveal more species on some of the islands, and similarity indices suggest unique communities on many islands. These findings support the predictions of island biogeography theory; primarily that species richness is correlated with island size and negatively correlated with distance from the mainland.

Sun-PM2-B-1

Dryopteris fragrans: Status, Habitats, and Genetics of a Northern Plant at its Southern Limits

Scott W. Bailey (US Forest Service, North Woodstock, NH; swbailey@fs.fed.us)

Sun-PM2-A-4

Ant Diversity in New York State Inland Pine Barrens and the Role of Hiking Trails

Grace Barber (University of Massachusetts, Amherst, MA; gracebarber.w@gmail.com)

Abstract - Ants are important seed dispersers, soil turners, and elements of terrestrial food webs. Although the ecological roles of ants are significant, little is known about the ant assemblages of northeastern inland pine barrens. Two years of sampling ants in these barrens has revealed areas of exceptionally high ant species density, yielded new records of rare species, and provided insight into the effects of hiking trails that pass through these landscapes. Vegetation type and cover were strongly associated with differences in ant species density and composition. The results of this study have implications for ant diversity conservation in the region.

Mon-PM2-C-5

A New England Food Vision: Producing 50% of the Region's Food While Sustaining and Enhancing Environmental Quality

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Abstract - A New England Food Vision (NEFV) is a report that was released in 2014 which explores the opportunity for our region to build the capacity to produce at least 50% of clean, fair, accessible, and just food for New Englanders by 2060. The Vision includes a set of guiding assumptions and calculations that sketch a future in which diverse local and state food systems are supported by and in turn support a regional sustainable food system. Drawing on lessons learned from overexploitation of our fisheries in addition to historical agricultural expansion in the region that resulted in the degradation of soil, water, and forest resources, coupled with changes in food-production methods and intensification over the past several decades, the Vision also recognizes that developing forward-thinking strategies which support ecologically sound practices for land reclamation, land- and sea-based food production, distribution, and consumption will be key to reaching the sustainability goals articulated in the Vision. This session will give an overview of the NEFV, including its development and ways in which it is being utilized to guide conversations, planning efforts, and the development of research questions throughout the region. Preliminary research around one such question—how to increase our agricultural footprint approximately three-fold without degrading watershed quality—will be presented in this and the following session.

Mon-PM1-A-1

The Soundscape Ecology of Adirondack Boreal Wetlands: Birds, Land Use, Roads, and Noise

Samouel J. Béguin (SUNY ESF, Syracuse, NY; sjbequin@syr.edu), **Stacy McNulty** (SUNY ESF Adirondack Ecological Center, Newcomb, NY; smcnulty@esf.edu), **Shannon Farrell** (SUNY ESF, Syracuse, NY; sfarrell@esf.edu), and **Mark Lomolino** (SUNY ESF, Syracuse, NY; island@esf.edu)

Abstract - New York's Adirondack Park is a vast protected landscape of public and private lands. Among the habitat types represented, Adirondack lowland boreal wetlands (bogs, fens, conifer swamps) are near the southern limit of their North American distribution. Boreal wetland birds are regionally prioritized for conservation as they are threatened by climate change, exurban development, and other anthropogenic disturbance. This study employed soundscape monitoring methods from May to July 2014 to examine how human activity and land use may influence bird communities. We hypothesized that sites closer to major roads would have decreased biophony (higher-frequency animal sound) and increased anthrophony (lower-frequency mechanized noise) than secluded sites regardless of land ownership. Six acoustic indices derived from 2310 hours of digital recordings were compared across 21 boreal wetland sites on both state and private lands and with varying distances to major roads. Anthrophony was indeed higher and biophony lower at sites near major roads. The mean ratio of biophony to anthrophony (NDSI) ranged from 0.21 at sites near roads to 0.80 at secluded sites. A strong inverse relationship ($P < 0.0001$) between anthrophony and biophony was observed irrespective of land ownership, suggesting a potential noise effect despite the Park's land-use regulations. Truly boreal species such as *Perisoreus canadensis* (Gray Jay), though rare, were detected across study sites during the breeding season. No sites were immune from mechanized noise; overhead aircraft were heard even at remote sites. Overall, this study offers a new approach to inform Adirondack bird, wetland, and landscape conservation planning.

Sun-AM1-C-3

Long-term Effects of an Invasive Shore Crab on Cape Cod, Massachusetts

Christopher P. Bloch (Bridgewater State University, Bridgewater, MA; cbloch@bridgew.edu), Kevin D. Curry (Bridgewater State University, Bridgewater, MA; kcurry@bridgew.edu), and John C. Jahoda (Bridgewater State University, Bridgewater, MA; jjahoda@bridgew.edu)

Abstract - Invasive species can cause dramatic changes in the structure of intertidal communities. In some systems, however, abundance or impacts of invaders may peak 10–20 years after invasion and decline thereafter. *Hemigrapsus sanguineus* (Asian Shore Crab) has been established at Sandwich, MA, on the north side of Cape Cod, since the mid-1990s. This study documented population dynamics of the Asian Shore Crab and three species of prey or competitors—*Carcinus maenas* (European Green Crab), *Mytilus edulis* (Blue Mussel), and *Littorina littorea* (Common Periwinkle)—over 10 years. An additional goal of the study was to determine whether population growth of the Asian Shore Crab has slowed since its initial establishment. Density of the Asian Shore Crab increased over time, with no evidence of a density-dependent decrease in per capita growth rates. Concurrently, density of the Green Crab and the Blue Mussel declined, but there was no significant temporal trend in density of the Common Periwinkle. If observations at Sandwich are representative of sites north of Cape Cod, populations of the Asian Shore Crab are growing rapidly, and dramatic changes in community structure may be widespread.

Sun-AM2-B-2

Ecomechanics of the White-water-Loving Horned Leaf Riverweed

Michael L. Boller (St. John Fisher College, Rochester, NY; mboller@sjfc.edu), and Alexander F. Dean (St. John Fisher College, Rochester, NY; adean700@yahoo.com)

Abstract - *Podostemum ceratophyllum* Michx. (Horned Leaf Riverweed) is the only North American aquatic angiosperm to exploit the hydrodynamically stressful white-water rapids and waterfalls of rivers. They thrive in sunny areas of turbulent water flows by attaching directly to stable rocky substratum using a highly modified root system. Upright stems and leaves extend towards the flow and are observed to flutter with the turbulence. Flowering in the species occurs as water levels drop in late summer. Despite their unique niche, little is known about the ecology of the species and no biomechanical analyses have been published on the plant. Here, the mechanical properties of these plants are explored. Plants were collected from populations in the Shepaug and Pootatuck rivers in Connecticut and transported to the lab. Within 24 h, stems were subjected to tensile and cyclical loading tests to determine standard material properties. Samples of Horned Leaf Riverweed had a low Young's modulus but high breaking strain, breaking stress, and work of extension, indicating relatively high flexibility and strength compared to other aquatic plants. Tests revealed that the stems possess a short elastic deformation then long plastic deformation when under tension. Cyclic testing demonstrated a relatively low energy ratio. We hypothesize that these characteristics of Horned Leaf Riverweed may be beneficial in brief but potentially large forces experienced under a turbulent boundary layer. Forces stretching the stems beyond their elastic phase may be absorbed with plastic deformation, allowing the stem to potentially survive and heal. Further studies of the ecomechanical performance of this plant, e.g., the in situ forces it experiences, the environmental safety factor under which it lives, and the ability to recover from stress, are needed to more fully understand this unique North American aquatic species.

Sun-PM2-C-1

SUNY Oneonta Campus Invasive Plant Survey, Removal, and Replacement Plan

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Abstract - College campuses encompass a variety of habitats subject to a high level of invasive plant introductions from frequent soil disturbance during construction projects and non-native horticultural plantings. At the same time, campus landscapes can become outdoor laboratories for invasive plant species research, education, and control efforts. Last fall, students of Plant Ecology (BIOL 381) at SUNY Oneonta researched 24 invasive plants from the New York State list of Prohibited and Regulated Invasive Species (6 NYCRR Part 575). The 250-acre campus is within the Catskill Regional Invasive Species Partnership (CRISP) region, and the project was developed in cooperation with CRISP. Students were assigned portions of the campus to survey. Many of the 20 invasive species located were horticultural plantings (e.g., *Berberis thunbergii* [Japanese Barberry], *Euonymus alatus* [Burning Bush]), but in several of the minimally managed woodlots the students found extensive *Acer platanoides* (Norway Maple) and *Alliaria petiolata* (Garlic Mustard) in the understory. GPS locations of over 100 spot locations were reported to an online dataset (www.iMapInvasives.org). Our current study expands the previous work to include verification of GPS locations and species identification. We are collaborating with our SUNY Oneonta Facilities Office to initiate a long-term invasive plant removal and replacement plan that includes a spring 2015 outreach event replacing some of the invasive shrubs on campus with native species. One target species is the Japanese Barberry, which is prohibited for sale in New York State. Our plan will replace Japanese Barberry with suitable, deer-resistant, native, and non-invasive shrubs over a multi-year period. To our knowledge, this project is the first full-campus invasive plant survey in the 64 campus SUNY system that includes the development of a long-term management plan. We hope that our project will provide a successful template for invasive plant management on campuses throughout the northeast, and encourage contact with other campuses creating more sustainable campus landscapes.

Mon-PM1-D-4

Biogeography and Diversity of Ants in Columbia County, NY

Kyle Bradford (Hawthorne Valley Farmscape Ecology Program, Ghent, NY; kylebradford@gmail.com), **Conrad Vispo** (Hawthorne Valley Farmscape Ecology Program, Ghent NY; conrad@hawthornevalleyfarm.org), and **Claudia Knab-Vispo** (Hawthorne Valley Farmscape Ecology Program, Ghent NY; claudia@hawthornevalleyfarm.org)

Abstract - Ants were collected in Columbia County, NY, for five years, in habitats varying from cemeteries to bogs. We attempted to gather representative ant samples from many of the county's distinct plant communities. This work will provide data for an upcoming field guide to habitat types of Columbia County. The County's geography, which includes the Hudson River to the west and the Taconic Mountains to the east, encompasses substantial climatic variation and hence a diversity of ant communities. Our sampling picked up some interesting biogeographical records. These included the eastern-most record for *Formica prociliata* and a surprisingly southern record for the boreal *Myrmica brevispinosa*. We also noted some latitudinal and longitudinal patterns within the county. By looking at a variety of environmental variables, and the literature, I attempt to explain some of these patterns. Overall, we have found 77 ant species in 24 genera. This is more than half the diversity known in all of New England. I will provide observations and information on some of the most interesting members of Columbia County's ant fauna.

Sun-PM2-B-3

Minnow Re-colonization of Lake Champlain Waterways after the Glaciers

Meriel Brooks (Green Mountain College, Poultney, VT; brooksm@greenmtn.edu) and **Bich Nguyen** (Green Mountain College, Poultney, VT; bnguyenb@greenmtn.edu)

Abstract - This study investigated the re-colonization of the Lake Champlain watershed by 2 minnow species, *Rhinichthys atratulus* (Blacknose Dace) and *Rhinichthys cataractae* (Longnose Dace), in 5 major Champlain watershed rivers, as well as the Battenkill River, which has been disconnected from the Champlain drainages since Lake Vermont drained. The time frame of re-colonization covers about 15,000 years, from early Lake Vermont to the Champlain Sea marine intrusion and into the current Lake Champlain phase. We used mtDNA and sampled populations to allow comparisons of current population connectivity within rivers at similar altitudes. Historic patterns are revealed by comparison within rivers at very high and low altitudes, between rivers, and between southern and northern drainage sets. Barriers to past dispersal and extirpation of low-lying populations from the marine intrusion are revealed in the geographic pattern of haplotype distributions. We found increasing variability with decreasing latitude, low within-river population connectivity, an apparent effect of the Champlain Sea intrusion, and evidence of headwater genetic exchange among river basins.

Mon-PM2-A-1

Diversity and Abundance of Wild Bees Associated with Maine Blueberry Fields

Sara L. Bushmann (University of Maine, Orono, ME and George Stevens Academy, Blue Hill, ME; sara_bushmann@umit.maine.edu) and **Francis A. Drummond** (University of Maine, Orono, ME; frank.drummond@umit.maine.edu)

Abstract - Insect mediated pollination is critical for *Vaccinium angustifolium* (Lowbush Blueberry; Ericaceae) fruit development. Past research shows a persistent presence of wild bees (Hymenoptera: Apoidea) providing pollination services even when commercial pollinators are present. We undertook to (1) provide a description of bee communities found in Lowbush Blueberry growing regions, (2) identify field characteristics or farm management practices that influence those communities, (3) identify key wild bee pollinators that provide pollination services for the blueberry crop, and (4) identify non-crop plants found within the cropping system that provide forage for wild bees. During a 4-year period, we collected solitary and eusocial bees in over 40 fields during and after blueberry bloom, determining a management description for each field. We collected 4474 solitary bees representing 124 species and 1315 summer bumblebees representing nine species. No bumblebee species were previously unknown in Maine, yet we document 7 solitary bee species not previously reported for Maine. These new state records include species of the genera *Nomada*, *Lasioglossum*, *Calliopsis*, and *Augochloropsis*. We found no field characteristic or farm management practice related to bee community structure, except that bumblebee species richness was higher in certified organic fields. Pollen analysis determined loads of 67–99% ericaceous pollen carried by 5 species of *Andrena*. Our data suggests two native ericaceous plants, *Kalmia angustifolia* and *Gaylussacia baccata*, provide important alternative floral resources. We conclude that Maine blueberry croplands are populated with a species-rich bee community that fluctuates in time and space. We suggest growers develop and maintain wild bee forage and nest sites.

Mon-PM1-C-1

A Comparison of Fish Assemblages in Lake Ontario Tributaries From Over a Century Ago

Ben Carson (RIT Thomas H. Gosnell School of Life Sciences, Rochester, NY; bcc7151@rit.edu) and Paul Shipman (RIT Thomas H. Gosnell School of Life Sciences, Rochester, NY; passbi@rit.edu)

Abstract - Albert Hazen Wright (1879–1970) conducted a comprehensive survey of fishes and their habitats during 1902–1903 in 10 Lake Ontario tributaries west of Rochester, NY. These tributaries are located in a region greatly impacted by human activity over the past century, from the construction of the Erie Canal, to the urban sprawl of the city of Rochester. We digitized data from Wright's manuscript, which was re-discovered and posthumously published in *Guelph Ichthyology Reviews* in 2006, and subjected it to modern statistical analysis. We performed canonical correspondence analysis to identify any errors that Wright might have made in his innovative, but informal, graphical analysis that related fish species with particular habitat types. We then conducted a new survey to see how fish communities have changed in 5 of these tributaries over the last 100+ years. These Streams, when combined with the other small tributaries—excluding the Niagara River, the Genesee River, the Oswego River, and the Black River—comprise 17% of the New York State watershed for Lake Ontario. Tributaries such as these are critical components for the life cycles of many fishes found in and along Lake Ontario, and have a big impact on an economically important sport fishery.

Mon-PM2-A-3

Grazing and the Coupling of Biodiversity in Vascular Plant and Soil Microbial Communities

Caroline Girard Cartier (University at Albany, SUNY, Albany, NY; cgirard@albany.edu) and Gary Kleppel (University at Albany, SUNY, Albany, NY; gkleppel@albany.edu)

Abstract - Studies with *Ovis aries* (Sheep) indicate that intensive rotational grazing (IRG), an approach to grazing that mimics the spatial and temporal distributions of wild herd-forming grazers, results in an increase in vascular plant species richness. Our current study seeks to address the underlying mechanisms that result in this increase in vascular plant species richness by relating changes in the soil microbial community to changes in species richness in the plant community. Changes in microbial and plant communities, as well as nitrogen availability, were measured over a grazing season at 2 sites in Albany County, NY (Longfield Farm in Altamont and the Normanskill Farm), in which a portion of the landscape was exposed to an IRG regime and other portions of the landscape were left ungrazed or exposed to various other experimental treatments including continuous grazing. While no significant differences were observed in vascular plant species richness in treatment enclosures prior to treatments, in the spring following treatments, a difference in vascular plant species richness was observed between the IRG and ungrazed enclosures at both sites (Longfield Farm: $t = 2.59$, $df = 16.97$, $P = 0.019$; Normanskill Farm: $t = 2.39$, $df = 20.32$, $P = 0.027$). There was also a significant difference in vascular plant species richness in response to the different grazing regimes (IRG vs. continuous grazing) at both sites in the spring of the following year (Longfield Farm: $t = 6.23$, $df = 17.16$, $P < 0.001$; Normanskill Farm: $t = 2.50$, $df = 21.94$, $P = 0.021$). Differences in nitrogen dynamics and the response of the microbial community varied significantly between the two sites. While it appears that a relationship exists between plant species richness and microbial diversity at the Normanskill Farm ($r^2 = 0.3151$), the relationship between vascular plant species richness and soil moisture appears to be strongly correlated ($r^2 = 0.4024$) at Longfield Farm. These findings suggest that while IRG leads to an increase in vascular plant species richness, there are significant differences in the response of microbial communities to grazing in dry upland pasture and moist lowland pasture.

Mon-AM1-A-2

A Molecular Assessment of Internal Nematodes Isolated From Cold-Stunned Sea Turtles Off of Cape Cod

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Abstract - Sea turtles can suffer from a condition called cold-stunning, a hypothermic reaction that occurs from exposure to prolonged cold water temperatures. The chemical and physiological effects of this condition are not known, but what is understood is that all marine turtles are endotherms that are unable to regulate their body temperature, therefore susceptible to cold-stunning. Each season, a small number of juvenile sea turtles that feed in the waters of Cape Cod Bay and Massachusetts Bay become trapped in the arm of Cape Cod as they migrate south for the winter. These individuals become cold-stunned, and when immobile, will strand on the northern shores of the Cape. The most common species to strand is *Lepidochelys kempii* (Atlantic Kemp's Ridley Sea Turtle), with the second most common being *Caretta caretta* (Loggerhead Sea Turtle). Both of these marine turtles are classified as endangered or threatened. Therefore, it is important to learn all we can about these animals in order to help save them. The majority of sea turtles that strand are alive, with a small percentage of these individuals perishing shortly after stranding. Those that die are collected by staff at Mass Audubon at Wellfleet Bay. An internal examination and/or necropsy of these specimens are conducted to determine their overall health and gender and to collect internal parasites from various tissues. Necropsies are conducted at the Marine Mammal Center's Necropsy Facility at Woods Hole Oceanographic Institution (WHOI). Internal parasites for this study were collected from a select number of sea turtle carcasses. Parasites, specifically nematodes, were removed from the surrounding tissue and measured and photographed. DNA from some of these samples was extracted and amplified using PCR techniques. This semester, we will continue this project by extracting DNA from the other nematodes. These DNA samples will then be PCR amplified, the amplicons cloned, and the clones sent for sequencing in order to determine the type of parasites that infect juvenile cold-stunned sea turtles that live in the waters of New England.

Sun-AM2-C-1

Direct and Indirect Effects of Climate Change on Native Biota of the Northern Forest

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Abstract - Changes in climate often present ecosystems with unique challenges, ranging from non-perceptible, such as adjustments in metabolic rates, to profound, such as migrants arriving significantly earlier in the spring than normally anticipated. Both the non-perceptible and profound can affect ecosystem processes, altering net rates of primary production through direct and indirect changes in community structure and function. At the Hubbard Experimental Forest in central New Hampshire, we have been specifically investigating how snow depth and soil freezing will influence the activity of both large and small herbivores, and how this activity feeds back to regulate decomposition and nutrient dynamics, both important ecological processes. We found that changes in snow depth led to altered browsing behavior in *Alces alces* (Moose), with *Abies balsamea* (Balsam Fir) more heavily browsed under low snow conditions compared to *Acer saccharum* (Sugar Maple) or *Viburnum* shrubs. Second, plants that were mechanically browsed to simulate Moose feeding triggered differential plant response and nutrient uptake, where Moose fecal nitrogen was more available to Balsam Fir than Sugar Maple or *Viburnum* shrubs, while biomass production was reduced. Population density of Moose appear to fluctuate over time, but we have not observed a critical decline in Moose numbers over the past decade as has been reported for other regions of the US. Decomposition rates were also slowed or reduced under soil-freezing conditions. Colembola and Acari, the most dominant soil invertebrates, had different patterns of total biomass (secondary productivity in the detrital food web) across our study sites. Total invertebrate biomass in leaf litter was similar in both frozen and non-frozen soils, but predator biomass was highest in soils that experience freezing. It appears that changing climate, as measured through soil freezing, can produce a cascade of responses, all of which can influence the success of future wildlife populations.

Sun-PM1-A-1

Characterizing House Sparrow Nest Sites in Yards Along an Urban to Rural Gradient

Stephanie L. Clymer (University of Massachusetts, Amherst, MA; stephclymer@gmail.com) and Susannah B. Lerman (Department of Environmental Conservation, University of Massachusetts and US Forest Service, Amherst, MA; slerman@cns.umass.edu)

Abstract - Introduced birds compete with native species, causing declines in biodiversity, particularly in urban areas. The urban environment is beneficial for some species such as *Passer domesticus* (House Sparrow), which was introduced to the United States in the 1850s. Despite its ubiquity and impact on bird communities, fundamental aspects of the House Sparrow's ecology are not well understood. Meanwhile, House Sparrow populations are declining in their native range in Europe, particularly in urban areas, where it is a species of conservation concern. The primary goal of this research was to identify the habitat characteristics of House Sparrow nests, where they are located, and which structures are used. This information can be used to deter House Sparrows in areas where they are invasive while promoting conservation where they are native. We located House Sparrow nests along an urban-rural gradient, primarily in private yards included in the Smithsonian's Neighborhood Nestwatch program. We surveyed vegetation structure and land cover around the nests using the US Forest Service's iTree urban forest assessment tool. These habitat characteristics (percent cover of tree canopy, maintained grass, impervious surface, and buildings) were compared between yards with and without House Sparrow nests and across different spatial scales (nest site, yard, and landscape). House Sparrow nests were located in 19 of the 92 Neighborhood Nestwatch yards. House Sparrows nested almost exclusively in nest boxes ($n = 28$) or other anthropogenic structures ($n = 18$), and only one nest was located in a tree. When House Sparrow nests were present, there was more maintained grass ($F = 5.279, P = 0.02$) and less tree cover ($F = 5.75, P = 0.02$) in the yard. There was more impervious cover at the landscape scale ($F = 31.2, P < 0.0001$), and individual House Sparrow nest sites tended to have more maintained grass ($F = 3.294, P = 0.08$). Providing nest boxes for native species may have unintended consequences as House Sparrows frequently nest in them. However, House Sparrows do not nest everywhere in urbanized areas and an understanding of House Sparrow nesting preferences will identify control measures in the species' introduced range. A shift in how yards are maintained seems necessary to discourage House Sparrows from nesting in urban areas.

Sun-PM2-D-3

Historic Changes in the Alpine Vegetation and Flora in Northeastern North America

Charles V. Cogbill (Harvard Forest, Petersham, MA; cvcogbill@gmail.com)

Abstract - The vegetation above treeline on isolated alpine summits (gol'tsy) is a distinctive element of the geography of northeastern North America. This vegetation and its flora have been upheld as tightly tied to the meso-climate of the region and perhaps as a bell weather of changes imposed by modern climate change. The hypothesized upward movement of treeline and resultant loss of coverage and extirpation of associated species gives a test of the timing and extent of this connection. Extensive botanical studies, in particular utilizing herbarium collections, of these restricted areas over the past 200 years, and intensive ecological studies, particularly plot sampling in the alpine meadows, over the past 40 years, are here mustered to quantify these changes. Specific studies by the author and collaborators on the history of vegetation of the Franconia Range in New Hampshire, a survey of the flora of 94 summits in the Northeast mountains, and a resurvey of M.L. Fernald's initial exploration in the Gaspé, Québec contribute to the details of this change. In addition to descriptive observations, documented extirpations, analysis of species biogeography, ordination of vegetation communities, and analysis of floristic diversity using a nested temperature calculator all show patterns of change. Overall, the primary source of change in alpine areas is driven by physical disturbance by human activities. There are documented recent changes in the vegetation and treeline position, but most changes started well before the recent change in climate. In accord with this process, the most prominent extirpations in flora were established in the 19th century.

Sun-PM2-A-1

Planning An Agricultural Renaissance For New England: What About Water Quality?

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Abstract - Building on the previous presentation, this talk considers some developing research into potential water-quality impacts of agricultural intensification in New England. According to *A New England Food Vision*, by 2060 the region could have a healthier diet, universal food access, and local production all of its vegetables, half its fruit, some grain and beans, and all dairy products, meats, and eggs. Achieving this production would involve clearing up to four million acres of forest, mostly on pre-1945 farmland, largely to provide pasture and hay for livestock. Cattle would increase from 400,000 to 1.4 million animals, pigs from 44,000 to 2.6 million, sheep from 30,000 to 1.2 million, and poultry from 7.4 million to over 350 million. Increased sustainable farming could benefit New Englanders greatly, but unrestricted agricultural expansion could seriously impair the region's inland and coastal waters. Commercial beef production began here in the mid-1600s, and grass-based dairying was a major regional industry into the 1960s. Today, most remaining dairy and beef production is increasingly grain-based, with large herds that spend little or no time on pasture. There is far less on-the-ground expertise to guide planning and policy for grass-based agriculture than half-a-century ago, and little current research on how New England haylands and pastures store, cycle, and release nutrients and animal wastes. How much organic waste and what nutrient loads would accompany projected grass-based livestock production? How much would be retained on the land, how much might enter waters, and how do the answers vary with soils and other factors? What criteria are needed to determine which forested lands are/are not appropriate for conversion to pasture, from a water-resources perspective? What conservation actions and best management practices by farmers would protect inland waters from increased runoff, sediments, nutrients, and organic livestock wastes, and prevent increased coastal nutrient loads? What public policies, funding, and reallocation of agricultural subsidies are needed to support both the dynamic expansion of sustainable food production in New England and critical soil and water resources? Water-resources agencies, NGOs, researchers, local food supporters, the agricultural community, and individuals all have a role in addressing these critical questions.

Mon-PM1-A-2

The Short Dangerous Lives of Small Mammals: Patterns of Activity and Mortality

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Abstract - Activity patterns of small mammals, and the effect of factors such as disease and weather are poorly understood. We evaluated the impact of parasites on a wild population of *Peromyscus leucopus* (White-Footed Deer Mice) by continuously measuring activity patterns of radio-collared animals using an automated radio-telemetry system. The first time such a technique has been used to investigate the behavioral effects of disease. Wild mice naturally infected with *Borrelia burgdorferi* (Lyme Disease) showed 27% lower mean overall activity index than uninfected mice, but the magnitude of this effect varied according to the stage of infection. Mice also showed increased nocturnality, with increased daytime activity and decreased nighttime activity. Decreased activity may result in more time spent in their nests, and increased intraspecific transmission of *Borrelia* due to the accumulation of ticks in shared nests. Parasitization by *Cuterebra fontinella* (Bot Fly) increased activity by 30%, which could increase the probability of survival of mature Bot Fly larvae, which must emerge from their hosts above ground to successfully pupate in leaf litter. Local weather and sex also influenced activity, with mice being more active on rainy and warm nights and male mice less active than female mice. Our study shows for the first time that *Borrelia* causes symptoms in wild deer mice, and is the first direct evidence of an effect of Bot Fly larvae on host behavior.

Mon-PM1-B-1

Woodbridge Creek Salt Marsh Restoration: Post-Restoration Monitoring

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Abstract - The 7-ha (17.5-acre) Woodbridge Creek Salt Marsh restoration project was selected to serve as partial compensation of injured natural resources associated with the Exxon Bayway Oil Spill that occurred on 1 January 1990 in the Town of Woodbridge, NJ. Pre-restoration monitoring at the Woodbridge Creek Restoration site and 3 near-by reference sites was conducted in September of 2000 and 2001. Restoration construction was completed in June 2007 and consisted of soil excavation, berm removal, tidal-flow enhancement, non-native *Phragmites australis* (Common Reed) removal, and native marsh vegetation planting. The purpose of post-restoration monitoring at the Woodbridge Creek Restoration Site was to qualitatively and quantitatively characterize habitat conditions and changes over time for soil characteristics, vegetation, nekton, and tidal hydrology at the restored marsh and a nearby reference marsh. During the first year of monitoring (2010) vegetation community structure, *Geukensia demissa* (Ribbed Mussel) and *Uca* sp. (fiddler crab) burrow density, porewater salinity/sulfide, soil characteristics, nekton, surface-water quality, and hydrology was monitored during October and the first week of November 2010. The second year of post-restoration field monitoring was conducted during September 2012 and included the same parameters as the first year of monitoring. The trajectory for vegetation development at the restored marsh appears to be proceeding as planned. Ribbed Mussels were observed at the natural reference marsh in low densities during both monitoring years, but were not encountered in the restored marsh during either of the two years. Average porewater salinity concentrations were significantly greater at the reference marsh during both years, as expected due to its downstream location. The primary difference in soil characteristics observed among the restored and reference marshes included inter-annual variation in soil pH at both sites, as well as inter-annual and/or inter-site differences in %N and total P concentrations. Nekton results were highly variable, but revealed that third-order creeks support greater abundance per unit area. In both years, the restored marsh was characterized by greater average flooding duration than the reference marsh. This result is to be expected, as the restored marsh was designed and constructed to be a low, regularly flooded marsh.

Sun-PM1-D-4

“New and Improved” Geospatial Model for Determining Conservation Priority of New York State Lands

Dr. John B. Davis (University at Albany - SUNY, Albany, NY; jbdavis@albany.edu), Lynn Bogan (NYS Office of Parks, Recreation and Historic Preservation, Albany, NY; Lynn.Bogan@parks.ny.gov), and Christina Croll (NYS ITS, Albany, NY; Christina.Croll@its.ny.gov)

Abstract - In 2007–2008, the NY State Office of Parks, Recreation, and Historic Preservation (OPRHP) developed a geographic information systems (GIS)-based model to identify and prioritize land parcels adjacent to State Park lands based upon their potential to protect and enhance biodiversity. Using new and augmented data layers, we have revised that model and expanded it to include all of New York State. The model uses existing geospatial data layers that are tied directly to the known or predicted locations of biodiversity resources, or which are surrogates for high biodiversity. These include the presence of rare or endangered animals, plants, or significant ecological communities; proximity to wetlands, streams, or water bodies; presence of contiguous forest blocks and other natural land cover, such as grasslands and shrublands; and the predicted occurrence of large numbers of vertebrate species. To reflect stresses induced by anthropogenic features of the landscape, such as roads, we also incorporated the New York Natural Heritage Program’s Landscape Condition Assessment layer. A weighting factor applied to each data layer determines its importance in the model, and can be adjusted to reflect different management objectives. In the baseline model, all layers were weighted equally to provide a basis for comparison with other weighting schemes. The model overlays the data layers to produce a 30 m x 30 m grid output that is essentially a biodiversity score for each location. Areas with higher scores reflect the richest potential to support high biodiversity, while areas with lower scores have lower potential. Preliminary results have demonstrated the ability of the model to detect suitable areas for further investigation by managers and planners in areas adjacent to State Parks. We also anticipate that land conservancies, municipalities, and other state agencies will find this a valuable tool for identifying lands of potential conservation value within their scope of operations.

Mon-AM1-D-3

Fifteen-year Community-type Change in a Sandstone Pavement Barren

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Abstract - Sandstone pavement barrens are rare ecological communities geographically located at the narrow overlap of *Pinus banksiana* (Jack Pine) and *Pinus rigida* (Pitch Pine) species ranges in the northeastern United States. We studied successional change following an ice storm at the Altona Flat Rock pine barren in Clinton County, NY. Prior research showed potential for plant community changes in the barren due to fire exclusion. This study sampled pine barren overstory, understory, and ground cover vegetation in 2014 and compared this data with information from the same plots that had been sampled in 1999 after the “great ice storm” of 1998. These plots were reserved as unmanaged reference plots following the ice storm disturbance. Ours is the first study to examine long-term changes in plant species composition of this pine barren community. In the overstory, Pitch Pine basal area and density remained similar (i.e., <20% change) between 1999 and 2014, while density and basal area of *Acer rubrum* (Red Maple) increased 67% and 109%, respectively. In contrast, Jack Pine overstory mortality was 100% between 1999 and 2014. We found very few Jack Pine saplings (12.5 stems/ha) and no Pitch Pine saplings were present in our 2014 sample plots. However, a high density of Red Maple saplings (1950 stems/ha) were recorded. The ground cover was dominated by *Gaylussacia baccata* (Huckleberry), *Sphagnum* spp., and *Pleurozium schreberi* (Schreber's Big Red Stem Moss). With continued absence of fire and the subsequent decreases in Jack Pine and Pitch Pine in the years since the ice storm, this pine barren is developing into a heath barren dominated by Huckleberry with an overstory comprised mostly of Red Maple. In the absence of fire, or a suitable management alternative, this rare ecological community type may become extirpated from the Northeast. Further research will provide a more complete understanding of the ecological requirements for successful regeneration of pines and associated species in fire-prone ecosystems such as Clinton County's sandstone pavement barrens.

Sun-PM1-C-3

A Fine-scale Examination of *Larix laricina* and *Picea mariana* Abundances along Gradients of Belowground Variables in an Adirondack Peatland: Implications for Species Responses to Climate Change

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Abstract - *Larix laricina* (Eastern Larch) and *Picea mariana* (Black Spruce) are dominant conspecific tree species in open boreal wetlands in the northeastern United States. Eastern Larch is a deciduous, shade-intolerant conifer, while Black Spruce is a shade-tolerant evergreen. Studies have compared response to light and nutrient availability, and the physiology of carbon gain and allocation of these two facultative wetland conifers; however, little is known about the relative importance of fine-scale factors that correlate with the relative abundances of these species where they co-occur. We collected pH, conductivity, depth to water table, variability in depth to water table, water temperature, variability in water temperature, dissolved oxygen, and inorganic and dissolved organic nitrogen concentration data along transects in an Adirondack wetland where Eastern Larch and Black Spruce were the dominant tree species. We regressed Eastern Larch and Black Spruce stem abundances with univariate and multivariate habitat axes (developed using PCA). Eastern Larch stem abundance was strongly negatively correlated with pH of the groundwater, with some additional variance explained by adding depth to groundwater (PC1). Black Spruce stems were significantly negatively correlated with higher water temperature. PC2 included dissolved oxygen (% saturation), and the composite variable explained substantially less of the variance than did the univariate relationship alone. Nitrogen concentrations in the groundwater were not useful predictors of stem abundance in either species. Since the majority of our stems were seedlings, these results have implications for future regeneration of these conspecifics in northeastern wetlands where climate change is predicted to alter hydrologic and temperature regimes. Warming water temperatures may have negative impact on spruce abundances. If increased precipitation results in higher water tables during the growing season, Eastern Larch may be negatively impacted; however, northeast climate models predict a lowering of water tables in the growing season with increased winter precipitation.

Mon-AM1-B-4

Nesting and Floral Utilization by *Osmia cornifrons* and *Osmia taurus* in Morristown National Historical Park, New Jersey

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Abstract - *Osmia cornifrons* and *Osmia taurus* are two non-native mason bees that were introduced to Maryland from Japan in the 1970s and 1980s. Both are rapidly expanding their ranges across the eastern US. Scientists have growing concerns about the impacts of these invasive bees on native bees and local plant communities, but little is known about their natural history. The goal of this project was to better understand how both *O. cornifrons* and *O. taurus* utilize resources in their non-native habitat. Invasive species are often habitat generalists making it easier for them to adapt to their new homes and reducing the likelihood of resource limitation. *Osmia cornifrons* and *O. taurus* require floral and nesting resources in order to persist. Both of these *Osmia* species are pollen generalists, utilizing a wide-range of flowering plants. They are also cavity-nesters, making their nests in pre-existing holes found aboveground. Mason bees preferentially use holes relative to their body size, therefore appropriately sized cavities might be limited. In spring 2013, we placed artificial wooden nestboxes at sites across Morristown National Historical Park in New Jersey. The boxes were collected from the field the following winter and then surveyed in the lab to determine bee nest abundance. We compared these data to plant-survey data collected at each site by the Northeast Temperate Network of the National Park Service. Our nestboxes were almost exclusively colonized by *Osmia taurus* and *O. cornifrons*, with *O. taurus* found in higher abundance than *O. cornifrons*. Total bee abundance was not related to plant species richness or abundance. Nor was it related to the presence of any specific plant species. In contrast, nesting substrate may be a more limiting factor to these bee populations as colonization was more likely where there was more nesting substrate. Both species appear to prefer nesting in holes that are on the outside edges of the nest boxes over the nests in the center of nest boxes, but they did not appear to have a preference for larger or smaller nest holes, possibly indicating some flexibility for both *O. cornifrons* and *O. taurus* in nest-cavity selection.

Mon-PM1-C-2

Young-forest Management for an Endangered Butterfly Benefits other Species in a NY Pine Barrens

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Abstract - The decline of young forests (i.e., vegetation communities dominated by shrubs and saplings) in the northeastern US has resulted in increased concern about the conservation of wildlife that depend on these communities. Pitch Pine-Scrub Oak barrens (PPSOB) are the rarest and most persistent type of upland young forest in the region. The Albany Pine Bush Preserve protects one of the best remaining examples of PPSOB and is the type locality for the endangered *Lycaeides melissa samuelis* (Karner Blue Butterfly [KBB]). Public and private partners have been recovering the Preserve's KBB population through ecosystem restoration (fire, tree removal, mowing, herbicides, and seeding) on more than 200 ha since 1992 and have been accelerating the colonization of restored areas with locally derived, captive-reared animals since 2008. Recovery actions appear to be successful; the Preserve's KBB population has increased from 900 to >14,000 between 2007 and 2014. More specifically, the most recent year of surveys marks the fifth consecutive year of growth for the Preserve's butterfly population and the second year that the population exceeded recovery thresholds. Preliminary data from monitoring projects on other taxa suggest that these recovery efforts are also benefitting approximately 24 other species designated by the NY State Department of Environmental Conservation to be species of greatest conservation need (e.g., *Setophaga discolor* [Prairie Warbler], *Scolopax minor* [American Woodcock], *Heterodon platirhinos* [Eastern Hognose Snake], *Clemmys guttata* [Spotted Turtle], *Hemileuca maia* [Barrens Buckmoth], *Erynnis martialis* [Mottled Duskywing]). Notably, two species thought to be extirpated (i.e., *Callophrys henrici* [Henry's Elfin], *Chaetagnaea cerata* [Waxed Sallow Moth]) were re-discovered within managed sites. These results suggest that an ecosystem approach to recovery of a single endangered species can be beneficial to state and national wildlife conservation goals for many species.

Sun-PM1-D-3

Analysis of eBird Information as a Source of Data for Diversity Studies in Urban Microparks

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Abstract - Since its inception in 2002, eBird has become a ubiquitous source of information to those interested in birds. It has become one of the best sources for occurrence data on most species in North America and has proven to be useful in tracking changes in their distributions through time. It is also an outstanding example of successful citizen science. Little or no direct analysis has been done to date on the relationship between observer effort and alpha diversity at a single location within the eBird database. As part of a long-term study on avian diversity and behavior in urban microparks, we have evaluated the use of eBird for recording alpha diversity in these environments. As was expected, our study found a positive correlation between the number of species recorded for eBird “hotspots” and the number of lists for hotspots. This result is a classic chicken and egg scenario where birders will go to a well-visited spot and make it more well-visited in the process thus increasing the likelihood of encountering rare species and increasing the overall alpha diversity for the spot. Neither the number of lists or the number of species were correlated with alpha diversity. These results were consistent with those from our targeted study on avian diversity in urban microparks in New York City that show that diversity is tightly correlated with observer effort. Our data indicates that the location-specific data found on eBird are strongly affected by observer effort, that there is also much to learn from this bias, and that microparks may be much more important to migratory birds than has previously been realized.

Sun-PM2-D-4

Rebound of a Once Common Bumble Bee?

Frank Drummond (University of Maine, Orono, ME; frank.drummond@umit.maine.edu)

Abstract - The sampling of bee species populations in Maine for the past 50 years has shown that some species have decreased and some species have increased over time. Collapse of two bumble bee species occurred in the mid-1990s: *Bombus terricola* (Yellowbanded Bumble Bee) and *B. affinis* (Rusty-patched Bumble Bee). The rise in relative abundance of *B. ternarius* (Orange-belted Bumble Bee) occurred throughout Maine subsequent to the decline of the previously mentioned species and the increase of *B. impatiens* (Common Eastern Bumble Bee), a species of rare occurrence in Maine 50 years ago that has since increased dramatically. Within the past two years, *B. terricola* has also increased dramatically in Maine. The possible reasons for these species shifts are discussed.

Mon-PM1-C-3

Development of a Pollinator-Habitat Assessment Tool in Maine’s Wild Blueberry Landscape

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Abstract - Wild bees are a critically important resource, and one of the central problems in promoting bee conservation is that their populations are difficult for stakeholders to see and assess. This research presents a participatory process for developing a novel web-based tool for stakeholders to visualize estimated bee abundance in the landscape around focal crops. Bee abundance is predicted by the InVEST Crop Pollination model applied to Maine’s wild blueberry landscape. The model is informed by land-cover suitability values determined by expert opinion. The InVEST model suite has been developed to translate knowledge to interested stakeholders and inform decision-making processes regarding resource conservation. To our knowledge, this tool is the first stakeholder-engagement application of the InVEST Crop Pollination model. Our aim is for this tool to be easily implemented, understandable, and accessible to all wild blueberry growers. Therefore, our research partners with growers. Their industry is heavily dependent on commercial honey bees; however honey bee numbers are declining, and dependence on honey bees is increasing in risk. Wild bees are an important source of pollination, and growers that contribute to wild bee conservation near their fields will benefit from increased crop pollination. Development of our web-based tool includes an iterative, participatory process that will incorporate grower feedback about the tool’s content and design. We are obtaining feedback at multiple forums: the annual Wild Blueberry Commission Advisory Board meeting, in-depth one-on-one sessions with six key informant growers chosen for their knowledge of different growers groups, a demonstration booth at the spring wild blueberry growers meeting, and workshops at blueberry field schools. The final version of the tool will help growers visualize the contribution of the landscape surrounding their fields as wild bee habitat and inform their decisions about land management to enhance crop pollination as well as wild bee conservation.

Mon-AM1-D-1

A Troglotic Amphipod in the Ice Caves of the Shawangunk Ridge, New York

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Abstract - *Stygobromus allegheniensis* Holsinger, 1967 (Allegheny Cave Amphipod) is a troglotic crustacean commonly found in caves of the Northeast. We describe several new populations from the unique tectonic ice caves found in the Shawangunk Ridge. DNA-sequence data support that the populations of these tectonic caves and a population from a limestone cave 100 km away belong to the same species. Results also show that despite being an eyeless species, it can detect particular colors of light and appears to be scotophilic. Finally, the ice caves pose a challenge to any aquatic troglotic living in this habitat; in the winter months, the ice caves freeze and the floor and walls become covered in solid ice. Our results show that specimens may seek warmer waters within the cave, but they can also survive being frozen in solid ice.

Sun-PM2-B-2

A Hare's Eye View to Winter Habitat Use: Fine-scale Analysis of Using "Runs" vs. Going it Alone

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Abstract - Within *Lepus americanus* (Snowshoe Hare) winter habitat, we commonly see tracks of a single animal, as well as pathways where single tracks cannot be distinguished because the path has been used many times as a "runway" or a "run". We found little published scientific data about differences in fine-scale habitat along these two different types of tracks that might suggest reasons for their respective use. The use of runs may be related to browse availability or ease of rapid movement through dense cover to avoid predators. Alternatively, the packing of snow on runs should increase the ease of movement for terrestrial predators that have a higher footloads than the snowshoe hare, which is well adapted to staying on top of unpacked snow. Using backtracking in the winter of 2014, we conducted a preliminary field study to examine cover and browse characteristics with respect to these ideas. Specifically, we looked to see if there were differences in food availability, browse intensity, and horizontal and vertical cover characteristics along travel paths for animals traveling singly, compared to where runs had developed. We found that browse was no more available along runs than along single tracks and that browse opportunities are rare in winter habitat in general. Our preliminary study suggested that the frequency of tracks of slow or non-moving animals traveling singly are highest at a distance of 0.5 m from protective horizontal cover, and those of faster-moving animals are approximately 1 m from cover. Along runs, the highest frequency of sampling points was at 1.5 m from protective cover, perhaps suggesting extremely fast movement through the habitat along those pathways. Surprisingly, single tracks in areas with an opening in the overstory tended to be approximately twice as far from a piece of horizontal cover (3.5 m) than in areas with more closed canopy, whereas animals traveling in runs tended to consistently be between 1 and 2 m from a piece of protective horizontal cover regardless of vertical canopy cover. This pattern may suggest that hares traveling singly are venturing into less safe territory to search for food. Runs do not appear to be browse corridors.

Mon-PM1-B-3

State of the Plants: Challenges and Opportunities for Conservation of the New England Flora

Elizabeth Farnsworth (New England Wild Flower Society, Framingham, MA; efarnsworth@newenglandwild.org) and **William E. Brumback** (New England Wild Flower Society, Framingham, MA; bbrumback@newenglandwild.org)

Abstract - The New England Wild Flower Society has released a comprehensive, peer-reviewed report that, for the first time, gathers together the most up-to-date data on the status of plants on the New England landscape. From these data, we can discern increases and declines in both rare and common species across all 6 states. We identify hotspots of rare plant diversity, and discuss factors that foster this diversity. We document the primary ecological and anthropogenic threats to both rare and common species. We discuss activities and initiatives by New England Wild Flower Society and its partner organizations in the New England Plant Conservation Program to conserve and manage rare plants and habitats throughout the region. We articulate a research agenda to bridge gaps in our knowledge of plant species and ecological communities and develop a framework for protecting the viability of thousands of species that together comprise our diverse and vibrant flora.

Sun-PM1-C-1

Remnant Populations of Northern Long-Eared Bat in Northeastern Coastal Communities

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Abstract - Broad scale declines of *Myotis septentrionalis* (Northern Long-Eared Bat) in the Northeast following the introduction of White-Nose Syndrome (WNS) have been well documented. Multiple sources of information, from both summer and winter, suggest that the species is much more difficult to find now than prior to the arrival of WNS. Here we report on a recently discovered remnant population on Long Island, NY. Although comparable pre-WNS data from Long Island are sparse, catch per effort in the small area sampled is similar to that experienced elsewhere in NY before arrival of WNS. Hints of similar abundance in other coastal habitats in the Northeast have also been reported. It is unclear why these populations exhibit a more successful life history in the face of this disease, but we speculate that hibernation behavior may play a role. Current trend of these populations is unknown.

Mon-PM2-B-4

Birds, Bugs and Wildflowers: Organic Integrated Pest Management for the Home Gardener

Richard Gardner (Bernville, PA; rtgardner3@yahoo.com)

Abstract - This past year, we transformed our yard into a place for birds, pollinators, and an organic garden. The purpose of this transformation was twofold: to provide pollinator and bird habitat, and to increase the yield in our garden by attracting pollinators of the vegetables and native predators of herbivorous insects. To do this we planted several wildflower beds, placed birdhouses throughout our yard, our woodlot, and the pasture next to it, and avoided non-organic garden chemicals such as pesticides and fertilizers. This presentation is a photo essay of the past year accompanied by discussion of the methods we used.

Mon-PM1-A-3

Bioeradication: Research and Insights on Five Common Invasive Plants in Central Pennsylvania

Richard Gardner (Bernville, PA; rtgardner3@yahoo.com)

Abstract - This presentation will discuss the effects of native organism systems on 5 common invasive non-native plants, i.e., bioeradication. Research over the last several years has shown that native organism systems are beginning to eradicate various invasive non-native plants from local ecosystems in central Pennsylvania. This approach is very different than attempting to find and utilize a "magic bullet" of biocontrol in that it relies on mutualistic native systems instead of a single non-native organism. The concept is based on Darwinian evolution over the (extended) period of time it takes a system to develop. Naturally, this approach is slower than biocontrol. However, instead of "control" with all the potential consequences of introducing another non-native into an ecosystem, the goal is extinction of the target non-native with lower ecosystem risk and lower negative environmental impact.

Sun-AM2-B-3

Tales of Campus Citizen Science Collaboration

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Abstract - In fall of 2014, six independent student-driven projects were launched on campuses using Android applications. Each project was meant to address a sustainability need at respective institutions in northern New York. At SUNY Plattsburgh, faculty used the iNaturalist app to create the “Saranac River Trail Trees” project and the Epicollect app for the “Bird Window Strike-SUNY Plattsburgh” project. Students at SUNY Fredonia implemented the Epicollect app “TrashTracker” project, which had previously been created and implemented at SUNY Plattsburgh, to increase awareness of litter habits on campus. Clinton Community College students inventoried campus trees “CCCTrees”, prior to major construction, using the iNaturalist app. At SUNY Cobleskill, the “AgDamage” project in iNaturalist was developed to help farmers assess agricultural losses and discuss mitigation with wildlife management officials. Finally, in the aquatic realm, Peru High School launched the “PeruNYStreamInvertebrates” project in iNaturalist to aid in their long-term stream-biodiversity monitoring. Faculty, who were trained in project creation using both iNaturalist and Epicollect apps, later worked with students to develop questions and implement projects. Success varied on each campus, and technical difficulties arose ranging from IT oversight, to lack of Wi-Fi, to app instability. In many of the projects, additional skills were honed and target student groups spearheaded spatial mapping in GIS, outreach/PR, data analysis, and assessment. Each project encouraged the use of students as mobile sensors for technology-facilitated field-data collection. This collaborative project, employing tablets and stand-alone apps, addressed scientific questions and offers the potential for distance mentoring and effective interdisciplinary research at other institutions.

Mon-PM1-D-3

Distribution of *Ixodes scapularis* and Associated Tick-borne Pathogens in Vermont

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Abstract - Since the early 1900s, the geographic range of *Ixodes scapularis* (Black-legged Tick) has been expanding northward and inland throughout New England. The Black-legged Tick is the principle vector for a variety of human diseases, the incidences of which have risen in concert with tick expansion. The arrival of the Black-legged Tick and associated diseases is relatively recent in Vermont as compared to other New England states. In 2013, we began a long-term monitoring project for Black-legged Ticks and the causative agents of three diseases: *Borrelia* (Lyme disease), *Anaplasma* (Anaplasmosis), and *Babesia* (Babesiosis) in Vermont. Adult Black-legged Ticks were collected by drag sampling 4 times per year at 6 collection locations west of the Green Mountains, and at 6 collection locations in the Connecticut River Valley. Pathogen tests used established molecular genetic protocols. We collected a total of 879 Black-legged Tick adults and nymphs. While Black-legged Ticks have been documented throughout most of Vermont, their abundance in our results varied dramatically (mean = 73.25 total ticks per site, range = 0–222, $n = 12$). Abundance did not vary uniformly with geography; northwestern and east-central sites had the highest abundances, and the lowest abundance was in the northeast. Moreover, the site with highest abundance was adjacent to the 3 lowest-abundance sites. For sites where we had at least 20 ticks tested ($n = 10$ sites), pathogen prevalence ranged 0.27–0.69 and 0.00–0.02, for *Borrelia* and *Anaplasma*, respectively, and pathogen prevalence was not well predicted by tick abundance. Zero ticks tested positive for *Babesia*.

Sun-AM1-D-2

Comparing Zooplankton Communities of 54 Adirondack Lakes with Variable Fish Histories

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Abstract - The Adirondack Park holds more than 3400 lakes. Many of these have never been sampled for zooplankton. Knowledge of the patterns of zooplankton presence among Adirondack lakes has implications for fish stocking success, invasion vulnerability, and climate change. Greater knowledge will also contribute to health assessments of lakes throughout the region. During the summer of 2013, fifty-four lakes in northeastern Adirondack Park were sampled. Ordinations were used to evaluate presence and density similarities. Lakes were selected using generalized random tessellation stratified sampling, and then selected from that pool based on fish stocking history to evaluate the potential human impacts of unchecked fish stocking. Preliminary results show that larger lakes tend to have a greater number of species, which are a homogenized mixture of regionally present species while, smaller and more remote lakes tend to have fewer and less common species, including cold stenotherms not found in larger lakes. Analysis also shows that while some larger species are ubiquitous to the region, e.g., the copepod *Leptodiptomus minutus*, others are present on a more local or infrequent scale.

Sun-PM2-C-3

Citizen Science: An Alternative Research Approach for Undergraduate Students

Elyse Glover Fuller (SUNY Rockland Community College, Suffern, NY; efuller@sunyrockland.edu)

Abstract - Many undergraduate students are fortunate to participate in research. These research opportunities can better prepare students for graduate school and their professions. As opposed to more-traditional independent research, existing citizen science opportunities offers an alternative route for students as they develop their research agendas. Since two-year community college students have limited time to develop a multi-semester research project, they, in particular, can benefit from citizen science research since the core programs of these projects have already been established. This presentation will explore how students can and do use citizen science in their undergraduate research pursuits.

Mon-PM1-D-1

An Absolutely Dated Mastodon with Strong Human Associations

Richard Michael Gramly (ASAA, North Andover, MA; gramlyasaa@comcast.net)

Abstract - A mastodon skeleton was exposed on the edge of a former pond by farming operations during 2013 north of Middletown, Orange County, Hudson River valley, NY. Excavations during 2014 recovered a badly fragmented, partial skeleton of an aged (45–50 years old) mastodon, likely a bull, in direct association with ivory, bone, and stone artifacts. Unequivocal chop-marks upon the skeleton indicate that it was dis-articulated with the aid of a stone axe. In addition, non-human scavengers left gnaw-marks upon a few of the mastodon bones. Radiocarbon dates of collagen from a well-preserved tusk are $10,950 \pm 40$ and $11,187 \pm 88$ RCYBP, suggesting that the carcass was processed by a Clovis group. Further, this group previously had visited at least one other proboscidean carcass and expected to encounter others in the future.

Sun-AM1-D-5

Determining Species Residency in Adult Odonate Surveys

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Abstract - Over the last two decades, surveys using adult Odonata have gained popularity as a means of providing a relatively easy and cost effective method of allowing ecologists, conservation biologists, and habitat managers to evaluate both water quality and the surrounding wetland habitat integrity. Several difficulties arise from using only adults in surveys; in particular, the presence of adults at a water body or in a wetland may not accurately reflect that the species of dragonfly originated from, successfully bred in, or requires the use of, that site. For dragonflies, the final exuviae provide the most identifiable larval stage, can substitute for lethal processing of live animals, and definitively indicate life cycle completion or reproductive success at that locality. However, dragonfly exuviae are difficult to find and identify relative to dragonfly adults, and species richness in exuvial surveys is generally biased low. In this study and analysis, we tested readily attained information in adult surveys as indicators of exuvia presence and, therefore, species residency. Repeated concurrent surveys of adults and exuviae were completed at 32 wetlands in New York and 30 wetlands in Oklahoma. We modeled the occurrence of exuviae as logit-linear functions of adult abundance, detection frequency (across surveys), teneral frequency, and breeding frequency while controlling for imperfect detectability. Exuviae occupancy probabilities and associated standard errors suggested several reliable indicators of species residency: (1) finding adults on at least 4 surveys, (2) finding tenerals on at least 2 surveys, and (3) counting more than 20 adults on at least 1 survey (with caveats). The odds of exuviae occurrence under these thresholds were about 9 to 18 times greater than when no adults were detected. Using these criteria, then, species residency may be accurately inferred during adult surveys, potentially improving freshwater applications and conservation via dragonflies.

Mon-PM2-C-2

A Comparison of Biodiversity and Community Structure between Temperate and Subtropical Rocky Shores

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Abstract - Coastal ecosystems are complex and species rich, but are vulnerable to degradation from a variety of anthropogenic activities. Therefore, an understanding of the factors that shape the structure of communities and influence biodiversity is critical for wise management. Comparative studies may help to develop a more comprehensive understanding of coastal ecosystems and their responses to global change. The goal of this study was to compare biodiversity and community structure of rocky intertidal ecosystems between temperate and subtropical biomes. Intertidal invertebrates were sampled at multiple rocky intertidal sites on the coasts of New England and Puerto Rico. Habitat characteristics (e.g., slope, habitat complexity) and anthropogenic variables (e.g. human population density, road proximity) were measured for comparison among sites. Shannon diversity did not differ significantly between subtropical and temperate sites, but species richness was significantly greater, on average, at subtropical sites. Algal cover and rock complexity were positively correlated with biodiversity, while intertidal species abundance and human population density were negatively correlated with biodiversity. Metacommunity structure in Puerto Rico exhibited Gleasonian turnover, ostensibly driven by a gradient of wave exposure, whereas metacommunity structure in New England conformed to a checkerboard pattern, probably driven by competition among crab species. These patterns suggest that effects of intense human activity on species composition and spatial variation in biodiversity are highly dependent on habitat characteristics and local ecological and evolutionary history.

Sun-PM2-B-4

Bat Community Composition and Distribution in the Delaware Water Gap NRA after White-nose Syndrome

Christopher Hauer (East Stroudsburg University, East Stroudsburg, PA; chauer1@live.esu.edu), Elizabeth McGovern (East Stroudsburg University, East Stroudsburg, PA; emcgovern@live.esu.edu), and Howard P. Whidden (East Stroudsburg University, East Stroudsburg, PA; hwhidden@esu.edu)

Abstract - Since the emergence of white-nose syndrome (WNS) in February 2006, populations of hibernating bats have experienced severe declines throughout eastern North America. We used mist-netting surveys to assess the potential impacts of WNS on the distribution and community composition of bats in the Delaware Water Gap National Recreation Area (DWGNRA) by comparing capture data from 2013–2014 with capture data from the park's last comprehensive bat survey in 1997–1998. A negative binomial regression model found a significant decline ($P < 0.001$) in capture rates of *Myotis lucifugus* (Little Brown Myotis) and *M. septentrionalis* (Northern Long-eared Myotis) from 1997–1998 to 2013–2014, whereas capture rates of *Eptesicus fuscus* (Big Brown Bat) increased significantly ($P < 0.001$) over this time period. We also conducted emergence counts at active summer maternity roosts to assess current reproductive rates and possible declines as a result of WNS. A maximum of 295 Little Brown Myotis were observed during emergence counts at one roost, representing a 90% decline from the 2500-3000 individuals that were present at this roost in 1997–1998. In addition, Big Brown Bats have partially displaced a former colony of 400 Little Brown Myotis at another roost. Finally, we used an AR125 acoustic detector to record bat echolocation calls along a 109-km driven transect route in the DWGNRA. We identified echolocation calls to species using the SonoBat 3 autotransmitter and plotted the locations of bats in the park using TransectPro. The majority of recorded bat passes were Big Brown Bats and *Lasiurus borealis* (Eastern Red Bat), and these species now appear common and widespread in the DWGNRA. In contrast, Little Brown Myotis and *Perimyotis subflavus* (Tricolored Bat) were rarely detected and appear to have very restricted distributions in the park today.

Mon-PM2-B-3

An Introduction to Assassin Fly (Diptera: *Asilidae*) Natural History in St. Lawrence County

Charlotte E. Herbert (St. Lawrence University, Canton, NY; ceherb11@stlawu.edu)

Abstract - Diptera: *Asilidae* (assassin flies) are predatory flies with over 7500 known species that span all zoogeographical regions. Very little is currently known about their ethology and ecology. To investigate the natural history of assassin flies in St. Lawrence County, NY, I recorded data on genus, perch height, perch location, and perch type for each assassin fly that was caught ($n = 227$) at 3 study sites that were similar in size and ecology. I also conducted mark and recapture observation on *Laphria* in order to make detailed ethology studies. Other individuals were collected for venom analysis. My initial data analysis of the 6 most common genera ($n = 181$) has revealed that all 6 genera were found to prefer lower perches than expected if perches were randomly selected. Three genera were consistently captured on the ground, whereas the 3 other genera could be considered generalists, with no apparent preference in their choice of perch. These data suggest interesting follow-up studies to help us better understand assassin fly ecological niches.

Sun-AM2-D-1

Measuring *Ixodes scapularis* and *Borrelia burgdorferi* Abundance in Oswego County, NY

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Abstract - The occurrence of Lyme disease in the northeast United States is related to a complex set of ecological interactions between the spirochete pathogen (*Borrelia burgdorferi*), the tick vector (*Ixodes scapularis*; Black-legged Tick), and the vertebrate hosts of the tick vector. Oswego County, NY, is part of a transition zone from higher Lyme disease risk to the south in Onondaga County to low risk of Lyme disease to the north. Lyme disease is relatively rare in central New York; however, there has been a significant increase in reported Lyme disease cases in Oswego County from 2009 to 2012. This project extends ongoing sampling of ticks in Oswego County and vicinity. We have used drag-sampling methods to collect *Ixodes scapularis* at SUNY Oswego Rice Creek Field Station (RCFS). In addition, small-mammal abundance was measured through live-trapping methods at Rice Creek Field Station. Ticks were also collected from hunting gear and *Odocoileus virginianus* (White-tailed Deer) carcasses by local licensed hunters from sites in South Granby and Fulton, NY in the fall of 2014. We tested ticks for infection by *Borrelia burgdorferi* using polymerase chain reaction and gel electrophoresis. In 2012 and 2013, we collected 214 and 73 ticks from RCFS, respectively. Tick populations were highly abundant in forest habitats in comparison to meadows and trails. Only one tick from each of the 2012 and 2013 sampling seasons tested positive for *Borrelia burgdorferi* at RCFS. Since May 2014, there has been a total of 52 ticks found at RCFS and 68 ticks provided by hunters. To date, 2 ticks that tested positive for *Borrelia burgdorferi* infection were recovered in 2014. PCR amplification of *Borrelia* in ticks is ongoing. Efforts to document tick population fluctuations in Oswego County will provide valuable information about the predicted northward expansion of ticks infected with *Borrelia burgdorferi*.

Sun-AM1-D-1

Stopover Ecology and Physiology of the White-throated Sparrow in Western New York

Christina M. Hoh (SUNY College at Brockport, Brockport, NY; chohl@brockport.edu)

Abstract - Recent declines in migratory bird numbers have led researchers to evaluate where conservation efforts would have the greatest impact on population recovery. Ornithologists are especially interested in identifying and protecting important stopover sites found along spring and fall migration routes. Birds use these habitats to rest and refuel before continuing to migrate, and quality of food and shelter there may determine if birds are able to reach their destination. Lake Ontario serves as a barrier to migrating birds, so it is especially important for them to rest and rebuild fat stores before attempting to cross the lake. This study compares fat storage and usage in *Zonotrichia albicollis* (White-throated Sparrow) individuals stopping along the Lake Ontario shoreline with individuals stopping farther inland. Preliminary results suggest that birds stopping at the lakeshore may have higher blood triglyceride concentrations than those stopping inland. By also considering factors such as age, sex, and body condition, we hope to learn more about how birds choose stopover sites and how they spend time there.

Sun-PM1-B-1

Developing a Stressor-based Landscape Condition Assessment Metric in GIS and Validation in New York Wetlands

Timothy Howard (SUNY ESF/New York Natural Heritage Program; Albany NY; tghoward@nynhp.org) and Aissa Feldmann (SUNY ESF/New York Natural Heritage Program, Albany NY; feldmann@nynhp.org)

Abstract - In the context of developing protocols to assess wetland condition, the New York Natural Heritage Program developed a landscape condition assessment (LCA) model to cumulatively depict a suite of anthropogenic stressors across the landscape of the state. The model synthesizes these stressors at the 30 m x 30 m pixel scale—each pixel has a score representing cumulative stress. We incorporated the assumption that ecological effects of all input themes would decrease to zero within 2000 m of their mapped footprint and that each effect would have a sigmoidal decay function to better represent the idea that effects remain strong near the source for some distance before decreasing. We incorporated 13 different stressors into the final LCA metric and evaluated the scorings for wetlands in portions of New York. We found significant relationships between the LCA score (= Level 1 assessment) and both a rapid on-site scoring (Level 2 assessment) and a more detailed floristic quality assessment (Level 3).

Mon-AM1-D-2

Stacking in the Field and Plant Portraits in the Studio

Jerry Jenkins (Wildlife Conservation Society Adirondack Program and Northern Forest Atlas Project, Eagle Bridge, NY; jcjenkins@hughes.net)

Abstract - In much field photography, depth-of-field is severely limited. Classical photography minimizes the problem with clever composition and tilting lenses. Modern photography avoids the problem by shooting a stack of images focused in different planes and assembling them with the computer. This technique, which was developed for macrophotography in the studio, adapts surprisingly well to the field and can be used for everything from close-ups to landscapes. Field photography is also limited by light quality. Much can be done to modify this, but bad light is bad light, and for portrait-level work, nothing beats a studio. To assemble the libraries of plant pictures we need for the Northern Forest Atlas Project, we have built a small, portable studio. It uses a mix of diffused natural light and LED panels, and has proven quite versatile and efficient. We will explain the techniques we use and argue that, with plants as with people, lighting is the key to portraiture.

Sun-AM1-B-3

Air-videos from the AirCam

Ed McNeil (McNeill Films, Lake Placid, NY) and **Jerry Jenkins** (Wildlife Conservation Society Adirondack Program and Northern Forest Atlas Project, Eagle Bridge, NY; jcjenkins@hughes.net)

Abstract - The AirCam is a specialized air-photographic platform, designed by Phil Lockwood for the National Geographic in 1955. It is an open-cockpit, high-wing aircraft, with two pusher engines; the version we use is turbocharged and has reversible props, floats, and retractable wheels. It is designed to take off and land in under 200 feet, to fly low and slow in windless conditions, and to have the maximum possible field of view for photography and videography. It is owner-built, and certified as an experimental aircraft. Ed McNeil has built two AirCams that he uses for air photography for conservation. We are using the second, N801EM, to prepare an atlas of low-elevation HD videos of Adirondack landscapes. We will show clips of three landscapes—alpine zones, open river corridors, and large open bogs—and explain the photographic techniques and what we are trying to accomplish.

Sun-AM1-B-5

Anemones and Roseroots

Jerry Jenkins (Wildlife Conservation Society Adirondack Program and Northern Forest Atlas Project, Eagle Bridge, NY; jcjenkins@hughes.net)

Abstract - *Anemone multifida* (Cut-leaved Anemone) and *Rhodiola rosea* (= *Sedum roseum*) (Roseroot) are two northern calciphiles that are disjunct in New England. We have about 20 years of monitoring data on each of them. The results are strikingly different. The anemone, now known in Vermont from a single population at Winooski Falls, lives in cracks in river ledges where it is subject to ice-scouring in the winter, violent flooding in the spring, and extreme heat and dryness in the summer. The individual-level data we have shows a decline of about 75% over those two decades, with low regeneration throughout and episodic peaks in mortality associated with hot dry summers. The Roseroot, currently known from two sites in Vermont, lives on mountain cliffs with calcareous seepage or surface flow. We mapped and made approximate counts of the population on the Eagle Cliff on Mount Horrid twice, 17 years apart. Within the limits of our mapping, neither the anemone nor a second boreal species which grows with it, *Saxifraga paniculata* (White Saxifrage), showed a significant change. The lesson from this is that geography and regional climate are poor predictors of persistence. Habitat, microclimate, water supply, and population size appear to be critical. Given the right place and plumbing, northern species may be surprisingly persistent. Absent these, they may be very vulnerable.

Sun-PM2-A-3

Citizen Science: Integrating Authentic Research Experiences into Liberal Arts and Sciences Curricula

Linda S. Jones (SUNY Empire State College, Saratoga Springs, NY; linda.jones@esc.edu), **Nikki Shrimpton** (SUNY Empire State College, Syracuse, NY; nikki.shrimpton@esc.edu), and Sadie Ross (SUNY Empire State College, Saratoga Springs, NY; sadie.ross@esc.edu)

Abstract - For many instructors offering courses in the sciences, the quest for effective strategies aimed at increasing and sustaining students' interests in science is an ongoing challenge. Citizen Science projects provide students with relevant, authentic experiences that connect them to global and local communities and encourage long-term participation. We begin by presenting some of our own experiences with incorporating a variety of established citizen science projects into courses in environmental science. We then discuss what we have learned from developing our own citizen science project, the Beetle Project. Student participation in the Beetle Project involves the collection of data on the presence of *Popillia japonica* (Japanese Beetle) larvae and adults, and a range of associated environmental variables, and the contribution of that data to a mapping platform. We will also expand upon our observations related to student engagement and learning.

Mon-PM1-D-2

Two Centuries of River Herring Decline and Current Threats to Recovery

Adrian Jordaán (Department of Environmental Conservation, University of Massachusetts, Amherst, MA; ajordaan@eco.umass.edu) and Jacob Kritzer (Environmental Defense Fund, Boston, MA)

Abstract - The documented long-term impacts from dams and overfishing on river herring populations has led to moratoria in many States and a recent petition for listing under the Endangered Species Act. A 2008 river herring stock-status report by the Atlantic States Marine Fisheries Commission (ASMFC) used a cluster analysis to identify patterns in river herring run counts. The results suggested some rivers have common patterns suggesting that trends were not entirely controlled by proximate factors. We expand upon the ASMFC cluster analysis by incorporating environmental drivers in pursuit of a more holistic understanding of the causes of decline. It appears the most likely explanation of most recent declines include a period of low freshwater productivity resulting from low water flow coupled with increasing predatory pressure and bycatch in fisheries. Thus, multiple drivers across marine and freshwater systems can act synergistically to produce negative population trends. Ultimately, our work aims to complement ongoing stock assessments by adding insights on broader environmental drivers, and to assist prioritization of impacts for mitigation and development of conservation strategies that counter against these multiple stressors.

Mon-PM2-A-5

Geology, pH, and the Freshwater Communities of the Shawangunk Ridge

Beryl C.M. Kahn (Randall's Island Park Alliance, New York NY; bkahn@gm.slc.edu) and Howard R. Feldman (American Museum of Natural History, New York NY; feldspar4@optonline.net)

Abstract - The "Sky Lakes" on the Shawangunk Ridge in the lower mid-Hudson Valley, NY, are a rich microbiome of aquatic faunal communities that appear to be directly impacted by the geology of the region. Each of these 5 lakes (Mohonk, Maratanza, Mud Pond, Awosting, and Minnewaska) has a similar geological makeup. They all occur in the Middle Silurian Shawangunk Formation (conglomerate), which is underlain by the Late Ordovician Martinsburg Formation (shale). Each lake is a closed, self-contained system at the top of the ridge with no drainage outlet. The pH in each of the lakes varies greatly, however; Awosting, Mud Pond, and Maratanza all have a pH of 4, whereas Minnewaska's pH increased from 4 to 6 in the last 20 years. Mohonk Lake has a neutral pH at the surface, making it an ideal reference site. This study analyzes and compares the aquatic faunal communities among the lakes in relation to their geological characteristics. Eighteen distinct taxa were found in Mohonk Lake, with a diversity index (DI) of 64.77 (number of specimens/number of taxa). It is believed that the more acidic Sky Lakes will have a lower DI than Mohonk, due to pH sensitivity in several aquatic species. We have not yet studied the other 4 lakes, but in the coming year, we aim to sample these systems to compare their faunal community compositions. If indeed the more-acidic systems are less diverse, this could potentially serve as a model for the effects of acid precipitation and pollution across the Northeast.

Sun-PM2-C-2

Effects of Water-level Fluctuations on the Common Loon in the Adirondack Park, NY

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Abstract - *Gavia immer* (Common Loon) is listed as a species of special concern in New York. Loon reproductive rates are affected by human activity, water-level changes, predation, and mercury levels; consequently, conservation initiatives have been implemented to monitor and research Common Loons throughout their range. In New York's 6 million-acre Adirondack Park, lakes are checked each summer for the presence of Common Loons, and their nests are monitored to document nest success (egg hatch) or failure. Initial data analyses from Huntington Wildlife Forest in the central Adirondacks, where lakes have been monitored for Common Loons since 1986, indicate nest failures have been increasingly caused by water-level fluctuations compared to mammalian predation. While this small sample size (7 lakes) does not show a significant trend, we will next conduct this analysis on a larger scale using more lakes in the Adirondack region. In addition, there has been an increasing variability of precipitation in the study area ($P = 0.07$), with rainfall occurring as severe precipitation events (i.e., intense heavy rainfall events followed by prolonged periods of little to no rain) rather than moderate but steady rains spread out over a longer time and more frequent in occurrence. Years with a higher variability of precipitation during the nesting season were associated with a lower hatching success rate, supporting the hypothesis that Loon nesting success is tied to a consistent lake level. Because extreme precipitation events are often attributed to climate change, and as climate change is likely to continue to affect water levels, it is important to study both the current and potential impacts of water-level fluctuations on Common Loon populations. Therefore, continued monitoring, along with devising strategies that allow Common Loons to nest successfully under circumstances of more severe water-level fluctuations, will become increasingly necessary to maintain healthy populations of the species in the region.

Sun-AM1-C-4

Altitudinal Range Shifts of Birds at the Southern Periphery of the Boreal Forest

Jeremy J. Kirchman (New York State Museum, Albany, NY; jeremy.kirchman@nysed.gov), and Alison E. Van Keuren (New York State Museum, Albany, NY; aev12159@gmail.com)

Abstract - Reports of shifting geographic ranges of species in response to recent climate warming have increased as researchers continue to examine data from long-term monitoring projects and repeated faunal atlases. Detecting altitudinal shifts with these data is harder than detecting latitudinal shifts because the large geographic scale of most survey units (e.g., BBS = 40-km routes, CBC = 452-km² circles, state atlas projects = 25-km² blocks) masks the substantial elevational variation within their boundaries. In an effort to directly measure altitudinal range shifts of forest-breeding bird species we have repeated an altitudinal transect survey conducted 40 years ago by Ken Able and Barry Noon at Whiteface Mountain (Adirondacks, NY). We find evidence for uphill movement of both upper and lower boundaries of altitudinal breeding ranges over the last 40 years, and for a regional trend toward warmer summers from Adirondack weather station data collected over this same period. Upper boundaries have moved more than lower boundaries, resulting in novel bird communities at some elevations as well as shifted species-diversity curves.

Mon-AM1-B-1

Non-target Impacts on Biodiversity of Ecological Restoration Projects

Erik Kiviat (Hudsonia, Annandale, NY; kiviat@bard.edu)

Abstract - Management projects that restore, create, enhance, or mitigate are intended to improve biodiversity support or other ecosystem services. Because any change to a habitat will favor some species and disfavor others, these projects may have negative as well as positive consequences to desirable species. Several examples are from projects in New York's Hudson Valley and northeastern New Jersey. Hudsonia designed, monitored construction of, and conducted research on wetland and upland habitats created for *Emydoidea blandingii* (Blanding's Turtle), listed as threatened in New York in 1996–1997 at a site in Dutchess County, NY. Earthmoving and tree removal associated with habitat construction destroyed a winter den occupied by 3 species of snakes. A small ditch to provide water flow into constructed wetlands allowed fish to swim upstream into a previously fish-less intermittent shrub swamp used by woodland pool-breeding amphibians. In 2010, a mitigation bank was installed at the Kane Natural Area in Carlstadt and South Hackensack, NJ. This project resulted in the destruction of approximately 40 rain pools on a 1-km pipeline service road that supported a large population of an unlisted but globally rare crustacean, *Cyzicus gynecia* (Mattox's Clam Shrimp). The mitigation bank also used the habitat of *Cyperus polystachyos* (Manyspike Flatsedge), a rare native flatsedge, for parking equipment, and apparently caused the spread of at least one potentially invasive nonnative flatsedge, *Cyperus amuricus* (Asian Flatsedge). Some of these impacts resulted from circumstances that would have been difficult to foresee, whereas other impacts were understood in advance of construction. Because adverse factors such as climate change, land development, and pollution also cause stress to desirable species, and management is increasingly practiced on a large scale, practitioners should consider cumulative impacts to species of conservation concern. Many instances of negative non-target impacts could be avoided by reviewing extant data on rare species, performing pre-design surveys of a wide range of taxa of concern, and placing higher value on the rare native species that already exist on a prospective restoration site.

Sun-PM1-D-2

The New Jersey Meadowlands: A Case Study in Urban Biodiversity

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Abstract - The "Greater" Meadowlands, from Newark Airport north to the Oradell Dam, are a mosaic of diverse human-built and natural habitats with a long history of biological observation and urban-industrial-transportation land use. We compared species richness of 21 taxa or guilds in the Meadowlands to species pools overall in Bergen and Hudson counties. Birds, fishes, and woody plants (for example) are relatively diverse, reptiles, butterflies, odonates, ferns, and mosses are intermediate in richness, and amphibians, true land snails, submergent plants, "fern allies," and liverworts are depauperate. Many taxa have been surveyed inadequately or not at all. The proportion of species represented in the Meadowlands is correlated with landscape permeability and habitat quality (as ranked by "best" judgment). There are many barriers to dispersal in the Meadowlands, and habitats there lack natural upland soils and are suberic, salinized, contaminated, or noisy. Much conservation attention has been accorded to tidal wetlands; however, freshwater wetlands and upland habitats support important diversity including half of the state-listed bird species of the region. Management has focused on attempts to replace nonnative *Phragmites australis* (Common Reed) with native wetland plants. This approach has generally been unsuccessful and ignores the considerable biodiversity support of reedbeds. Other habitats supporting rare species are being destroyed for residential, commercial, transportation, and recreation facilities. Our findings may be applicable to improve biodiversity conservation in other cities as well as industrial landscapes such as shale gas fields.

Sun-AM2-A-3

The Emergent Agriculture: A New Paradigm for Food Production Consistent with Nature

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Abstract - Over the past 50 years, intensive, industrial agriculture has increased food production significantly, but at a considerable cost to the environment and biodiversity. Industrial agriculture cannot meet future food demand, and attempts to do so will result in further environmental damage. An alternative approach, the beginnings of which date to the late 19th century, is gaining traction in the United States, and particularly in the Northeast. The emergent, holistic model of agriculture focuses on decentralized, small-scale, diversified farming; locally based marketing; land stewardship; and wildlife-friendly management. Both anecdotal and empirical evidence point to the efficacy of this holistic model. Reduced mowing, intensive rotational and high-grass grazing practices lower greenhouse gas emissions and appear to increase biodiversity in the vascular plant community. Comparisons of sheep body-condition scores (a 1–5 ranking correlated with nutritional well-being: 1 = emaciated, 3 = desired condition, 5 = obese) on quasi-wild (abandoned dairy) and conventionally managed pastures revealed small, but consistent differences in body condition, with the improved health for the sheep on quasi-wild pasture. Mean species richness of plants on quasi-wild pasture was 4.5 times greater than on conventional pasture, and the diets of sheep on quasi-wild pasture were more diverse than those on conventional pasture (chi-square goodness-of-fit test: $n = 80$, $P < 0.01$). Creating an agricultural system consistent with a land ethic permits farming to be ecologically functional.

Mon-AM1-A-1

Farmscape Ecology, Part 1: What can Farming Provide for “Wild” Nature?

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Abstract - Farming and nature conservation are often seen as mutually incompatible. However, we found that diversified medium-sized farms in the Hudson Valley can provide significant habitats for wild native plants and animals. For certain species, some of the habitats maintained by farming are ecologically analogous to habitats that were in the past created by natural disturbances, such as fire and Beaver-caused flooding. Now that these natural disturbances are largely controlled, such early successional and wetland habitats would be less common in a landscape without agriculture. We will show some examples of these on-farm habitats and of the native plant and animal species that find them suitably analogous to the natural habitats they had lived in prior to extensive human modification of the landscape. Of course, a farm cannot be all things to all people (nor to all plants and animals). Therefore, this presentation would not be complete without including some examples of organisms for whom the on-farm habitats do not provide suitable analogies to their natural habitats. We also illustrate some of the tradeoffs a farmer might consider between agricultural production and nature conservation goals, a theme that links this presentation to the next talk. Finally, we briefly summarize our ideas about the potential role of farms for nature conservation in a semi-agricultural landscape like the Hudson Valley.

Mon-AM1-A-3

Photography in the Classroom: Conservation and Education

David A. Krauss (Science Department, BMCC, CUNY, NY; dkrauss@bmcc.cuny.edu)

Abstract - Wildlife photography has many uses in conservation biology, and one of the most significant is the role it can play in the classroom. It has always been common to show an image of the organisms one is discussing in class to help students identify it and gain a sense of familiarity with their subjects. The use of photographs in the classrooms has evolved in recent years, and it is now possible to make much better use of class time and significantly enhance student involvement through the use of photographs as case studies. By presenting photographs as case studies, instructors gain the advantage of simultaneously reaching students at all levels of language proficiency and increasing classroom discussions and participation. In this presentation, I will discuss the advantages and methods of this teaching technique. While the photographic case study is a major teaching tool, it can be greatly enhanced when the instructor takes his/her own photos. Bringing in external photographs is fine, but there is a much more powerful hook to help students remember the educational principles that are being taught in conjunction with the photographs if there is a personal connection and story that goes with them. Towards this end, I will also explore the techniques of taking pictures that are not only visually appealing, but that also indicate ecological, evolutionary, and behavioral principles to make them more useful. I will discuss the use of super telephoto lenses as well as basic equipment and some lower-budget items that can greatly improve the quality of wildlife photography for the average person. This part of the presentation will serve as a follow up to the nature photography workshop on Saturday morning.

Sun-AM1-B-4

Caribou in New Hampshire: Paleofaunal Recoveries from the Tenant Swamp Site

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Abstract - The Tenant Swamp Paleoindian Site, in Keene, NH, was discovered during extensive archaeological testing and subsequent data recovery in advance of construction of a new Middle School. Complete excavation resulted in the identification of taxa not often recorded from Early Holocene sites in New England. A sample of calcined bone returned a date of $10,680 \pm 50$ B.P. (calibrated B.P. = 12,660 to 12,570). Two of the best-preserved bones are identified as a foot-bone fragment of *Rangifer tarandus* (Caribou) and a pelvis fragment, possibly of *Lontra canadensis* (North American River Otter). These taxa suggest exploitation of both terrestrial and riparian resources from the nearby Ashuelot River. This assemblage compares with others of similar age in preservation, degree of fragmentation, and elements preserved. Even though poorly preserved, these data add to the database of animal taxa recovered from Paleoindian sites in New England.

Sun-AM1-D-4

Functional Diversity of Songbirds across an Urbanized Landscape Quantified from Citizen Science Data

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Abstract - Citizen science data from eBird were used to answer the question: How does habitat variation across an urbanized landscape affect the functional diversity of seasonal songbird communities? We paired species account data from several eBird sites in Northern New Jersey and the New York Metropolitan area with species trait data from The Birds of North America Online. We quantified functional diversity as the total branch length of a functional dendrogram for the avian community at each eBird site. Relationships between functional traits and site variation were analyzed using correspondence analysis. The degree of urbanization did not have a significant effect on functional diversity scores when calculated from a functional dendrogram. However, results of the correspondence analysis did show significant variation in traits among urban, suburban, and exurban sites. Some bird communities in large urban parks were actually more similar to those in non-urban forests than to those in other urban sites when all seasons were taken into account. Breeding and migratory birds were more closely associated with exurban sites than urban sites. Wintering and year-round residents were more strongly associated with urban sites. These results show that the degree of urbanization can affect the functional diversity of songbirds and that functional diversity is partly dependent on seasonal variation. Specific traits, such as generalist strategies, were more strongly associated with urban habitats. Additionally, non-native species were more closely associated with urban sites. These associations match those previously described in the literature using field data. Consequently, this analysis shows the utility of broad-scale citizen science data for quantifying the effects of urbanization on bird community structure.

Sun-AM2-A-1

Tracking Offshore Movements of Common Terns Across the Southern New England Continental Shelf Using Nanotags and Automated Radio Telemetry Stations

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Abstract - Knowledge of offshore distributions and flight paths of bird species is required to inform effective conservation decisions in marine spatial planning, such as how to minimize impacts of offshore wind energy facilities on bird populations. To help fill this information gap, we are evaluating emerging nanotag technology for tracking offshore movements of conservation focal species off the US Atlantic coast. Nanotags are light-weight (0.25–2.6 g), digitally coded VHF transmitters that emit signals to specialized receiving stations programmed to monitor the locations of tagged birds around-the-clock. During 2014, we captured and nanotagged a total of 126 *Sterna hirundo* (Common Tern) from two major nesting colonies in the northeastern US and tracked their movements using an array of fixed and mobile automated radio telemetry stations positioned at strategic coastal and offshore locations throughout the southern New England continental shelf region. Specifically, the array consisted of eleven, 12-m (40-ft) radio antenna towers that tracked individual terns at ranges of 5–20 km, and receiving equipment within each nesting colony configured to monitor nest attendance. In addition, we operated receiving equipment on a passenger ferry in Nantucket Sound and on a fisheries research vessel that surveyed throughout the northwest Atlantic, and conducted periodic aerial telemetry surveys throughout the southern New England study area. The array of receiving stations recorded over five million detections of nanotagged birds as they moved through the southern New England region during the breeding, post-breeding, and pre-migratory staging periods. In addition, the array detected 235 different shorebirds, songbirds, and seabirds that were captured and nanotagged throughout the Gulf of Maine and Canadian Maritimes as part of the emerging Motus Wildlife Tracking Network, a collaboration of researchers utilizing nanotags and automated radio telemetry stations throughout the US and Canada. We present preliminary results of our 2014 study and discuss plans for our 2015 field season, which include expanding our array of radio telemetry stations across a broader section of the southern New England coast and using nanotag technology to track the movements of federally listed *Sterna dougallii* (Roseate Tern) and *Charadrius melodus* (Piping Plover) from northeastern nesting populations.

Sun-AM1-A-1

Response of American Red Squirrels (*Tamiasciurus hudsonicus*) to Climate Change in the Northeast

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Abstract - Research has shown that some wildlife populations are shifting poleward and upslope in the face of climate change. However, the history of land-use change and the comparatively smaller change in temperature seen in the northeast may make predictions of distribution shifts overly simplistic. We investigated long-term data collected at 469 sites across the northeast from 1996 to 2007 to determine whether *Tamiasciurus hudsonicus* (American Red Squirrel) populations have shifted in elevation over the last two decades. As predicted, we saw a substantial expansion into higher elevations, without a coincident contraction at the lower end of the range. These results will be discussed in the context of recent changes in the spruce-fir forests where the squirrels are found, as well as how these shifts might affect vulnerable montane bird populations.

Mon-AM1-B-2

Urban Forests as Stopover Habitat for Neotropical Migrants

Kristi MacDonald (Bernardsville, NJ; kristimacdonald1@gmail.com)

Abstract - I studied the effects of local forest habitat quality and adjacent urban land use on the community of migrating songbirds during spring in the Arthur Kill Watershed of New Jersey and New York City. I detected 48 species of Neotropical migrant birds among urban forests during the study. It is assumed they were using these forests as en route stopover habitat during spring migration. Richness and density of migrating birds were positively associated with forest maturity. Bird richness was especially influenced by the habitat features of more mature forests, including larger trees, greater vertical complexity of the vegetation, and higher richness of herbaceous plant species. Forests with residential land use adjacent to them had a higher density of migrating songbirds than those abutted by commercial-industrial areas, which indicates that land use is affecting the community of birds migrating through forests in spring. I will discuss the potential value of preserving even small forests in urbanized landscapes for birds and other taxa.

Sun-AM2-A-2

Changes in Land Snail Biodiversity Associated with Logging in Eastern Hemlock Woodlots

Zachary T. Mann (Unity College, Unity, ME; zmann11@unity.edu)

Abstract - The purpose of this study was to determine how logging in *Tsuga canadensis* (Eastern Hemlock) forests changes microclimate conditions and land snail richness and abundance. Eastern Hemlock forests throughout Maine are threatened by *Adelges tsugae* (Hemlock Woolly Adelgid, HWA), an introduced insect pest. When infested, trees may die within as few as 4 years, drastically altering the late successional ecosystem of which they are a part. Preemptive logging is a common response many woodlot owners in Maine are contemplating. The microclimate created under hemlock stands provides mild conditions that harbor species not found elsewhere. Land snails are an understudied group of organisms highly susceptible to changes in microclimate, especially sensitive to high temperature extremes and low soil moisture. Land snails were sampled in logged and unlogged sites in hemlock stands. Leaf-litter sieving and visual searches resulted in a total of 1041 snails and slugs collected. Diversity and the proportions of snail genera were significantly different ($P < 0.0001$ and $P < 0.0001$, respectively) among logged and unlogged treatments. Significant differences in maximum temperature ($P < 0.01$) and volume of coarse woody debris ($P < 0.05$) were found between logged and unlogged treatments. Additionally, 6 new records of land snails were identified for Waldo County, ME. Findings from this study indicate that logging in Eastern Hemlock forests could lead to changes in microclimate that significantly alter land snail communities, including local extirpations of species occurring in low abundance. It also reveals that more surveys of Maine's land snails are necessary to update current distribution knowledge.

Mon-PM2-C-4

The Impact of Invasive Honeysuckle Removal on Black-legged Tick Density in an Exurban Residential Setting

Emily R. Marsh (Lyndon State College, Lyndonville, VT; emilyrmarsh75@gmail.com) and Alan R. Giese (Lyndon State College, Lyndonville, VT, alan.giese@lyndonstate.edu)

Abstract - *Ixodes scapularis* (Black-legged Tick) is the vector for *Borrelia burgdorferi*, the bacteria that causes Lyme Disease. Elucidating the ecological dynamics of the Black-legged Tick will clarify geographical patterns in Lyme Disease and aid in its management and control. Black-legged Ticks have expanded their range in recent decades, bringing *B. burgdorferi* with them. Our study examined the relationship between *Lonicera tartarica* (Tartarian Honeysuckle) and the Black-legged Tick. Tartarian Honeysuckle is a non-native shrub that invades open forests and fields and crowds out native species. Our study adds to a growing body of research regarding the relationship between ticks and invasive shrubs. We surveyed ticks in two plots, a treatment plot in which Tartarian Honeysuckle was removed and a paired control plot. The density of Black-legged Tick larva was significantly lower in treatment vs. control plots. Adult and nymphal densities were similar in both plots. Factors that may explain the large reduction of larvae numbers but not in nymphs and adults are micro-climate, animal transport, and the timeline of the study. The long-term effectiveness of the treatment will depend on whether adults ticks re-establish larval densities in future years, or whether fewer larva leads to fewer adults. Our results have implications for the extent and duration of invasive species control that might be required by homeowners wishing to limit exposure to tick-borne pathogens.

Sun-AM1-D-3

Wildlife Photography for Conservation

Larry Master (Intervale Lowlands Preserve, Lake Placid, NY; lawrencemaster@gmail.com)

Abstract - The author has been taking photos of wildlife for over 50 years, has photographed in all 50 states and 33 countries, and has produced a growing archive of over 200,000 images of thousands of species that he makes freely available educational and conservation use. He will discuss his reasons for taking photos, equipment used (both expensive and inexpensive), ethics in the field, and the processing, web site display (www.masterimages.org), and archiving of photos.

Sun-AM1-B-2

Determining the Ecological Consequences of the Historical Damming of New England Watersheds

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Abstract - Anadromous river herring, collectively *Alosa pseudoharengus* (Alewife) and *A. aestivalis* (Blueback Herring), were historically abundant in most northeastern US coastal river systems. River herring provided an abundant commercial fishery during the development of New England and were an important prey base for a variety of marine predators. In addition, seasonal influxes of juvenile river herring into freshwater systems may have played an integral role in the diet and health of native predator species. Dam construction, which disrupted diadromous fish migration pathways, is considered the earliest principal cause of reduced productivity and population declines. Using published surveys, GIS layers, and historical documents, we created a database of dams constructed throughout New England watersheds from 1600 to the present. This information will allow us to establish a timeline of lost access to river herring spawning sites, which will be used as a proxy for abundance. To evaluate the effect of reduced productivity on lake food webs, we collected juvenile Alewives and freshwater predator fish from 20 coastal ponds in Massachusetts. Using diet analysis of predator fish and predator health, we will investigate the relationship between juvenile Alewife consumption and the relative health of predator species. Results will be used to develop a better understanding of the ecological importance of Alewives in freshwater systems and how the ecosystems have been altered by dams.

Mon-PM2-A-2

Health Survey of Northeastern *Crotalus horridus* (Timber Rattlesnakes) With and Without Dermatitis

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Abstract - From May 2013 through October 2014, biologists familiar with each of 9 different *Crotalus horridus* (Timber Rattlesnake) populations from four northeastern states (CT, MA, NH, VT) randomly captured individual snakes as part of a health assessment. In addition to collecting data on the overall health of the snake populations, they examined all snakes specifically for evidence of dermatitis. Each snake received a full physical examination, body weight, morphologic measurements, PIT tag placement, blood work and cloacal swabs for paramyxovirus. Snakes which had identifiable skin lesions were biopsied for microscopic evaluation, and tissue samples were analyzed using PCR to determine any fungal pathogens. During the study, a total of 98 snakes were sampled. Thirty-two snakes (33%) had dermatitis lesions noted on examination, and 75% of these lesions had detectable levels of *Ophidiomyces ophiodiicola* within the lesions.

Mon-PM2-D-4

Assessment of Eastern North American Tree Bat Activity along Two Potential Migration Corridors

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Abstract - The tree bats of northeastern North America—*Lasiurus borealis* (Eastern Red Bat), *Lasiurus cinereus* (Hoary Bat), and *Lasionycteris noctivagans* (Silver-haired Bat)—exhibit long-distance latitudinal migration and roost in trees year-round. As a result, studying the seasonal habits and movements of these species is a challenge. To better understand the seasonal activity of tree bats in northeastern Pennsylvania, and to assess the importance of linear landscape features as migration corridors, we used AR125 acoustic detectors to monitor bat activity at 3 paired sites along the Delaware River and an adjacent ridge. We identified echolocation calls to species using the SonoBat 3 autotransmitter, assessed seasonal activity patterns for each species, and used the Wilcoxon signed-rank test to compare ridge and river activity. Eastern Red Bat activity was elevated from late June to late August, coinciding with the summer resident period, and activity was higher at the ridge than by the river ($P < 0.001$). This is consistent with the use of forested uplands as summer habitat for this species. Hoary Bat activity was elevated from mid-April to late May and mid-July to early August, coinciding with spring and fall migration periods for this species, and activity was higher by the river than at the ridge ($P < 0.001$). Silver-haired Bat activity was elevated from mid-April to mid-May at both the ridge and river, and from mid-August to early October at the ridge, coinciding with spring and fall migration periods for this species. These patterns of bat activity indicate differences between species in the timing of migratory activity and suggest that different species may migrate along different landscape features. The tree bats of northeastern North America are threatened by fatalities at commercial wind-energy facilities and are most susceptible to fatality during fall migration. Identification of migration corridors may therefore assist in the conservation of these species.

Mon-PM2-B-1

Natural History, Biogeography, and Evolution of an Assassin Fly Genus

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Abstract - *Lasiopogon* is one of the 503 known genera of assassin flies (also known as robber flies). The approximately 70 species of *Lasiopogon* in North America have radiated into a diverse range of habitats including but not limited to mountain tops, coastal dunes, inland deserts, woodlands, and streamsides. Detailed ecological studies of the genus are just starting. In this presentation I plan to share some observations concerning the natural history, biogeography, and evolution of these important predators. Results of six collecting expeditions as well as a survey of over 2000 museum specimens will be analyzed with reference to a recent phylogeny constructed using DNA and morphological characters. We have uncovered correlations of assassin fly morphology with climate, elevation, biogeography, and evolution. The relationships seen with *Lasiopogon* may be helpful for researchers seeking to understand patterns of diversity for other insects.

Sun-AM2-D-3

Alternative Erosion-Control Techniques to Reduce Amphibian Entrapment and Mortality

Kathy Michell (KT Wildlife, Narrowsburg, NY; kmichell@hvc.rr.com), David Griggs (ERS Consultants, Warwick, NY; david@ersconsultants.com), and Tom Michell (KT Wildlife, Narrowsburg, NY; tomorama@gmail.com)

Abstract - Geotextile silt-fencing has been widely used for many years at construction sites for erosion control and to reduce sediment flow into wetlands and water bodies. Its effectiveness depends greatly on proper installation and maintenance. In recent years, state and local regulatory agencies have imposed more stringent requirements on contractors resulting in more effective barriers to water and silt movement. In addition, the recent increase in new linear utility construction and replacement has resulted in more and longer erosion-control barriers. Unfortunately, these improved barriers have resulted in increased disruption of amphibian migrations, often resulting in mortality of both adult and juvenile amphibians as they attempt to migrate between upland habitats and their wetland breeding areas. Many of these erosion-control barriers extend unbroken for several hundred meters and migrating amphibians become trapped against them making them vulnerable to predators and construction activities. Large numbers of amphibians may be affected in wetland areas. For example, on a 300-m section of a double-row silt fence, 435 *Notophthalmus viridescens* (Red-spotted Newt, Red Eft stage) were counted within one hour. The authors encourage the use of effective, amphibian-friendly alternatives to lengthy silt-fence barriers. Mulch berms allow amphibians as well as reptiles and small mammals to easily pass over them while effectively filtering sediments from run-off water. They can be made in various heights depending on the erosion needs and can utilize native materials from clearing activities making them cost effective and readily available. Erosion control "logs" are made from native materials blown into netting in the shape of logs and can be used to line access roads instead of geotextile fencing. Shorter sections of fencing combined with silt basins can also reduce amphibian loss while containing runoff. Regulatory agencies should become familiar with the amphibian-friendly alternatives to silt fencing which are available.

Sun-AM2-C-3

The Effect of Land-use History on the Invasibility of Southern New England Forests

Andrew Morrison (Antioch University New England, Keene, NH; amorrison2@antioch.edu)

Abstract - Within New England, forests are under pressure from shade-tolerant invasive plants. A review of past studies of invasive plant interactions and distribution within forest ecosystems in New England has shown that the primary metric used in research is invasion. Invasion metrics do not measure or control for the propagule pressure at the site, and therefore, the scope of the conclusions that may be drawn from this body of research is limited. Invasibility studies, which use propagule pressure to assess the relative success of invasive plant species, are needed to affirm our understanding of the factors controlling invasion within New England forests. I used a paired study design to survey invasive plant density in former agricultural sites and continuously forested woodlots while quantifying any difference in propagule pressure through a soil and litter seed assay. Results confirm the findings of previous invasion studies and demonstrate structural differences between former agricultural sites and continuously forested woodlots, as well as a greater invasive species density in the former. Preliminary data indicates that continuously forested woodlots have larger seed banks than former agricultural sites, but that invasive species seeds occur in higher proportions within the seedbank of the former agricultural forests. The research may also show that former agricultural sites are more invasible than the paired continuously forested woodlots, a result which is predicted under resilience theory and could expand our theoretical understanding of invasive species success.

Sun-AM2-B-1

The Center for the Study of Pinniped Ecology and Cognition (C-SPEC): What Have We Learned?

Kathleen A. Nolan (St. Francis College, Brooklyn, NY; knolan@sfc.edu), **Kristy Biolsi** (St. Francis College, Brooklyn, NY; kbiolsi@sfc.edu), **Kevin Woo** (SUNY/Empire State College, NY; Kevin.Woo@esc.edu), and **Allen J. Burdowski** (St. Francis College, Brooklyn, NY)

Abstract - The Center for the Study of Pinniped Ecology and Cognition (C-SPEC) was conceived of by Kristy Biolsi, who holds degrees in psychobiology and psychology with a focus on animal cognition. She uses sea lions and seals as her models. Through training, she has learned that pinnipeds can distinguish among various symbols. Her students have been observing and counting *Phoca vitulina* (Harbor Seal) in the New York City vicinity with the help of the Audubon Society and Kevin Woo, from The State University of New York/Empire State College. Dr. Biolsi has extended her reach to the St. Francis College Biology Department, and is assisting students with their research on sea lion vocalizations using the program Audacity. Patterns are different for individuals. C-SPEC held an informational session in October 2014 in which educators and researchers from the Long Island Aquarium, New York Aquarium, Bronx Zoo, and the Queens Zoo presented information about marine mammals to the attendees, who were mostly undergraduate students. This important center could serve as a clearinghouse for information about marine mammals and how they have fared since the Marine Mammal Protection Act of 1974. Networking and data sharing and analysis can also be enhanced and expanded. More information about C-SPEC can be accessed at <http://www.sfc.edu/pinniped>.

Sun-PM2-D-1

Data Sharing through the New Youth Educational Seining (YES) Consortium

Kathleen A. Nolan (St. Francis College, Brooklyn, NY; knolan@sfc.edu)

Abstract - The Youth Educational Seining (YES) Consortium is a two-year-old group that has met twice to share best practices and data obtained from their youth educational seining programs. Our first meeting was at St. Francis College in March 2013 and included a mix of government and academic scientists and environmental educators. We outlined our projects and discussed data we could share. A Day in the Life (of the Hudson River), seining programs, water-quality testing, and other educational programs were discussed. Our second meeting was in October 2014 at the Sarah Lawrence College (SLC) Center for the Urban River. (formerly known as the Beczak Environmental Education Center). This center is adjacent to the Hudson River, and, besides the meeting, the event included a seining program for the participants. Our membership now includes representation from five colleges and universities, one high school, a state agency, two independents, and two environmental education organizations. Some of us are partnering for the World Science Festival in May 2015. We hope to increase our membership (and thus data sharing and analysis) over time.

Sun-PM2-D-2

Rodents of Unusual Size: Preliminary Results Reveal Evidence of the Island Rule on the Boston Harbor Islands

Lauren Nolfo-Clements (Department of Biology, Suffolk University; lnolfoclements@suffolk.edu)

Abstract - The island rule has been confirmed for a number of mammal species on islands around the world. This rule states that, generally, larger species are dwarfed on islands while smaller species exhibit gigantism. Rodents have been a focus of numerous studies in which this pattern has been observed for smaller species. Through our trapping on the Boston Harbor Islands, we have revealed that the *Peromyscus leucopus* (White-footed Mouse) on the islands for which we have sufficient data (Bumpkin and Peddocks) exhibit a significantly larger body size than their mainland counterparts. Furthermore, this size increase is more pronounced on areas of islands that are more isolated from the mainland and where fewer predators have been observed.

Mon-PM1-B-2

Seasonal Variation in Energetic Condition and Chronic Stress in Three Species of Neotropical Migratory Songbirds

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Abstract - Migratory birds face a variety of stressful events and challenges throughout the year. Despite the potential negative effects of stressful life periods, few studies have sought to understand how stress levels and energetic condition change throughout the year in Neotropical migrants. Due to the high mortality rate experienced during migration it is important to understand what stress and physiological changes take place between breeding, molt, and migration in order to prioritize management of critical habitats and resources. In order to better understand these changes, we took blood samples from *Dumetella carolinensis* (Gray Catbirds), *Melospiza melodia* (Song Sparrows), and *Septophaga petechia* (Yellow Warblers) caught at Braddock Bay Bird Observatory from April 2014 to October 2014. We prepared blood smears for each bird and used the heterophil/lymphocyte ratio as a measure of chronic stress in the target species. Energetic condition was determined by measuring the levels of certain plasma lipid and protein metabolites and determining the mass index. We compared plasma metabolite levels, mass index, and stress levels among the 3 seasons for each species, and in relation to other factors like age and date within a give season. Preliminary results suggest that plasma triglyceride levels are highest during the fall, and uric acid is highest during the summer. We also plan to correlated condition indices with each other to determine how stress is related to the physiological condition of birds. Results of this study will inform us about potential variation in the health/stress levels of migratory birds across seasons and may provide additional insight about how different seasonal stressors may affect body condition.

Sun-PM1-B-2

Effects of Environmental Variables on Carabidae Composition in Logged Hemlock Dominated Forests

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Abstract - *Tsuga canadensis* (Eastern Hemlock) stands throughout Maine forests are threatened by the expanding range of the *Adelges tsugae* (Hemlock Woolly Adelgid). Death of Eastern Hemlocks will drastically alter the environments in which they are found since they are a foundation species. Preemptive logging is a common choice for many of Maine's landowners. Logging alters the ecosystem and the organisms that live in them, including beetles. Carabidae are thought to be biological indicators, but their response to changes in environmental variables is not well documented in Maine. Carabid beetles were sampled in 50 paired logged and unlogged hemlock-dominated plots. Between 2010–2013, I collected 2525 beetles and separated them based on both habitat affinity; (forest, open, and generalist), and moisture affinity; (hygrophilous, mesophilous, or xerophilous). I examined the relationships between the environmental variables and the carabid beetles and calculated and compared the diversity of beetles in both treatments. The results of this study conclude that preemptive logging of hemlock forests could lead to changes in the diversity of carabid beetles.

Mon-PM2-C-1

Potential Impacts of *Typha angustifolia* on the Rare Bog Buckmoth (*Hemileuca* sp) of Central New York

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Abstract - Invasive *Typha* (cattail) species have negative impacts for the biodiversity of Great Lakes shoreline marshes. Silver Lake is an intermediate fen located on the Lake Ontario coastal plain. This peatland is notable for harboring one of the few populations of the New York State endangered *Hemileuca* sp1 (Bog Buckmoth). The Bog Buckmoth relies almost exclusively on *Menyanthes trifoliata* (Bog Buckbean) as its larval food source. The increased abundance of cattails on the peatland mat has the potential to eliminate Bog Buckbean and therefore jeopardizes the long-term viability of the Silver Lake Bog Buckmoth population. We quantified the early stages of cattail encroachment on the peatland mat in order to determine if detrimental consequences of cattail colonization were apparent. We predicted that increases in cattails would be evident between sampling in 2012 and 2014. We also expected that plant species richness would decline as cattail stems and biomass increased. *Typha angustifolia* (Narrow-leaved Cattail) is the dominant cattail species at Silver Lake fen as indicated by stem counts and biomass measurements ($P < 0.0001$). Total cattail stems increased between 2012 and 2014. In 2014, living cattails averaged ~ 7 stems m^{-2} and standing dead cattail stems averaged ~ 23 stems m^{-2} . Mean biomass of living cattails was 53 gm^{-2} and that of standing-dead cattails was 83 gm^{-2} . Neither cattail biomass nor water depth had a significant effect on plant species richness ($P > 0.05$). Regional data indicates that cattail litter does not impact plant species richness until approximately 500 gm^{-2} of leaf litter accumulate. Based on these data and the spatial spread of cattails at Silver Lake, there is still time before cattail litter reaches a level likely to decrease plant species richness. However, in the absence of adequate control efforts, we expect cattails to continue to increase, eventually producing enough litter to reduce the cover of Bog Buckbean and therefore limit the available forage of the Bog Buckmoth.

Mon-PM2-C-3

The Effects of Landscape and Vegetation on the Abundance and Behavior of Non-Migratory Songbirds

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Abstract - While many non-migratory songbirds appear to be abundant in their natural habitat, little is known about how fragmentation, landscape, and vegetation impact their behavior and abundance. We sought to determine how abundance and behavior of non-migratory songbirds is affected by landscape and vegetation composition and type of forest edge, including natural edges, human-induced edges, and interior forest. To determine the influence landscape and vegetation have upon wintering songbirds, we selected 42 sites in the North Shore region of Massachusetts based on their location and habitat type. We surveyed each site 8 times, and collected data on the presence and behavior of Black-Capped Chickadees, Tufted Titmice, White-Breasted Nuthatches, and Downy Woodpeckers. Geographical information systems (GIS) software was used to analyze the vegetation and landscape at 200-, 500-, and 1000-m radii around each site. We determined that these birds are impacted by multiple factors, including tree type, forest density, and edge location. From the results of this research, each species appears to selectively use specific habitats differing in both landscape and vegetation, and is significantly impacted by forest area and the type of edge habitat.

Sun-AM1-C-1

Tracking Bats on the Maine Coast Using Nanotags

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Abstract - Extensive acoustic bat monitoring has demonstrated that bats occur frequently on remote offshore islands, weather buoys, ships, and other structures, particularly during fall migration. Offshore wind projects could therefore pose a mortality risk to bats. Assessing the risk of such impacts depends on a greater understanding of bat behavior offshore than what can be determined from passive surveys alone. We will present the results of a 2013 pilot study and a 2014 follow-up study that demonstrated the feasibility of tracking bats offshore in the Gulf of Maine using coded VHF nanotags and a regional array of over a dozen automated telemetry stations. Collectively, we tracked 14 bats for up to 21 nights per bat, with each tagged bat detected at least once at a telemetry station. Bat behavior and movement patterns differed substantially among species. Although tagged bats remained in the general area, detections occurred at stations up to 40 km from the capture sites, and individual bats were detected by up to 5 stations during a single night. We demonstrated that nanotag technology can effectively monitor movements of bats over a large region. The utility of the method depends to a large extent on the extent and positioning of automated telemetry stations but provides an unprecedented opportunity to monitor large-scale movements of bats and other small wildlife.

Sun-AM1-A-3

An Overview of the Vermont Boreal Flora

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Abstract - While it is speculated that the boreal flora of the Northeast is under increasing threat due to climate shifts, the evidence from Vermont shows a mix of increases and declines. We look at several species at a number of sites in Vermont and speculate as to the possible cause of any population shift. On Mt. Mansfield, anecdotal observations indicate a possible decline in *Diapensia lapponica* (Cushion-Plant); however a previously undocumented population was recently discovered at a new site in 2014. *Dryopteris fragrans* (Fragrant Fern), another boreal species, was relocated in 2014 at a site where it had not been observed since 1906. Lastly, a site for a number of populations of boreal calcareous species that was visited by Pease in 1929 was relocated, and all but one of the rare boreal species were still extant. All of these locations have the benefit of either being remote or closed to the public, whereas noticeable declines in the boreal flora have been documented at smaller, more heavily visited sites such as Mt. Abraham and Mt. Hunger. We speculate that much of the decline in boreal species may be due to trampling by hikers rather than to climate change, and therefore, monitoring protocols must be designed to distinguish between these two threats.

Sun-PM2-A-2

Turtle Nest-Depredation Patterns Relative to a Containment Fence in a Managed Recreational Landscape

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Abstract - Listed as a threatened species in the New York State, *Emydoidea blandingii* (Blanding's Turtle) faces high nest-depredation rates from meso-predators including skunks and opossums. One population, in Lagrangeville, NY, inhabits a series of natural and constructed wetlands between high school athletic playing fields and a public golf course at an adjacent state park. Blanding's and other wetland turtles such as *Chrysemis picta* (Painted Turtle) and *Chelydra serpentina* (Snapping Turtle) can potentially explore a large area around the wetlands that they inhabit to find suitable nesting sites. However, a containment fence between the school athletic fields and wetlands, which was constructed to diminish negative interactions between turtles and school athletic and recreational activities, severely constrains the extent of open space for potential nesting available to this population. Moreover, turtle-egg predators can forage for nests more effectively within a very confined zone, with a much higher likelihood of encountering the small patch of disturbed soil that may indicate a turtle nest. We determined the turtle nesting patterns for this wetland complex from 2011 to 2014 and found that turtles nested significantly ($P < 0.0001$) more frequently in rototilled or previously tilled areas than in paths or vegetated areas. We also determined depredation rates of simulated turtle nests (made both with quail eggs and with no eggs) placed within the wetland containment fence versus outside the fence in open meadows, among athletic playing fields, and on the golf course. We found no significant difference ($P > 0.4$) in depredation rates between experimental nest types (with eggs versus shams without eggs). Depredation rates of the simulated nests were significantly higher ($P < 0.0001$) in June than July, higher within the fenced-in areas compared to the unconstrained areas in both June and July, and higher in the tilled areas compared to the vegetated areas in both months. We also found that increases in nest distance from the tree-shrub line significantly increased time until depredation ($P < 0.005$). Our results highlight some confounding consequences resulting from conservation techniques involving managed landscapes and constructed, constrained environments that may actually create ecological traps with extremely low nest survivorship.

Sun-PM1-A-2

The Impact of 2011 Flooding on Fish Populations in Schoharie County, NY, Streams

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Abstract - In September 2011, Schoharie County streams experienced record flooding when Hurricane Irene and Tropical Storm Lee devastated the area. Heavy flooding and mitigation resulted in high sedimentation and downstream degradation. To determine the impact of flooding on fish populations, we conducted standardized backpack electrofishing surveys in 7 streams at established headwater and lower-reach sites 6, 18, and 30 months (2012–2014) post-flood and compared the results to pre-flood (2007–2011) data. Streams were classified as altered and unaltered based on the amount of human activity in the streams post-flood. We analyzed trends among 3 common headwater species—Brook Trout (*Salvelinus fontinalis*), Slimy Sculpin (*Cottus cognatus*), and Blacknose Dace (*Rhinichthys atratulus*). In altered headwaters, Brook Trout CPUE increased significantly 6 and 18 months post-flood but returned to pre-flood levels 30 months post-flood. In unaltered headwaters, Brook Trout increased significantly 6 months post-flood, but was found to have dropped significantly by 30 months post-flood. In altered lower reaches, Brook Trout showed no significant change from pre-flood levels through 18 months post-flood, but they decreased by 30 months post-flood. In altered headwaters, Slimy Sculpin increased significantly by 6 months post-flood, decreased significantly by 18 months post-flood, but returned to pre-flood levels by 30 months. In unaltered headwaters, Slimy Sculpin decreased significantly for all years that data were collected. In altered lower reaches, Slimy Sculpin was found to have decreased after both 6 and 18 months post-flood but returned to pre-flood levels 30 months post-flood. In unaltered lower reaches, no significant change in Slimy Sculpin was seen until a decline recorded at 30 months post-flood. In altered headwaters, Blacknose Dace significantly increased by 6 months post-flood but then was found to have significantly decreased after both 18 and 30 months post-flood. In unaltered headwaters, Blacknose Dace catch increased significantly and stayed above pre-flood levels for all surveys through 30 months post-flood. In altered lower reaches, Blacknose Dace increased significantly every year that we surveyed post-flood, with the 30-month levels 8.1 times higher than pre-flood levels. In unaltered lower reaches, Blackside Dace was found to have decreased significantly every year we surveyed post-flood. It was expected that altered streams would recover much more slowly than unaltered streams; however, after 30 months no uniform trend

Sun-PM2-C-4

Serpentine Geocology of Eastern North America: Current Knowledge and Information Gaps

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Abstract - Serpentine outcrops provide model settings for studies in ecology, evolution, conservation, and restoration. While much attention has been paid to serpentine outcrops worldwide, the literature on eastern North American serpentine outcrops and associated biota is scant. Although outcrops in the region have been mapped, there have been few intensive mineralogical and pedological investigations to date. Soil analyses suggest elevated levels of Ni, near-neutral pH, and Ca:Mg < 1, characteristics typical of serpentine soils worldwide. Botanical studies have largely focused on floristic surveys. *Cerastium velutinum* var. *villosissimum* (Octoraro Creek Chickweed), *Adiantum viridimontanum* (Green Mountain Maidenhair Fern), and *Packera serpicicola* appear to be endemic to serpentine soils while *Aspidotis densa* (Indian's Dream), *Minuartia marcescens* (Serpentine Stitchwort), *Symphyotrichum depauperatum* (Serpentine Aster), and *S. rhiannon* (Rhiannon's Aster) are largely restricted to serpentine. The few studies on cryptogams suggest that regionally rare lichens and bryophytes are often associated with serpentine outcrops. Studies of diversity, ecology, and cross-kingdom interactions of soil microbes and other fauna are minimal. Compared to other regions of the world, ecophysiological and evolutionary investigations are limited. Plant-soil relations, especially the capacity to hyperaccumulate Ni and the ecological consequences of metal accumulation, are also under explored. There are also limited efforts on habitat conservation and restoration. Overall, serpentine geocology in eastern North America remains largely unexplored, providing many opportunities for research.

Sun-PM1-C-2

Population Trends Influence Climate Niche Breadth, Geographic Distribution, and Response to Climate Change

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Abstract - Ecological niche theory states that occupied niche breadth should increase with population growth. This relationship has been studied extensively in the context of habitat niche breadth, and much evidence supports that populations at higher density occupy a wider range of habitats. However, no previous studies have investigated the relationship between population trend and breadth of other environmental niche components, for example climate niche breadth. Given the importance of climate niche in determining species distributions, if population trends influence occupied climate niche breadth, this could have important implications for understanding dynamic species distributions, responses to climate change, and our ability to model species distributions into the future. We compared trends in abundance to changes in distributional extent and climate niche breadth between 1980 and 2012 for 60 species of birds, estimated using occurrence data from the North American Breeding Bird Survey and 8 bioclimatic variables. We demonstrate for the first time that trends in abundance are significantly and positively correlated with changes in occupied climate niche breadth. Additionally, we used path analysis to show that the direct influence of trends in abundance on distribution was non-significant compared to a highly significant indirect pathway through change in niche breadth, indicating that climate niche breadth is likely an important mechanism linking abundance and distribution. Lastly, we found that population trend influenced species' responses to climate change. Species with increasing trends were more likely to expand their niche into warmer climate space than were declining species, consistent with reports of increasing species geographically maintaining their southern boundary despite climates warming. Conversely, species with declining trends were more likely to lessen their use of cooler niche space, indicating a failure to geographically "track" climates northward at the northern periphery. These results indicate that occupied climate niche can change within species on an ecological timescale as a function of population trends, and that changes in climate niche are important for understanding dynamic distributions especially in the face of climate change.

Mon-AM1-B-3

Current Status of White-Nose Syndrome in North America

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Abstract - White-nose syndrome (WNS) is an infectious disease responsible for decimating hibernating bat populations in eastern North America. Caused by the novel fungus *Pseudogymnoascus destructans*, WNS has spread rapidly since discovery in New York in 2007, and by March 2015 it has been documented in 25 states and 5 provinces. Seven North American species have been confirmed with the disease and at least 5 others have been identified carrying *P. destructans*. The fungus, likely of foreign origin, infects torpid bats resulting in physiological and behavioral impacts, often leading to mortality. Population declines exceeding 90% have been documented in affected hibernacula, and corroborated by counts at maternity colonies and by acoustic and trapping indices during summer. The US Fish and Wildlife Service is the lead federal agency coordinating the response to WNS in the US, and since 2008 the agency has provided over \$20 million to researchers and state and federal agencies to address WNS. These efforts have led to advances in our understanding of hibernation physiology, bat population dynamics, disease ecology, and general bat behavior. Scientists are investigating all aspects of this fungal disease, including the life history and ecology of this new fungus, the dynamics of fungal infection and transmission, and bat hibernation physiology and immunology in their search for a way to control *P. destructans* and conserve our native bats.

Mon-PM2-B-2

Shedding Light on Past Assumptions: A Look at Life-history Characteristics of Alewife (*Alosa pseudoharengus*) in Coastal Massachusetts

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Abstract - *Alosa pseudoharengus* (Alewife) is a critical component in both marine and freshwater food webs, providing an important food source and exchange of nutrients. Historically, Alewives have been harvested for direct consumption and bait (e.g. to catch *Morone saxatilis* [Striped Bass] and *Homarus americanus* [American Lobster]); however, population declines have limited this potential in recent decades, which has resulted in a petition for federal listing under the Endangered Species Act. Current understanding of factors affecting Alewife populations is limited by the lack of knowledge of Alewives in freshwater habitats, especially pertaining to juveniles. Alewife populations are typically assessed by counting adult fish as they enter spawning habitats through visual assessments (citizen scientist tallies) or electronic counters. Based on these data, we know that adults begin their migration into freshwater in April and early May. This timing may vary based on water temperature, photoperiod, and lunar phases. It has been assumed that adult Alewives immediately spawn in their respective natal nursery and quickly migrate back to sea; however, our preliminary results based on sampling 20 freshwater lakes and ponds in Massachusetts suggest that there is a distinct delay between adult migration and the resultant adult spawning event. Furthermore, genetic results from a parallel study show that Alewives are mating with multiple individuals over a 2- to 3-week time period. This expanded knowledge of Alewife life history may help guide management and restoration of their populations in freshwater environments.

Mon-PM2-A-4

Wildlife Management in Suburbia: It's Not All About the Wildlife

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Abstract - Suburban landscapes are the front-line of conservation as they occur at the interface between degraded urban centers and pristine rural areas. Despite their fragmented nature, suburban areas provide ample habitat for wildlife. Recently, the increase in species such as the *Canis latrans* (Coyote), *Castor canadensis* (Beaver), and *Odocoileus virginianus* (White-tailed Deer) in the suburbs has resulted in increased human-wildlife conflicts and ecological impacts. While science informs specific management strategies to address these wildlife issues, implementing management has been difficult due to the often conflicting viewpoints and goals of a variety of stakeholders that exist in areas with high human population densities. Animal rights groups, hunters, regulatory agencies, conservationists, political officials, and the media all interact to affect management decisions and, ultimately, outcomes. Using a suburban deer management program that has incorporated both sharpshooting and traditional hunting as an example, I highlight the challenges of implementing wildlife management in suburbia and discuss techniques for balancing stakeholder interests to facilitate successful management.

Sun-PM1-A-3

Applied Nanotag Tech: Automated VHF Telemetry Enhances Shorebird Migration Research in Coastal Maine

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Abstract - Studies of migratory species are often limited by spatial and temporal constraints, and have often relied on mark-recapture techniques to follow migrating individuals. Automated VHF telemetry can provide a more robust dataset to compliment other research tools. We have used this combined approach to study shorebird migration in Maine. The Gulf of Maine provides valuable stopover habitats for migratory shorebird species, particularly during fall migration (Jun–Nov). *Calidris pusilla* (Semipalmated Sandpiper) is one of the most abundant shorebirds in North America, but has declined in numbers in past decades, especially its eastern population. In 2013 and 2014, we captured a total of 158 Semipalmated Sandpipers, and collected morphometric data and blood samples at the time of capture. We deployed a total of 72 “nanotags” (coded VHF transmitters), all but one were subsequently detected by a collaborative array of automated receivers. We found that individual Semipalmated Sandpipers varied in their physiological condition, which significantly affected length-of-stay in the study site. Arrival date, size-corrected mass, and age were significant predictors of post-capture detection period. We found that the tagged birds continuously occupied roosting and feeding habitats within the local study area during the stopover period, but were not detected by any of the numerous active telemetry stations in the greater region. This finding supports the hypothesis that Semipalmated Sandpipers depart directly on transoceanic flights from eastern Maine. Using “nanotags” and automated telemetry receivers provided valuable information not available with traditional techniques.

Sun-AM1-A-4

Biometrics of an Assassin Fly Genus With Respect to Geography and Perch Location

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Abstract - There are over 7500 known species of Asilidae (Diptera), often called robber flies or assassin flies. The functional anatomy of 23 species of the assassin fly genus *Lasiopogon* was measured with image-analysis software. Measurements of 74 body parts were scaled to the average species size and then compared by geographic location, habitat preference, and perch location. We found significant differences in the functional anatomy of coastal, mountainous, and eastern *Lasiopogon* species, including an increase in femur size, tergite (abdomen segment) hair length, frons width, midcoxa length, and femur hair length in coastal flies as compared to the other geographical areas. In addition, our data suggest many other significant correlations between geographic location, habitat preference, perch location, and the functional anatomy of robber flies.

Sun-AM2-D-2

Exurban Development Does Not Impact the Physiological Condition of Ovenbirds in the Adirondack Park

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Abstract - Exurban development (low-density development in rural areas) can significantly alter wildlife community composition, but it is largely unknown whether it also affects wildlife at the individual level. We investigated individual-level impacts of exurban development in New York State's Adirondack Park by comparing the physiological condition of 62 male *Seiurus aurocapillus* (Ovenbird) breeding in forests with low-density housing development with those in contiguous forests. We used hematocrit (HCT) volume and plasma triglyceride (TRIG) levels to compare energetic condition, plasma uric acid (UA) and total plasma protein (TPP) levels to compare diet quality, and heterophil:lymphocyte ratios (H:L) to compare chronic stress. HCT was the only parameter to differ, with birds near houses exhibiting lower values. The comparable TRIG, UA, and TPP that we found between treatment types suggest that Ovenbird food quality and availability are unaffected by exurban development in our study area. Similar H:L suggests that homeowner activities do not significantly change chronic stressors faced by breeding male Ovenbirds. We also found no difference in body mass, body size, or age ratio to indicate that habitats in either treatment type were in higher demand or more difficult to acquire. Although our results suggest that exurban development does not reduce habitat quality for male Ovenbirds in a way that affects their condition, we caution that it may still ultimately reduce fitness by attracting synanthropic predators. Further work is needed to better understand the impacts of exurban development on wildlife at all levels and provide science-based information needed to meet conservation challenges in rapidly developing exurban areas.

Sun-PM1-B-4

Detecting Fisher (*Martes pennanti*) in Westchester County, New York State

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Abstract - Historically extirpated from much of its geographic range, *Martes pennanti* (Fisher) populations have re-established and are recovering in many areas across the continent including portions of New York State. In Westchester County, Fisher sightings have increased, suggesting range expansion into suburban areas north of New York City. This study sought to investigate Fisher presence on large forested parcels throughout the county. We conducted Fisher detection surveys for 14-day periods in ninety 1-km² sampling units across 19 protected forested areas in Westchester County from February through early April 2015. We placed cameras in each sampling unit and wired bait to a tree directly across from each camera to attract Fishers. Preliminary results detected Fishers on protected lands where they were not previously known to be present. Fisher is an ecologically important species in forested communities. Additional studies are needed to ascertain Fisher population size, breeding success, and habitat preference in this suburban landscape. This information will be useful for conservation organizations seeking to protect and enhance habitat for wildlife.

Mon-PM1-B-4

Songbird Fall Migration in the Gulf of Maine: Lessons From Automated Telemetry

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Abstract - The development of offshore wind resources in the Gulf of Maine could pose a risk to migrant songbirds. To investigate migratory movements in this region, we outfitted *Vireo olivaceus* (Red-eyed Vireo) and *Setophaga striata* (Blackpoll Warbler) with VHF nanotag radio transmitters at the Petit Manan National Wildlife Refuge in Steuben Maine in fall 2013 and 2014. We tracked birds in 2013 with 11 automated telemetry receivers deployed on islands and coastal areas in the Gulf of Maine and at 23 receivers deployed by collaborators between Nova Scotia and Nantucket Sound. In 2014, we utilized a greatly expanded array of receivers stretching to Chesapeake Bay. In 2013, we encountered 93% of the birds at >1 site (mean = 4 sites, range = 1–13). Preliminary analyses indicate that 82 percent ($n = 19$) of Blackpoll Warblers, and 30 percent ($n = 20$) of Red-eyed Vireos made at least one extended (>24 hr) stop after departing the banding site, indicating multiple stopovers over a relatively short (~600 km) stretch of coastline. Blackpoll Warblers made more stops than Red-eyed Vireos ($P < 0.001$). Migration rates were highly variable for both species. Blackpolls exhibited rates slower than those typically reported for long-distance migrants from banding or geolocator studies. Migration timing was strongly geographically structured for Red-eyed Vireos, with birds from more-distant natal origins passing through the Gulf of Maine earlier. Finally, males exhibited a greater proportion of offshore detections than females ($P = 0.04$), and earlier migrants exhibited a greater proportion of offshore detections than later migrants ($P = 0.07$). Our results suggest that individuals of both species spend extensive time on stopovers in the region, making numerous short-distance flights. This behavior could increase risk of collision with offshore turbines, particularly for later migrants that appear to make more over-water movements.

Sun-AM1-A-5

Common and Arctic Tern Movements in the Gulf of Maine: Applications of Nanotag Technology

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Abstract - Populations of *Sterna hirundo* (Common Tern) and *S.paradisaea* (Arctic Tern) are declining in the Gulf of Maine. We used VHF nanotag radio transmitters and automated telemetry to track these two species during their breeding and dispersal periods in 2013 and 2014, in order to gain insight on foraging ecology, colony attendance patterns, and dispersal and staging activities. We outfitted individuals with transmitters at the Petit Manan Island colony in 2013, and at the Matinicus Rock colony, and the Metinic, Seal and Ship Island colonies in 2014. We tracked birds with a series of automated telemetry receivers situated at the colonies and on nearby islands. In both years, we detected both species in nearshore and offshore habitats during foraging flights. However, Common Terns were detected at nearshore sites more frequently than Arctic Terns, and Arctic Terns appeared to depart from the colony away from the coast more frequently than Common Terns, suggesting some degree of resource partitioning. Both Common and Arctic Terns were absent from the colony for relatively shorter (15–30 minute) and longer durations (>1 hr), indicating that birds foraged locally and travelled away from the colony for extended foraging trips. In 2014, we detected 37% of Arctic Terns and 24% of Common Terns after dispersal from their breeding colonies. Four Arctic Terns were detected in Nova Scotia and/or New Brunswick after dispersal from their colonies for less than 2 hours; however 5 individuals remained in the region for multiple days (1–17). Similarly, 2 Common Terns were only detected in Nantucket sound for a few hours, but 5 individuals remained for multiple days (3–13). No Common Terns were detected at coastal receiving stations located further south than Long Island sound, suggesting that birds moved offshore after departing Nantucket sound.

Sun-AM1-A-2

High Resolution Imaging Techniques and Technologies in Photomacrography

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Abstract - Various techniques for optical, electron, and scanning-probe microscopy have been used to characterize and describe a broad range of scientific materials. The higher resolving capabilities of the electron, confocal, and x-ray microscopes have classified these as the go-to industry standards for imaging; however, new focus-stacking technologies relating to digital photomacrography have since simplified and advanced the use of standard light imaging in order to achieve higher resolving powers down to 0.4 μm . The images generated from these technologies show highly magnified details of colors and structures that represent samples in their most natural form. Focus stacking is the process of capturing and stitching together multiple exposures along the z-axis of an object in order to render an accurate image that is entirely in focus. The rigorous testing of various wet, dry, animate, and inanimate specimens has led to the development of refined techniques and solutions that allow for ∞ -100x reflected- and transmitted-light still and time-lapse imaging or high-definition filming of specimens, which do not need to be altered or prepared for imaging. Post-processing techniques are currently being tested to convert focus-stacked imagery into 3D triangular meshes or point clouds so they can be displayed in virtual reality or printed on 3D printers. The images generated with focus-stacking technologies produce data-rich images that are more closely associated with human perception and understanding. This natural representation of scientific objects has more profound implications for the way students understand complex observations, are more likely to resonate with the general public, and can increase the level of exposure and outreach of academic programs and natural history museums.

Sun-AM1-B-1

Physiological Condition of Migrating Birds near Lake Ontario and the Importance of Fruit Resources

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Abstract - Migratory birds are challenged to acquire adequate food resources during stopover periods, and wild fruits are a major source of this nutrition for many passerine species during autumn. We investigated refueling rates of birds during autumn stopover at 2 local sites in Rochester, NY, with habitats that support different fruit abundance and diversity. We also investigated potential site differences in the nutritional quality of 5 fruits common to both sites. Birds were captured at the Braddock Bay Bird Observatory (BBBO) located on the Lake Ontario shoreline and at the RIT Bird Observatory (RITBO) approximately 15 miles inland along the Genesee River corridor. We captured 2 focal species, *Zonotrichia albicollis* (White-throated Sparrow) and *Setophaga striata* (Blackpoll Warbler), at both sites and obtained blood samples for plasma metabolite profiling. During peak migration, we surveyed fruit abundance and diversity at both sites and collected fruits for nutritional analysis of energy density, percent dry mass fat, and total soluble solids. Site was the most important variable explaining variation in plasma triglyceride of both species, and birds had significantly higher plasma triglyceride at BBBO where overall fruit availability and fruiting shrub diversity were higher. Plasma uric acid did not differ between the sites, which may suggest a lesser importance of protein-rich foods like insects in explaining these site differences in refueling. Additionally, the fruits of *Viburnum dentatum* (Arrowwood Viburnum) were higher in fat and energy at the BBBO site where birds had higher refueling rates. Our results suggest that abundant high-quality fruit resources are associated with increased refueling during stopover in this area, and the quality of fruits produced by certain shrub species may vary among sites over relatively small geographic scales.

Sun-PM1-B-3

Garter Snakes of Massachusetts: Ecology and Variability

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Abstract - *Thamnophis sirtalis* (Garter Snake) is ubiquitous throughout New England and inhabits a variety of habitat systems. We have used artificial cover objects to study snake communities from long-term sampling stations on 2 islands in Nantucket County and on Wachusett Mountain in Worcester County, and from short-term study sites. We have developed standardized sampling techniques that can be implemented by seasonal students, interns, and volunteers. The long-term sampling stations provide data on population trends and how environmental conditions affect our sampling. We are also maintaining some snakes in captivity to study their behavior and growth in standardized conditions at Bristol County Agricultural High School. This research has resulted in documenting population-specific color-pattern differences, life-history plasticity (size, age at maturity), habitat use, diet, growth, reproduction, and thermal biology. Female snakes are significantly smaller on the islands of Nantucket and Tuckernuck compared to those from Wachusett Mountain. Snakes from mainland populations are more likely to have continuous stripes compared to island snakes, which have broken stripes or stripes that are interrupted by dark blotches. We will summarize our methods and several more of the most interesting findings.

Mon-PM2-D-2

Investigating Annual Variation in Fruit Quality Using Multidimensional Fluorescence Spectroscopy

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Abstract - Wild fruits are a nutritionally important food resource for birds during autumn migration. The nutritional quality and biochemical composition of the fruits may be affected by factors like growing conditions for any particular year. The goal of this study was to investigate nutritional differences among fruits collected during different growing seasons. This study focuses on wild fruits collected at the Braddock Bay Observatory, an important stopover site located on the south shore of Lake Ontario. We collected the fruits of 12 locally occurring shrub species in autumn of 2012 and 2013 and analyzed the samples for energy, fat, fiber, phenolic content, anthocyanin content, antioxidant content, and total soluble solids. Extracts of the fruits were analyzed using multidimensional fluorescence spectroscopy. The spectrofluorometry technique involves creating 3-dimensional “fingerprints” for each fruit, which provides the excitation and emission spectra of molecules in the fruits at various wavelengths. We performed parallel factor analysis (PARAFAC), a multiway deconvolution method that provides spectral characterizations and “scores” for fluorescent components in a sample set, on the fluorescence excitation-emission matrices (EEMs) and then correlated the component scores with nutrient levels in the fruits measured by other analytical methods. Results from this study could be used to identify nutritional changes in fruits over time that may be correlated with changing environmental variables.

Sun-AM1-C-2

Conserving Snake Species of Greatest Conservation Need Threatened by an Emerging Fungal Skin Disease

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Abstract - Within the past several years, there have been increasing reports of many snake species exhibiting facial lesions. Recent work has correlated these facial lesions to the fungal species *Ophiodiomyces ophiodiicola*, also known as snake fungal disease (SFD). These lesions often involve the orbit, pit organ, or labial region, causing concern for the individuals' survivorship. Following some of the study designs of the Roger Williams Park Zoo (RWPZ) Health Survey of *Crotalus horridus* (New England Timber Rattlesnake) populations of SFD (2013–2014), Massachusetts has taken the lead on a nine state Competitive SWG grant (2014–2015) to investigate the effects of SFD on snake populations. With this study, we assess the presence of SFD in several different snake species by submitting biopsies to the National Wildlife Health Center. We are also assessing treatment strategies for severely infected individuals. In addition, the one MA population of Timber Rattlesnakes with the highest report of SFD is currently being radio tracked to assess if there are any differences between infected and non-infected with regards to overwintering, movements, and habitat use. We are currently assessing management strategies of headstarting, captive breeding, and genetic rescue, for populations not only suffering from SFD, but also isolation, inbreeding, and increased mortality from road kill, poaching, and intentional killings.

Mon-PM2-D-5

American Black Duck and Mallard interactions in the Saranac Lakes Wild Forest Area, NY

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Abstract - *Anas rubripes* (American Black Duck) populations have steadily decreased across the northeastern United States, prompting researchers to examine causes of decline, including habitat loss, hybridization with *Anas platyrhynchos* (Mallard), and competitive exclusion by Mallards. Previous work has documented that American Black Ducks apparently prefer a forested landscape during breeding. Although there is suitable and abundant wetland habitat, few studies have investigated American Black Duck and Mallard interactions in the Adirondacks. Therefore, we designed a survey of lakes and wetlands of the Saranac Lakes Wild Forest Area in the summer of 2013 and used occupancy modeling to estimate occupancy and detection rates for each species. We also assessed the degree to which these two species interacted with one another. Given prior assessments, the predominantly forested landscape, and a low density of humans, we predicted American Black Ducks would have greater occupancy rates than Mallards at our study area. Our results show each species was approximately equally likely to occur and be detected, and there was no evidence that Mallards excluded American Black Ducks from habitats. However, Mallards did show greater affinity for habitats with more humans present while American Black Ducks occupied areas that afforded more isolation from humans. Less than half of the lakes and wetlands we surveyed were occupied by either species, even accounting for failed detections. If our findings apply to all Adirondack lakes and wetlands, then there is an abundance of unoccupied habitats that could have population-level ramifications for both species. Our methods can hopefully be applied to other regions of the Adirondacks and the northeastern United States to better understand the extent and degree by which Mallards and American Black Ducks are spatially interacting.

Sun-AM1-C-5

Importance of Depth for Corm Survival in *Erythronium americanum*

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Abstract - *Erythronium americanum* (Trout Lily) is a common spring ephemeral in northeast forests. It is important to nutrient retention in the spring, serves as food for wildlife, and has aesthetic value with its early visibility and attractive flower. Corms of *E. americanum* survive the summer and winter in a dormant state, and the plants expend energy using droppers to send corms deeper at the end of their active period in the spring. I investigated the importance of depth for corm survival by planting 10 corms at 1, 5, and 10 cm depth for the summer of 2014 and winter of 2015. In the winter, a second treatment was added from which snow was removed after each storm for the first and last four weeks of snow cover. During the summer, corms at 5 and 10 cm had a significantly greater chance of survival than those at 1 cm. Data from the winter will also be provided. Current results suggest that shallow corms will have a lower survival rate than more deeply situated corms. Mechanisms behind this pattern need further investigation.

Sun-PM1-C-4

Wildlife in a Changing World: A Role for Zoos

Alan Tousignant (Trevor Zoo at Millbrook School; atousignant@millbrook.org)

Abstract - The world is changing at ever increasing rates in almost every way one can measure. Human population, overall average temperature, species extinctions, major storm events, shifting weather patterns, and an almost limitless cast of other characters are changing faster than we can document them. One can debate the actual percentage, but there is no debate about the fact that anthropogenic factors play a role in the way that environments change over time. Zoos are becoming major centers for educating the general public about the ways in which these factors can affect our natural world. Zoos and other venues that connect people directly with nature provide a visceral link to aspects of the environment with which they would not otherwise interact. As the famous quote by Baba Dioum goes, "In the end, we will conserve only what we love. We will love only what we understand. We will understand only what we are taught." The Association of Zoos and Aquariums accredits about 225 zoos and aquariums. The most recent annual data shows that more than 181 million people visited a zoo or aquarium in 2013, more than 12 million kids visited on school trips. Over 400,000 teachers have received some kind of conservation-related training at or through a zoo in the last 10 years. Currently AZA-accredited zoos are working on 319 species survival plans to help conserve 590 threatened or endangered species of animals worldwide through field work, scientific investigation, economic development, and, most importantly, education at all levels.

Sun-PM1-A-4

Conserving Venomous Snakes: Where Culture, Biology, and Politics Collide

Tom Tynning (Berkshire Community College, Pittsfield, MA; ttynning@berkshirecc.edu)

Abstract - The only two venomous snake species in New England, *Agkistrodon contortrix* (Northern Copperhead) and *Crotalus horridus* (Timber Rattlesnake), have been the subject of endless fascination, unabated debate, widespread persecution, variable conservation effort, and remarkably little scientific attention, at least until very recently. Current conservation dollars are being spent on last-ditch efforts to stem the tide of population extirpation whose proximate causes are not new. Emerging threats include poaching, recreational activity abuse, and hysterics about mysterious diseases that at best divert attention to practical problems and at worst waste scarce resources. The situation begs the question if environmental education (in all its forms) has failed to embrace venomous species. This presentation is an introduction to the natural history and conservation status of New England's two venomous snakes.

Mon-PM2-D-3

Snakes at the Edge: Why New England Matters

Tom Tynning (Berkshire Community College, Pittsfield, MA; ttynning@berkshirecc.edu)

Abstract - Half of the 14 species of snakes found in New England are at the periphery of their global geographic range. None are rare on the continent, but edge populations are known to be especially rich in gene expression, behavioral modification, and morphological variation. The concept of population home range (PHR) is suggested as an important asset for protecting these snakes. A peripheral population of *Agkistrodon contortrix* (Northern Copperhead) has been casually studied over the past 25 years, and one particular den has been subject to recent concentrated attention due to its proximity to major human activity. In addition to impacts from human predation, natural loss, and exotic-invasives, this snake population is geographically constrained between an interstate highway and an ever-growing recreation area. The long-term survival for this population is not predictable, but efforts are underway to solve at least part of the issues that are also familiar to efforts to conserve most other snake species.

Mon-PM2-D-1

Farmscape Ecology, Part 2: What can “Wild” Nature Provide to Farming?

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Abstract - Our previous talk outlined the ways in which certain aspects of farming can benefit nature conservation. The question now becomes how can that wild, or, at least, unmanaged nature potentially affect farm production, and how might damages be minimized and benefits encouraged. Because of their interactions with crops, subsets of our wild biodiversity have been tagged as “pests” and “beneficials”. In this talk, we summarize our own modest, localized work looking at the aspects of the ecology of pests and beneficials in 3 crop systems (pastures, field tomatoes, and apple orchards). We describe some of the ways the wild nature of these systems influences, for better or worse, agricultural production. We then ask how management of both the cropland itself and the surrounding lands might help emphasize the synergies. In considering these ecological interactions of a given system, it is useful to think about the nature of the crop (How unique a “treat” is it? How similar is it to coexisting wild plants?) and the nature of the overall cropland habitat relative to surrounding wild lands (e.g., how sharp is the break between cropland and surroundings?). Furthermore, in assessing the role of surrounding nature from a production perspective, management style (e.g., organic vs conventional) can strongly influence how that nature is viewed. Finally, despite evidence from a variety of researchers, the production ecology of a farm is rarely considered to extend beyond the farm fences; we close by asking how public support for local agriculture might translate into public support for a functional agrarian landscape.

Mon-AM1-A-4

***Puffinus gravis* (Great Shearwater) Research in and around NOAA’s Stellwagen Bank National Marine Sanctuary**

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Abstract - In 2013, a consortium of researchers began using PTT transmitters, fisheries-dependent data, and stable isotope analysis of feathers, blood, and exhaled gases to investigate the habitat use, foraging ecology, fishery bycatch, and movement of *Puffinus gravis* (Great Shearwater [GS]) in and around the Stellwagen Bank National Marine Sanctuary (SBNMS). Bayesian switching state-space modeling (SSSM) of PTT data identified high-use areas in the Greater Gulf of Maine/Scotian Shelf (GoM/SS) and were linked to Bedford Institute of Oceanography-defined bathymetry and physical oceanographic features. SSSM combined with data on relative *Ammodytes dubius* (Sand Lance) forage-fish abundance indicate GS use of the SBNMS could be dependent on Sand Lance. Foraging preferences will be further elucidated by stable isotope results. State-space modeling (SSM) of PTT data was combined with fishery-dependent data to identify areas of high bycatch in the GoM gillnet fishery, with 50% of observed bycatch occurring in an area constituting ~1% of the GoM (2013). PPT data demonstrate that GS are capable of remarkably precise long-distance navigation, including repeated usage of spatially discrete migratory paths (<50 km wide but >3000 km long) by different individuals at different times during interhemispheric seasonal migration. Movement data are currently being analyzed to understand GS navigation, such as how birds compensate for wind drift when traveling.

Mon-AM1-C-4

Temporal Aspects of Amphibian Disease Ecology over a Three-year Period in Oswego County, NY

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Abstract - Amphibians are facing significant population pressures from emerging infectious diseases. Chief among these are chytridiomycosis and ranavirus, which tend to be more problematic in tropical and subtropical areas and in temperate regions, respectively. In 2012, we initiated a long-term study of prevalence and distribution of ranavirus and *Batrachochytrium dendrobatidis* (Bd), causal agent of chytridiomycosis, in local amphibian populations in Oswego County and to date have sampled 389 frogs, salamanders and toads representing 12 different species. Surveying commenced in mid-April and continued until the end of October or mid-November in 2012–2014, and we also sampled associated environmental data (temperature, humidity etc) and took swab and tissue specimens from collected animals. We used tissue specimens and swabs to test for the presence of ranavirus and Bd, using end-point PCR and gel electrophoresis, respectively. Both Bd and ranavirus has been detected on *Rana clamitans* (Green Frog), *R. catesbeianus* (Bullfrog), *R. sylvatica* (Wood Frog), *Pseudacris crucifer* (Spring Peeper), *Eurycea bislineata* (Two-lined Salamander), and *Notophthalmus viridescens* (Eastern Newt). Additionally, ranavirus has also been detected on *R. pipiens* (Northern Leopard Frog). Across the 3 years, Bd prevalence has varied considerably, with a 30% prevalence in 2012, and 3% and 6% in 2013 and 2014, respectively. Chi-square analysis established that Bd prevalence was not randomly dispersed throughout the season in 2012 and 2014, whereas no such support was found for 2013. For all 3 years, Bd prevalence was the highest throughout April-June with a second peak in September in 2012. On the other hand, ranavirus prevalence has been fairly stable throughout the 3 years sampled, with a distribution of 25, 23, and 39% for 2012–2014, respectively. For both 2013 and 2014, the general trend showed a propensity for higher ranavirus prevalence during spring months as opposed to fall, whereas 2012 showed the opposite pattern, with prevalence peaking in fall. These patterns of seasonality serve as a proxy for climatic conditions; thus, fluctuating prevalence rates of both ranavirus and Bd might suggest that environmental parameters that vary with season are important for establishing infection of amphibians.

Sun-AM2-C-2

Changes in the Diet and Growth Rate of *Sterna paradisaea* (Arctic Tern) Chicks on Seal Island National Wildlife Refuge

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Abstract - Long-term data sets concerning seabirds are exceptionally valuable to assist future management and conservation efforts. The Audubon Seabird Restoration Program has collected data about diet and growth rate of *Sterna paradisaea* (Arctic Tern) chicks at Seal Island since 1993. We present a preliminary analysis of Arctic Tern diet and associated growth of tern chicks over the past 12 years. We compared chick growth with sea-surface temperature and the timing of the spring plankton bloom to look for associations between these variables.

Mon-AM1-C-1

Ecological Restoration in New York City: Challenges, Opportunities, and Experimentation

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Abstract - Densely populated and industrialized urban settings, such the New York City metropolitan area, represent a unique challenge for ecologists, environmental engineers, and restoration practitioners to bring non-traditional and, in some cases, experimental approaches to project design and construction. Several ongoing programs sponsored by city, state, and federal natural resource agencies, and their non-governmental partners provide a framework for linking restoration initiatives encompassing a variety of habitat types, and for sharing information gathered during feasibility or “pilot-scale” investigations and post-restoration monitoring programs. Examples of current restoration programming in this region include the Hudson-Raritan Estuary Comprehensive Restoration Plan (HRE-CRP) and New York City’s “PlaNYC” program. Habitat types slated for restoration (or already restored) under these initiatives include submersed vegetation beds, tidal and non-tidal herbaceous and forested wetlands, coastal and floodplain forests, migratory-fish corridors, benthic (soft-bottom) habitats, shellfish (oyster and mussel) beds, and historically “hardened” or extensively modified urban shorelines. Restoration goals and targets for these habitats (and habitat complexes) have been set under these programs, and many projects have been completed yielding a broad range of functional capacities and outcomes. Active dissemination of this information can help inform ecologists and resource managers engaged in ongoing and future restoration projects in the NYC metropolitan region and elsewhere by providing “lessons learned” and supporting adaptive management efforts across all project stages, from initial planning and implementation to post-restoration monitoring and evaluation.

Sun-PM1-D-1

Using a Geographic Information System (GIS) to Monitor (and Find) Seabirds: A Birder's Perspective

Naeem Yusuff (Brookline Bird Club, Cambridge, MA; nyusuff@brooklinebirdclub.org), **Marshall Illiff** (Cornell University, Ithaca, NY; marshall.illiff@gmail.com), and **Jeremiah Trimble** (Harvard University, Cambridge, MA; jtrimble@oeb.harvard.edu)

Abstract - The pelagic waters off the coast of Massachusetts boast an impressive array of wintering, summering, and migrating seabirds; however, our knowledge of the full scope of their patterns of abundance and movements in lives is at best fragmentary. Indeed, recreational bird-watchers view pelagic bird watching as “the last frontier of birding in North America” precisely because so little is known about the status and distribution of species which seemingly occur regularly, particularly charismatic birds such as *Pelagodroma marina* (White-faced Storm-Petrel). Citizen-science initiatives have engaged new “crowds” to collect pelagic bird data. This presentation will showcase a preliminary GIS analysis of ocean bathymetry, satellite-derived sea-surface temperatures, and sightings eBird observations from amateur birdwatchers, to reveal patterns of distribution of pelagic birds.

Mon-AM1-C-3