

NEAFWA ABSTRACT ARCHIVES: 2015 Wildlife Sessions

Wildlife #1

Monday, April 20, 2015

1:00 p.m. - 5:00 p.m.

<p>1:00 p.m.</p>	<p>Update on White-nose Syndrome and the Collaborative Response <i>Christina J. Kocer, Jeremy T. H. Coleman, Jonathan D. Reichard — U.S. Fish and Wildlife Service, Hadley, MA</i></p> <p>White-Nose Syndrome (WNS) is responsible for the precipitous decline in bat populations throughout central and eastern North America. Caused by the fungus <i>Pseudogymnoascus destructans</i> (Pd), WNS continues to spread rapidly, affecting bats in 25 states and 5 provinces. The fungus, likely of foreign origin, infects torpid bats resulting in physiological and behavioral impacts, often leading to mortality. Seven North American bat species have been confirmed with the disease and five others have been identified carrying Pd. Population declines exceeding 90% have been documented in affected hibernacula. Although these losses are corroborated by counts at maternity colonies and by acoustic and trapping indices in summer, quantifying the overall impacts to bat populations as a whole is challenging due to the limitations in existing data. National response plans in both the U.S. and Canada provide the framework for a comprehensive North American response, and establish working groups to address the research and management needs for the disease. The U.S. Fish and Wildlife Service is the lead federal agency coordinating the response to WNS in the U.S., and since 2008 the agency has provided over \$19 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. Collaboration between the many groups engaged in the WNS response remains critical, and is responsible for the considerable advances we have made in our understanding of this disease.</p>
<p>1:20 p.m.</p>	<p>Inconsistent messages about bats and resulting implications for bat conservation <i>Heidi Kretser, Wildlife Conservation Society & Cornell University, Graham Dixon, University of Washington, Judy Zwillenberg, T. Bruce Lauber, Katherine McComas — Cornell University</i></p> <p>Conservation efforts must consider ways to communicate about infectious disease risk in ways that do not decrease societal tolerance for wildlife. White-nose syndrome (WNS) has devastated populations of seven bat species. However, communicating conservation recovery messages related to bats may be particularly challenging because bats are a risk-laden species, as potential carriers of a disease that is fatal to humans, rabies. We examined wildlife and public health agency press releases and newspaper coverage about bats in eight states from 2006-2013. We coded for 1) risks bats pose to humans or the environment, e.g., rabies; 2) risks to bats posed by humans or the environment, e.g., WNS; and 3) benefits of bats on humans or environment, e.g., pest control. Findings indicate public health agencies focus on human health risks, such as rabies, while rarely mentioning white-nose syndrome (WNS), a disease causing precipitous declines in 7 species of bat in the eastern United States, including 2 federally endangered species. Wildlife agencies focus more on WNS with little mention of rabies. These disparities were present in newspaper coverage and also in regions where additional bat species will likely be considered endangered. Future research should examine how the public reacts to potentially conflicting messages about bats. Greater alignment of communication messages across agencies may benefit recovery and conservation efforts of bat species facing an uncertain future due to WNS.</p>

<p>1:40 p.m.</p>	<p>2015 USFWS Updates on the Indiana Bat and Northern Long-eared Bat <i>Robyn A. Niver, USFWS, New York Field Office, Cortland, NY</i></p> <p>This presentation will serve as an update on several national efforts for the federally-listed endangered Indiana bat (<i>Myotis sodalis</i>) and the northern long-eared bat (<i>M. septentrionalis</i>). The winter of 2014-15 is an “on year” for Indiana bat winter surveys and preliminary results of any available surveys will be provided. Few changes are expected from 2014 for the U.S. Fish and Wildlife Service’s (Service) 2015 summer survey guidance but I will highlight any changes. I will also provide updates on the current listing status and conservation efforts for the northern long-eared bat. The Service proposed listing the northern long-eared bat as an endangered species on October 2, 2013, and our final listing determination is due by April 2, 2015.</p>
<p>2:00 p.m.</p>	<p>Evaluating Carnivore Detection Patterns Using Three Camera Sampling Designs At Great Swamp National Wildlife Refuge, Basking Ridge, New Jersey <i>Casey Wagnon, Megan Spindler — Department of Biology and Natural Resources, Frostburg State University; Thomas Serfass, Department of Biology and Natural Resources, Frostburg State University and University of Maryland Center For Environmental Science; Frank Ammer, Department of Biology and Natural Resources, Frostburg State University; Dorothy Fecske, Steven Henry — U.S. Fish and Wildlife Service, Great Swamp National Wildlife Refuge</i></p> <p>The effectiveness of detecting elusive mammalian carnivores using remote sensing cameras is well documented, and the technique provides an economical, indirect, and practical means to monitor multiple carnivores at a landscape scale. As the use of cameras steadily increases in carnivore studies, biologists are recognizing that different camera sampling designs may result in contradicting conclusions regarding covariates contributing to carnivore detections for a particular study area. The purpose of our study was to compare carnivore detection patterns using 3 camera sampling designs. From June to October 2014, we placed 20 cameras systematically along management roads at Great Swamp National Wildlife Refuge (GSNWR), Basking Ridge, NJ. We paired each road location with a baited camera ~100 m within the habitat matrix and evaluated differences in carnivore detections. Also, camera surveys at river otter (<i>Lontra canadensis</i>) latrines are becoming a common strategy to monitor otter populations in North America, and may offer a novel means to detect other carnivores in riparian areas. In addition to evaluating carnivore detection patterns using cameras at baited and road locations, we gauged the effectiveness of detecting carnivores with cameras at otter latrines. Cameras along management roads yielded 3,001 carnivore detections, and red fox (<i>Vulpes vulpes</i>; n = 1,875), raccoon (<i>Procyon lotor</i>; n = 1,069), and coyote (<i>Canis latrans</i>; n = 22) were the most commonly detected species. Paired, baited cameras accumulated fewer detections (n = 688) with raccoon (n = 596), red fox (n = 43), and Virginia opossum (<i>Didelphis virginiana</i>; n = 34) the most commonly detected species. Cameras at latrine sites (n = 11) produced 1,955 carnivore detections, and when omitting otter detections (n = 176), raccoon (n = 1,197), red fox (n = 378), and mink (<i>Neovison vison</i>; n = 44) were the most frequently documented species.</p>
<p>2:20 p.m.</p>	<p>A camera trap assessment of mammalian diversity among wetlands of the Finger Lakes, New York <i>Thea Cooper, Department of Environmental & Forest Biology, State University of New York, College of Environmental Science & Forestry, Syracuse, NY; H. Brian Underwood, Patuxent Wildlife Research Center, Syracuse Field Station, State University of New York, College of Environmental Science & Forestry, Syracuse, NY</i></p> <p>The Finger Lakes and associated myriad wetlands are unique vestiges of the last glacial retreat. We surveyed the mammalian communities of wetlands associated with the Finger Lakes over an area of approximately 2591 km². We placed Reconyx® PC800 passive infra-red cameras on otter latrines because they act as a natural attractants for a wide variety of species that rely on scent-</p>

marking as a means of intra-specific communication. Camera traps were deployed from May 2012 to October 2013 with varying distributions and duration periods. We collected thousands of images of mammals over 4076 trap-nights. We compared mammalian species richness and evenness by wetland type and constructed species accumulation curves. We explored species diversity among locations by specific wetland characteristics. For some species, we also compared the distribution of activity over the diel and overlap with con-generic species. With the aid of specialty software, we demonstrate how to conduct a comprehensive analysis of camera-trap data for explore species assemblages. Practical and ecological implications of wide-scale monitoring of wetland mammals are discussed.

BREAK 2:40 p.m.

The influence of maternal effect and philopatry on subadult female black bear den selection in Maine

Alyssa Vitale, Maine Cooperative Fish and Wildlife Research Unit, Department of Wildlife, Fisheries, and Conservation Biology, University of Maine, Orono; Shawn T. McKinney, U.S. Geological Survey, Maine Cooperative Fish and Wildlife Research Unit, Department of Wildlife, Fisheries, and Conservation Biology, University of Maine, Orono; Daniel W. Linden, Maine Cooperative Fish and Wildlife Research Unit, Department of Wildlife, Fisheries, and Conservation Biology, University of Maine, Orono, ME

3:20 p.m.

Understanding the process of female black bear (*Ursus americanus*) den type selection can help guide habitat management decisions. Black bears utilize a variety of den types, each providing a different degree of protection. Do subadult females choose the same den type as their mother (maternal effect), or are they more prone to select a den near their yearling den, regardless of type (philopatric effect)? Maine's black bear population is one of the largest in the U.S. (~30,000 bears), and since 1975, the Maine Department of Inland Fisheries and Wildlife has conducted research and monitoring to manage the population. This unique dataset allows for examination of several generations of multiple maternal lineages. We analyzed data on den selection of 168 subadult females from 1981-2013 at four study sites in Maine using GIS, generalized linear modeling, and model selection to determine which hypothesis (maternal or philopatric effect) has more support. Preliminary results are equivocal. Most (64%) females used moderate-protection den types, and 68% of bears raised in moderate-protection den types chose to den in that type as subadults. However, only 18% of bears raised in low-protection den types remained in that type while 82% switched to higher-protection types. Subadult females selected den sites an average of 2.7 km (min = 0.1, max = 53.8) from their yearling den. These results suggest that female choice reflects interplay between familiarity with the local environment and with den type, but that protection afforded by den type may also be an important factor in selection decisions.

3:40 p.m.

Novel approaches to big problems: Integrating citizen science to monitor and estimate black bear populations in New York

Catherine C. Sun, New York Cooperative Fish and Wildlife Research Unit, Department of Natural Resources, Cornell University, Ithaca; Angela K. Fuller, U.S. Geological Survey, New York Cooperative Fish and Wildlife Research Unit, Department of Natural Resources, Cornell University, Ithaca ; J. Andy Royle, U.S. Geological Survey, Patuxent Wildlife Research Center, Laurel Maryland; Jeremy E. Hurst, New York State Department of Environmental Conservation , Albany

Black bears (*Ursus americanus*) are an important game species in New York State. In the last three decades, the bear population in the state has been growing due to conservative bear management. As management efforts shift toward stabilizing and reducing populations, a greater understanding of patterns in resources selection and population density in relation to landcover types may guide bear managers toward more refined management strategies. New York is

	<p>approximately 141,000 km², and so to collect spatially representative data for such a large region, it is often necessary to consider alternative approaches to sampling that supplement intensive, traditional capture-recapture and occupancy methods. One such alternative could utilize citizen science, which engages a wide-ranging network of the public in the scientific research process, often through assistance with data collection. Citizen science has a long and successful history in monitoring natural systems over large spatial and temporal scales, and recent advances in technology and computation have made the large quantity and variable quality of citizen science data more tractable. We describe a conceptual framework for integrating non-invasive citizen science efforts with radiotelemetry, spatial capture-recapture, and occupancy methods into a single integrated population model for monitoring black bears. This integrated approach should be valuable for identifying patterns of black bear distribution, resource selections and movement across a range of spatial scales, for gaining a more mechanistic understanding of black bear population dynamics, and for refining efforts in the management of black bears in New York.</p>
<p>4:00 p.m.</p>	<p>A preliminary analysis of black bear habitat use in Maine <i>Jonah Gula, Unity College Bear Study; Dr. George Matula, Unity College Bear Study; Randy Cross, Maine Department of Inland Fisheries and Wildlife</i></p> <p>Following extirpation during the agricultural boom of the nineteenth century, black bears are slowly recolonizing south-central Maine in response to changes in land use and regeneration of the forests. The mosaic of habitats, relatively high human population, and low bear density has inspired Unity College (UC) to investigate this recolonizing population. One aspect of the project is to compare habitat selection of collared bears in the colonizing population to habitat selection by collared bears in a long-established bear population monitored by the Maine Department of Inland Fisheries and Wildlife in their northern Maine study area. There was evidence of selection in both study areas, but UC bears appeared to use wetland habitats more heavily. The use of these high quality habitats demonstrates that established females in this low density area may have the ability to select for areas that provide the greatest fitness benefits with little intraspecific competition.</p>
<p>4:20 p.m.</p>	<p>Black Bear in the Suburbs: Density and Spatial Structure in Human Dominated Landscapes <i>Michael J. Evans, University of Connecticut Dept. of Natural Resources & the Environment; Paul W. Rego, Connecticut Dept. of Energy and Environmental Protection Wildlife Division; Jason E. Hawley, Connecticut Dept. of Energy and Environmental Protection Wildlife Division; Tracy A. G. Rittenhouse, University of Connecticut Dept. Natural Resources & the Environment</i></p> <p>The re-establishment and expansion of black bear populations in the northeast United States present a new and challenging context for bear management. Bears' ability to thrive in densely developed contexts, and the human dominated landscapes in this region necessitate the need to understand the effects of land-use patterns on bear ecology and behavior. The first objective of this study was to produce a robust estimate of the size and density of Connecticut's bear population, quantifying differences in bear abundance and density between areas with varying intensity of development. Our second objective was to identify patterns of genetic structure and spatial organization within and between these areas. We used non-invasively collected genetic data to estimate population densities in a spatial mark-recapture (SMRC) framework, and to assess the effect of land-use pattern on dispersal using least-cost transect (LCT) analysis. We collected hair across black bears' range in western CT weekly for twelve weeks during June - August 2013 and 2014. Three study areas with 50 sampling sites each encompassed regions of high (83.6 houses*km⁻²), medium (25.3 h*km⁻²) and low (6.8 h*km⁻²) housing density. We identified 127 unique individuals in 2013 and 164 in 2014. We found differences in the number, rate and distribution of weekly bear detections between study areas. Estimates of bear density on</p>

the suburban grid ($D = 0.25 \pm 0.08$ bears/km²) were higher than the rural grid ($D = 0.17 \pm 0.05$ bears/km²). Top ranked SMRC models indicated density and detection probability varied as a function of land cover on the suburban grid, suggesting higher bear densities may be found in forest patches within developed landscapes. However, results of LCT analyses indicated developed land cover facilitated dispersal, suggesting bears view development as inhospitable habitat. Our findings will contribute to an understanding of how black bear populations respond to different levels of development, informing future bear management in these contexts.

4:40 p.m.

An Experimental Design to Manipulate Three Levels of Large Herbivore Browsing
Justin Compton, Springfield College; Stephen DeStefano, U.S. Geological Survey, Massachusetts Cooperative Fish & Wildlife Research, University of Massachusetts Amherst; Edward Faison, Highstead; David Foster, Harvard Forest

With the recent recolonization of moose (*Alces alces*) in northern temperate forests it has been challenging to determine the role of herbivory by white-tailed deer (*Odocoileus virginianus*) in shaping regeneration and recruitment of hardwoods. We created an experimental design in central New England that manipulated three levels of large herbivore diversity (moose + deer, deer only, and neither). At each site, we constructed a full enclosure (fence to the ground to keep out moose and deer), a partial enclosure (fence two-feet off the ground to keep out moose but allow deer in), and a control plot (no fencing). We monitored effectiveness of the experimental design with animal-activated cameras. Data collected from animal-activated cameras between 2008-2011 from 6 sites indicate moose and deer visits in control plots were similar (paired t test; $t = 0.19$; $DF = 4$; $P = 0.86$). Deer visitation rates within partial enclosure (0.27 visits wk⁻¹; $SE = 0.11$) and control plots (0.52 visits wk⁻¹; $SE = 0.19$; paired t test; $t = -1.15$; $DF = 4$; $P = 0.31$) did not differ. One site had a higher visitation rate in the control, causing the higher control mean. Our preliminary results indicate the effectiveness of our experimental design in excluding one large herbivore while simultaneously not altering another large herbivores movements within the treatments.

Wildlife #2

Monday, April 20, 2015
1:00 p.m. - 5:00 p.m.

1:00 p.m.

Impacts on game and non-game species from restoration of fire-adapted pitch pine/scrub oak barrens in Massachusetts
Brian Holt Hawthorne, Massachusetts Division of Fisheries & Wildlife, Habitat Program; Tim Simmons, Massachusetts Division of Fisheries & Wildlife, Natural Heritage & Endangered Species Program

After more than 50 years of human fire exclusion in globally rare, fire-adapted pitch pine/scrub oak priority natural communities in Massachusetts, encroachment by white pine had dangerously increased fuel loads and substantially reduced habitat quality for multiple state-listed rare species, including moths, butterflies, and herbaceous plants. In order to mitigate wildfire danger that threatened human health and property, and to restore priority natural community structure and function, extensive mechanical treatments including tree clearing, shrub mowing, and fuel break establishment were applied across more than 150 ha (400 ac) using competitively bid private contractors that were funded through a unique combination of state open space bond monies and state wildlife agency operational monies. Mechanical fuel reduction established an open canopy forest dominated by well-formed pitch pine, white oak, and red oak trees 30-50 cm (12-20") dbh over a diverse shrub understory dominated by scrub oak and lowbush blueberry that was bisected by numerous fuel breaks. Prescribed burning was conducted on various portions of the site by highly trained fire crews from the Massachusetts Department of Conservation & Recreation and the Massachusetts Division of Fisheries & Wildlife. Local populations of rare moths, butterflies,

and plants increased substantially within two to three years of restoration. Declining songbirds including Eastern towhee, brown thrasher, prairie warbler, and the state-listed whip-poor-will increased noticeably following restoration, and local abundance of game birds such as ruffed grouse and American woodcock also increased.

Designing sustainable landscapes: using species distribution models to inform landscape conservation design

William V. DeLuca, Northeast Climate Science Center, Department of Environmental Conservation, University of Massachusetts, Amherst; Kevin McGarigal, Ethan Plunkett, Bradley Compton, Joanna Grand, Ethan Plunkett — Department of Environmental Conservation, University of Massachusetts, Amherst

1:20
p.m.

The primary goals of conservation are to protect, manage and restore habitat, minimize the forces of habitat degradation, and design landscapes to ensure habitat connectivity and persistence within the limits imposed by the socio-economic realities of human population growth. To achieve these objectives we developed a landscape change, assessment and design model for the North Atlantic Landscape Conservation Cooperative that predicts changes to species' distributions under a variety of alternative future climate change and urban growth scenarios. We downscaled general circulation models to predict changes in climate and constructed a regional urban growth model. We then developed habitat capability models and climate suitability models for a suite of representative bird species to assess the effects of predicted landscape and climate change scenarios. We assessed the nature and magnitude of potential habitat gains and losses due to projected changes in climate and urban growth by identifying areas on the landscape where species' distributions are most likely to persist, contract, or expand. We describe the implications for strategic habitat conservation planning given uncertainty in future climate and landscape conditions and develop tools to inform landscape design that effectively combines approaches that simultaneously address habitat loss and potential shifts in species' climate niches.

Landscape Conservation Design Piloted in the Connecticut River Watershed

Scott Schwenk, North Atlantic Landscape Conservation Cooperative; Kevin McGarigal, UMass Amherst; Nancy McGarigal, Andrew Milliken, Randy Dettmers, Jeff Horan, David Perkins, John Warner — U.S. Fish & Wildlife Service; Bill DeLuca, Brad Compton, Joanna Grand, Ethan Plunkett — University of Massachusetts Amherst

1:40
p.m.

The North Atlantic Landscape Conservation Cooperative (LCC), the U.S. Fish and Wildlife Service, and UMass Amherst led a collaborative effort in 2014-2015 to develop a landscape conservation design for the Connecticut River Watershed. The pilot effort is designed to serve as a demonstration for applying large-scale conservation design tools and processes supported by the North Atlantic LCC and other regional partners. The design is intended to reflect the common priorities of governmental and nongovernmental partners working within the 7.2 million acre watershed and, ultimately, to guide shared conservation actions to protect, restore, and manage lands and waters to sustain the species and ecosystems of the watershed. Steps in the design process have included: 1) developing overall goals for ecosystems and for species of fish, wildlife, and plants; 2) combining concepts of ecosystem integrity and resilience with mapped landscape and ecosystem features to identify terrestrial and aquatic ecosystem priorities; 3) translating population objectives into habitat objectives for selected representative species of fish and wildlife; 4) incorporating scenarios of future climate change and development into the design; 5) combining ecosystem and species priorities into a unified network of core areas and connectors; and 6) mapping information about ecological values and priorities outside of the core area network. The design was developed through regular meetings of more than 30 conservation partners. Future steps include implementing and monitoring the design and extending the approach to other areas in the Northeast. More information is available at: <http://northatlanticlcc.org/groups/connecticut-river-watershed-pilot>.

<p>2:00 p.m.</p>	<p>Climate Change, Science-Denial and Wildlife Conservation: Shifting the Paradigm <i>Tom Rogers, Vermont Fish & Wildlife Department</i></p> <p>Climate change may be one of the greatest threats facing biological diversity today. Climate hazards challenging wildlife conservation include altered precipitation patterns, unpredictable winter weather, the increased risk of disease and pests, the spread of invasive species, altered plant communities, and the need for wildlife to migrate northward through a fragmented landscape. But despite the overwhelming scientific evidence, 40 percent of Americans said they do not believe in human-induced climate change in the most recent Gallup poll. The conventional approach to climate skepticism has been to treat it as an education problem, the belief being that if climate change deniers simply get more information they will change their minds. But research indicates that people with greater scientific literacy and numeracy are actually more likely, not less, to deny human-induced climate change. And when presented with the best available climate science, people become increasingly polarized and more firm in the beliefs they previously held. So how do we accomplish our mission to protect fish and wildlife from the threat of climate change when nearly half the public does not even believe in it? Conservationists need to move beyond trying to get general public buy-in and start being more direct in our efforts to protect the species in our charge.</p>
<p>2:20 p.m.</p>	<p>Hudson River Natural Resource Damage Assessment: Injury Assessment and Restoration Planning <i>Margaret Byrne, U.S. Fish and Wildlife Service</i></p> <p>The Hudson River has been heavily contaminated with PCBs from General Electric (GE) since the 1940s. Nearly two-thirds (about 200 miles) of the Hudson River has been contaminated by PCBs, from Hudson Falls to the Battery in New York City and beyond. PCBs move throughout the environment and are found in river sediments, river water, groundwater, on the river's floodplain, and in the animals that live throughout the river and its floodplain. Living resources at every level of the Hudson River's aquatic, terrestrial, and wetland-based food chains are contaminated with PCBs. The Hudson River Natural Resource Damage Assessment (NRDA) process began in 1997 and is ongoing. Natural resource damage assessments are carried out to make sure that polluters compensate the public for the loss of natural resources and the services they provide. The Hudson River Natural Resource Trustees – the National Oceanic and Atmospheric Administration, the U.S. Department of the Interior, and New York State – continue to assess how releases of PCBs from the General Electric Company (GE) plants at Fort Edward and Hudson Falls, New York harm the Hudson River's natural resources. The goal of the Hudson River NRDA is to restore injured natural resources. Assessment and restoration planning actions focus on ensuring the fullest restoration of those injured natural resources. This presentation will provide an update on injury assessment and restoration planning activities.</p>
<p>BREAK 2:40 p.m.</p>	
<p>3:20 p.m.</p>	<p>Prevalence of Ranavirus in Wood Frog (<i>Lithobates sylvaticus</i>) Breeding Ponds in a 5-state region of the northeastern U.S. <i>Scott A. Smith, Maryland DNR-Wildlife & Heritage Service; Kirsten J. Monsen-Collar, Montclair State University; Holly S. Niederriter, Delaware Division of Fish & Wildlife; Mackenzie L. Hall, Conserve Wildlife Foundation; Kathy Gipe, PA Fish and Boat Comm; Chris Urban, PA Fish and Boat Comm; Kimberly Terrell, Smithsonian Conservation Biology Institute; Craig A. Patterson, Maryland DNR-Wildlife & Heritage Service; D. Earl Green, USGS National Wildlife Health Center</i></p> <p>Ranavirus is an emerging infectious disease of fish, amphibians and reptiles. A 2-year study funded by a NEAFWA RCN grant was conducted in DE, MD, NJ, PA and VA; the largest</p>

	<p>geographic area ever surveyed for this disease. A random sample of 30 wood frog breeding ponds were chosen in each state, with a minimum distance between ponds of >3 km. Only ponds with ≥ 5 wood frog egg masses were included in the study, and were monitored through metamorphosis, die-off or pond dry-out. Standard Samples of 30 wood frog larvae/study pond at Gosner stage ≥ 27 were collected and analyzed by PCR for presence of Ranavirus. Die-off Samples were collected whenever a die-off of any species was observed and were analyzed by PCR and virus culture. In 2013 field work was conducted in DE, MD and NJ, and 28 of 64 (43.8%) study ponds tested positive for Ranavirus, while die-offs were only observed at 8 ponds (DE: 2, MD:6). All isolated viruses were identified as Frog Virus-3. Samples testing positive for Ranavirus included larvae of wood frog, spring peeper, spotted salamander, and eastern spadefoot. The 2014 samples, which included all 28 ponds that tested positive in 2013 plus 30 PA ponds and 26 VA ponds, were still being analyzed, but results will be available and discussed. This study represents the first cases of lab-confirmed Ranavirus in Delaware and the first in eastern spadefoots (in MD).</p>
<p>3:40 p.m.</p>	<p>The biogeographic origins and population structure of Maine's island red-backed salamanders (<i>Plethodon cinereus</i>) <i>Nikko Shaidani, Michael T. Kinnison — School of Biology and Ecology, University of Maine, Orono; Cynthia S. Loftin, U.S. Geological Survey, Maine Cooperative Fish and Wildlife Research Unit, Orono; Linda Welch, U.S. Fish and Wildlife Service, Maine Coastal Islands National Wildlife Refuge, Milbridge, ME; Bruce Connery, National Park Service, Acadia National Park, Bar Harbor, ME; Phillip deMaynadier, Maine Department of Inland Fisheries and Wildlife, Bangor, ME</i></p> <p>Island populations of terrestrial species have an increased potential to adapt and diverge, as these populations are often isolated from other populations and subjected to novel pressures compared with mainland populations. Indeed, extended isolation can elicit dramatic changes within populations and is recognized as a common driver of speciation. It is for these reasons that island populations are often a priority for conservation. Recently, red-backed salamanders (<i>Plethodon cinereus</i>) have been identified on many of Maine's coastal islands. Plethodontid salamanders are among the most terrestrial of Maine's amphibians and are not tolerant of prolonged exposure to seawater, suggesting these populations are strongly isolated. Moreover, <i>P. cinereus</i> is often typified as a forest obligate species, and yet, many of Maine's islands, such as Petit Manan and Western Brothers are non-forested. Our research seeks to determine the biogeographic origins, population genetic structure, and potential local adaptations of Maine island salamanders. Using 9 microsatellite loci, we have genotyped individuals spanning island and mainland sites along the entire coast of Maine to assess alternative island colonization scenarios, including the possibility that red-backed salamanders colonized marine islands 6,000-11,000 YBP when lower sea levels linked islands to the mainland. We are quantifying body morphology using both geometric and linear morphometrics to assess possible local adaptation. Here we present population genetic and morphological comparisons from over 600 salamanders across 22 sites as far south as Appledore Island and as far north as Aroostook State Park.</p>
<p>4:00 p.m.</p>	<p>Functional equivalence of created wetland water quality: a comparison of amphibian metamorphic success <i>Lauren A. McPherson, James T. Anderson — West Virginia University</i></p> <p>Previous studies indicate that created wetlands and natural wetlands differ in their ability to provide amphibian habitat. To isolate potential causative factors, we evaluated effects of water quality on anuran metamorphosis. We reared larval spring peepers (<i>Pseudacris crucifer</i>) and wood frogs (<i>Lithobates sylvaticus</i>) in twelve mesocosms containing water from three created wetlands and twelve mesocosms from three reference (natural) wetlands in West Virginia. Spring peepers experienced similar metamorphic success between created and reference wetland</p>

	<p>mesocosms ($P > 0.05$). Wood frog length of larval stage was slightly shorter in reference wetlands (mean = 33.5 days, SE = 0.11) than in created wetlands (mean = 34.4 days, SE = 0.27) ($P = 0.011$). Wood frog mass (created: mean = 0.59 g, SE = 0.02; reference: mean = 0.66 g, SE = 0.02) ($P = 0.052$) and body length (created: mean = 14.8 mm, SE = 0.17; reference: mean = 15.2 mm, SE = 0.12) ($P = 0.051$) upon completion of metamorphosis were greater in reference wetlands. A shorter larval period and a large body size at metamorphosis are ideal traits for amphibian life history. Water quality measurements of dissolved oxygen, pH, conductivity, temperature, and total nitrogen were not significantly different between created and reference wetlands ($P > 0.05$). The water quality parameters measured in this study were not able to explain the differences in metamorphic success of the wood frog. Our preliminary results suggest that the water quality of created wetlands functions similarly to natural wetlands to support spring peepers, but wood frogs experience higher metamorphic success in natural wetlands.</p>
<p>4:20 p.m.</p>	<p>Does Brood Parasitism Affect Host Nestling Diet and Nutrition? <i>Zachary S. Ladin, University of Delaware, Department of Entomology and Wildlife Ecology; Vincent D'Amico, US Forest Service, Northern Research Station; Deb P. Jaisi, University of Delaware, Department of Plant and Soil Sciences; Gregory Shriver, University of Delaware, Department of Entomology and Wildlife Ecology</i></p> <p>Food and nutrient limitation can negatively affect survival, fecundity, and lifetime fitness of individuals, which can ultimately limit populations. Changes in trophic dynamics, affected by anthropogenic environmental and landscape change, are poorly understood yet may play an important role in population regulation. We determined diets of wood thrushes (<i>Hylocichla mustelina</i>), a Neotropical migratory songbird species sensitive to urbanization, and explored how brood parasitism by brown-headed cowbirds (<i>Molothrus ater</i>) may affect wood thrush nestling diets. We measured carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) stable isotopes of seven invertebrate food sources (snails, spiders, isopods, earthworms, myriapods, insects, and caterpillars) and blood plasma from adult male and female wood thrushes, and from wood thrush nestlings in nests with and without cowbird nestlings. Wood thrush diet compositions were largely comprised of high calcium (Ca) foods (36-73%, 95% highest density intervals (HDI)), including snails, isopods, and myriapods, as well as spiders (25-35%, 95% HDI). Caterpillars were the least common food item in wood thrush diets (0.03-3 %, 95% HDI). Wood thrush nestling diets in nests without cowbirds contained greater proportions of Ca-rich foods and spiders compared to the diet of nestlings in parasitized nests. Our data suggest that, wood thrushes showed an obvious preference for Ca- and protein-rich foods, which may have important implications for adult survival, fecundity, and nestling development. Our results demonstrate that brood parasitism could have negative effects on developing nestlings through nutritional stress that may, in turn, affect survival, fecundity, and ultimately limit population growth.</p>
<p>4:40 p.m.</p>	<p>Dynamics of boreal birds on the edge of their range in the Adirondack Park, NY <i>Michale Glennon, Wildlife Conservation Society</i></p> <p>The Adirondack Park in northern New York is located at the southern range extent for several bird species that inhabit lowland boreal forest habitats which, in the Adirondacks, are naturally fragmented and intermixed with eastern temperate forest types. I examined occupancy dynamics of 8 bird species in lowland boreal forest wetlands, examining the influence of wetland size and connectivity, and other variables associated with climate change and habitat fragmentation on colonization and extinction dynamics for the period 2007 – 2011. Occurrence data from point-count surveys conformed to predictions of metapopulation theory with respect to extinction, with most species more likely to experience local extinction from smaller, more isolated wetlands. Responses to latitude and elevation were variable. Proximity of human infrastructure was the most consistent driver of short-term dynamics across species, with two-thirds more likely to colonize low impact sites and go extinct from more impacted sites. Evidence for metapopulation</p>

structure suggests that improved connectivity among wetlands and reduction of human impact near wetlands should be conservation goals for these species in the park.

Workshop: Pollinators

Monday, April 20, 2015

1:00 p.m. - 3:40 p.m.

<p>1:00 p.m.</p>	<p>Restoring habitat for native bees through conservation partnerships <i>Kelly Gill, Pollinator Conservation Specialist, Mid-Atlantic & Northeast Region, The Xerces Society for Invertebrate Conservation & Partner Biologist USDA-NRCS; Mace Vaughan, Pollinator Conservation Program Co-Director, The Xerces Society for Invertebrate Conservation & Joint Pollinator Conservation Specialist, USDA-NRCS West National Technology Support Center</i></p> <p>The ecological service of pollination is necessary for the reproduction of over 85 percent of the world's flowering plants, including more than two-thirds of the world's crop species. Pollinators are keystone species in most terrestrial ecosystems. Pollinator-produced fruits and seeds provide food for countless other animals ranging from songbirds to grizzly bears. In many places, the essential service of pollination is at risk as habitat loss, pesticide use, and introduced diseases threaten pollinator populations. Researchers, farmers, state and federal agencies and conservationists across the county are increasingly interested in the role of native bees as pollinators. The Xerces Society works with these diverse partners to identify how native bees contribute to crop pollination and how to enhance habitat to support the greatest diversity of bees. This session will introduce the diversity of native bees, their foraging and nesting habitat needs, and the latest science-based techniques for restoring high-quality pollinator habitat. Since 2008, the Xerces Society, in partnership with the Natural Resources Conservation Service (NRCS) has helped restore over 200,000 acres of pollinator habitat in agricultural landscapes. Through this partnership, The Xerces Society's Pollinator Program provides technical assistance and develops in-depth guidance documents for the implementation of pollinator conservation practices through USDA conservation programs. This session will highlight significant milestones of that partnership and identify opportunities for fish and wildlife agencies, public land managers, and other natural resource professionals to further expand pollinator conservation across all landscapes.</p>
<p>1:20 p.m.</p>	<p>Establishing High Quality Pollinator Habitat for Bees and Butterflies <i>Gary Casabona, USDA Natural Resources Conservation Service</i></p> <p>This presentation will cover best management practices for creation or enhancement of pollinator habitat through establishment of herbaceous and woody species of highest value to pollinators. The goal of habitat management is to provide pollen, nectar, and nesting sites throughout the growing season. Emphasis will be placed on the importance of site preparation and seeding techniques to ensure successful establishment of plants. Specific recommendations for Monarch butterfly conservation will be included. Choice of plant species that also provide benefits to other wildlife, such as migratory songbirds, will be part of the discussion. The session will conclude with a brief overview of Farm Bill financial assistance for pollinators available through the USDA Natural Resources Conservation Service.</p>
<p>1:40 p.m.</p>	<p>Integrated Vegetation Management Partnerships <i>Johnstone, Richard A. - President Integrated Vegetation Management Partners, Inc.; Michael R. Haggie, Haggie IVM</i></p> <p>This paper will present documented best IVM practices that meet safety and reliability needs of electric and natural gas utilities and highways while partnering with agencies and communities to implement the federal strategy on pollinators and control invasive weeds, lower risk of wildfire,</p>

	<p>improve bird, bee, butterfly and other wildlife habitat, improve aesthetics, community relations and economics.</p>
<p>2:00 p.m.</p>	<p>Young-forest management for an endangered butterfly benefits other Species of Greatest Conservation Need in an eastern NY pitch pine - scrub oak barrens <i>Neil A. Gifford, Steven P. Campbell, Amanda M. Dillon — Albany Pine Bush Preserve Commission</i></p> <p>The decline of young forests (i.e., vegetation communities dominated by shrubs and saplings) in the northeastern U.S. has 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 Karner blue butterfly (<i>Lycaeides melissa samuelis</i>; KBB). Public and private partners have been recovering the Preserve’s KBB population through ecosystem restoration (fire, tree removal, mowing, herbicides, and seeding) on >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 SGCN (e.g., prairie warbler, American woodcock, hognose snake, spotted turtle, barrens buckmoth, mottled duskywing). Notably, two species thought to be extirpated (i.e., Henry’s Elfin, 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.</p>
<p>2:20 p.m.</p>	<p>New England Butterfly Communities in Old Field and Young Forest Habitats <i>David King, U. S. Forest Service Northern Research Station; Thomas E. Lautzenheiser, Massachusetts Audubon Society, Arcadia Wildlife Sanctuary; Jeffrey M. Collins, Massachusetts Audubon Society; David L. Wagner, Professor, Ecology and Evolutionary Biology, University of Connecticut</i></p> <p>Although not as important as bees, butterflies increase pollination of some plants, and many species are of conservation interest (e.g. monarchs). Most butterfly species in our region are associated with meadow and shrubland habitats. Conservationists maintain shrublands by treating old fields with fire or mechanical methods, or by creating forest openings with silviculture. Maintaining old fields is costly, whereas creating young forest can produce revenue. Prior research indicates only slight differences in bird abundance and species composition between old fields and young forest, so it is unclear whether the higher cost of old field maintenance is justified for biodiversity. In contrast to birds, many butterfly species are host specific and thus likely to respond to plant species composition, which differs markedly between old fields and young forests. We compared butterfly abundance and species composition between seven old fields and five regenerating clearcuts during 2004 and 2005 to determine whether these habitats differed in terms of their butterfly communities. All sites were 6-7 years post-treatment. We counted 4,747 individuals representing 58 butterfly species using Pollard walk transects. Fourteen species differed in abundance between habitats, with all species except one (cabbage white) exhibiting greater abundance in old fields. Average butterfly abundance was higher in old field relative to young forest sites, as was species richness. Our results suggest old fields can be a valuable component of regional pollinator conservation.</p>
<p style="text-align: center;">BREAK 2:40 p.m.</p>	

<p>3:20 p.m.</p>	<p>Landscape-level monarch butterfly conservation: how farmers, federal and state agencies and others can help save this iconic species <i>Kelly Gill, Pollinator Conservation Specialist - Mid-Atlantic & Northeast Region, The Xerces Society for Invertebrate Conservation & Partner Biologist, USDA-NRCS; Mace Vaughan, Pollinator Conservation Program Co-Director, The Xerces Society for Invertebrate Conservation & Joint Pollinator Conservation Specialist, USDA-NRCS West National Technology Support Center</i></p> <p>Monarch butterflies (<i>Danaus plexippus</i>) of North America are renowned for their long-distance seasonal migration and spectacular winter gatherings in Mexico and California. The monarch butterfly population has declined dramatically, by an alarming, statistically significant 90% over 20 years of monitoring. The U.S. Fish and Wildlife Service is conducting a status review of the monarch butterfly to determine if this species should be protected as threatened under the Endangered Species Act. In light of these findings and developments, it is a critical time for natural resource professionals to take action to protect monarch butterflies and their habitat. This session will review monarch butterfly biology, threats contributing to their population decline, conservation through habitat creation, and protection from pesticides and land use impacts. The Xerces Society, in partnership with the Natural Resources Conservation Service (NRCS) has helped restore wildflowers to over 200,000 acres to agricultural landscapes. Tens of thousands of these restored acres include milkweed – the monarch’s only host plant. Xerces has also partnered with NRCS, the Monarch Joint Venture, and the native seed industry to mass-produce milkweed seed in key areas of the monarch’s range where local milkweed seed was not available. In the west, Xerces is working to identify key monarch breeding areas, and protect overwintering sites in California. These efforts are helping to provide essential habitat for this iconic species in the landscapes where it is needed most. There is a vital need for additional land managers to engage in large-scale habitat improvements for monarchs.</p>
<p>3:40 p.m.</p>	<p>Using the Northeast Conservation Framework to Guide Monarch Conservation at the Landscape Scale <i>Ken Elowe, Assistant Regional Director, Science Applications Division, US Fish and Wildlife Service</i></p> <p>This presentation will use the elements of the Northeast Conservation Framework to describe a science-based, landscape level approach to the conservation of monarch butterflies and other native pollinators in the Northeast Region.</p>
<p>3:50 p.m.</p>	<p>Panel Discussion, Q & A <i>All Presenters</i></p> <p>Questions from the Audience</p>
<p>Wildlife #3</p>	
<p>Tuesday, April 21, 2015 8:00 a.m. - 5:00 p.m.</p>	
<p>8:00 a.m.</p>	<p>Establishment of an Island Population of New England cottontails (<i>Sylvilagus transitionalis</i>) on Patience Island in Narragansett, Bay, Rhode Island <i>Brian C. Tefft, Wendy Finn — Rhode Island Department of Environmental Management Division of Fish and Wildlife; Thomas P. Husband, Thomas J. McGreevy Jr. — University of Rhode Island Wildlife Genetics Ecology Lab</i></p> <p>The New England cottontail (NEC) (<i>Sylvilagus transitionalis</i>), a native rabbit found in New England and portions of eastern New York State, is rare due to several possible causes including loss of habitat and competition with non-native Eastern cottontails (<i>Sylvilagus floridanus</i>). NEC</p>

	<p>is a candidate species for listing under the Endangered Species Act and as a result, collaborative efforts between Federal, State, University and Private Conservation Organizations are in place to implement a variety of conservation strategies to restore rabbit populations, including captive propagation. The NEC Conservation Strategy considers establishment of an island breeding colony essential to providing enough rabbits to release into habitats created throughout the range. A captive propagation program at Roger Williams Park Zoo used wild NEC founders from Connecticut, New Hampshire and Maine and produced 238 births during the period 2011 to 2014, resulting in 118 rabbits being available for release; 50 were released on Patience Island over a 3-year period to establish a breeding colony. Patience Island was selected because it had no existing rabbits. Each rabbit released was fitted with a transmitter and located weekly using triangulation to determine survival and cause specific mortality. We used LOAS and ARC GIS 10 to plot locations, evaluate data and create home range estimates (MCP). We estimated annual survival to be 60% in year 1 and 50% in years 2 and 3. Avian (33%) and mammalian (22%) were principal causes of death. We found variation in home range between sexes, males had a mean MCP 11.42ha (29.4 ac) and females a mean MCP of 3.0 ha (7.5 ac). Efforts to document reproduction on the island using microsatellite analysis are being perfected; however, camera traps have photographed new individuals without transmitters attached.</p>
<p>8:20 a.m.</p>	<p>Home range and habitat use of New England cottontails in New York <i>Amanda Cheeseman, Jonathan Cohen, Sadie Ryan, Christopher M. Whipps —SUNY College of Environmental Science and Forestry, Syracuse, NY</i></p> <p>Historically common throughout New England and eastern New York, the New England cottontail (<i>Sylvilagus transitionalis</i>) has experienced range-wide declines. This decline has prompted the United States Fish and Wildlife Service to consider the New England cottontail for listing under the Endangered Species Act. Programs throughout the Northeast have been instated to restore early successional forest, with the goal of increasing New England cottontail populations in the region. However, a better understanding of New England cottontail biology is necessary to ensure successful habitat management. Using radio telemetry, seasonal home range size and habitat composition were examined for adult and juvenile New England and non-native eastern cottontails (<i>Sylvilagus floridanus</i>) in the lower Hudson Valley, NY in response to sex, age, habitat structure, and presence of invasive vegetation. No difference was observed in home range size between New England and eastern cottontails or male and female New England cottontails. Home range of New England cottontails included both native and invasive vegetation patches when present, and was largest in sites dominated by native vegetation, though the sample size for comparison was small. Finally, results indicated a shift in core home range from dense shrubland during winter to grassland and young shrubland during summer. These results suggest young shrubland and grassland might be important summer habitat components for New England cottontail when in close proximity to suitable overwintering habitat.</p>
<p>8:40 a.m.</p>	<p>A landscape genetics approach for comparing connectivity across the range of the New England cottontail <i>Katrina Papanastassiou, University of New Hampshire; Adrienne Kovach, University of New Hampshire; Kate O'Brien, U.S. Fish & Wildlife Service; Michael Palace, University of New Hampshire</i></p> <p>Habitat connectivity is vital for dispersal and metapopulation persistence. Land use change and landscape modification alter the distribution and availability of habitat, thereby decreasing connectivity and impeding organisms' dispersal abilities. Reduction of connectivity is a concern for the New England cottontail (<i>Sylvilagus transitionalis</i>), a species of high conservation priority that has experienced a dramatic decline of its required shrubland habitat. To better understand New England cottontail connectivity, we used a landscape genetics approach to assess the impact of landscape features on cottontail dispersal in two geographically isolated study areas in Cape</p>

	<p>Cod and Maine/New Hampshire. Least Cost Path algorithms were implemented in ArcGIS in conjunction with resistance maps representing hypothesized costs of dispersal. We tested a range of resistance values for roads, development, open water, forest, wetlands, fields, and scrub-shrub habitat. Where data were available, we also evaluated the effectiveness of LiDAR-identified scrub/shrub and pine barrens habitats to inform genetic structure. Mantel correlations and mixed effects models were used to optimize resistance surfaces and test the influence of each landscape feature on gene flow. In Maine, development, water, roads, and forested wetlands were the greatest barriers to dispersal, while scrub-shrub, scrub/shrub wetlands and linear features (powerline right-of-ways and roadsides) were important facilitators. The relative influence of specific landscape features differed between subpopulations of the Maine/New Hampshire region, according to differences in landscape composition. New England cottontails on Cape Cod were most influenced by road barriers and facilitating pine barrens. Our findings highlight the impact of roads on New England cottontail dispersal and can inform habitat restoration efforts.</p>
<p>9:00 a.m.</p>	<p>The Captive Propagation and Reintroduction of the New England Cottontail Rabbit (<i>Sylvilagus transitionalis</i>) "Partners in Action" <i>Lou Perrotti, Director of Conservation Programs, Roger Williams Park Zoo</i></p> <p>The New England cottontail rabbit (<i>Sylvilagus transitionalis</i>), a rare and threatened species of native rabbit was once abundant throughout the New England region. Currently, the species is believed to be extirpated from Vermont, and with only sparse populations remaining throughout the rest of New England. In the 1930's non-native Eastern cottontail (<i>Sylvilagus floridanus</i>) was introduced from Missouri primarily to benefit hunters when the native cottontail populations began to decline. While the non-native Eastern cottontail population is widespread and abundant, the native New England cottontail has declined perilously since that time. For a number of years, biologists have been monitoring existing populations and surveying for additional ones, while working to recreate suitable habitat. The Roger Williams Park Zoo together with regional partners formed the Captive Breeding Working Group to facilitate a captive breeding program as one potential solution for saving the New England cottontail. By 2010, Roger Williams Park Zoo had dedicated space, staff and veterinary care for the breeding program and continues to provide expertise to sustain a supply of healthy captive born rabbits for the reintroduction and population augmentation initiative. This program is a fine example of zoos working together with state and federal wildlife agencies resulting in promising progress toward boosting cottontail numbers while the partners also work to protect and restore habitat throughout the range of this species.</p>
<p>9:20 a.m.</p>	<p>Genetic and Genomic Tools to Inform Applied Management Decisions for New England cottontail (<i>Sylvilagus transitionalis</i>) <i>Thomas J. McGreevy, Jr., Mary Sullivan, Amy Gottfried Mayer — Wildlife Genetics and Ecology Laboratory, Natural Resources Science, University of Rhode Island; Brian Tefft, Rhode Island Department of Environmental Management, Division of Fish and Wildlife; Thomas P. Husband, Wildlife Genetics and Ecology Laboratory, Natural Resources Science, University of Rhode Island</i></p> <p>The field of conservation genetics is an applied discipline that can provide essential information to inform management decisions for rare and endangered species. The New England cottontail (<i>Sylvilagus transitionalis</i>) is a candidate for listing under the Endangered Species Act and the focus of a multidisciplinary effort to conserve the species. The range of agencies involved in the conservation effort includes personnel that are state biologists, federal biologists, academic scientist, and zoo professionals. In collaboration with our partners, we have developed and refined genetic tools to identify the species of origin of a sample, identify the gender of an animal, and identify individuals from non-invasively collected fecal samples. We have used these genetic tools to document the distribution of New England cottontail in Rhode Island and across their range, inform management decisions for the captive breeding program, and document the</p>

reproduction of captive born New England cottontail that have recently been released on Patience Island, which is located in the upper bay of RI. These tools will continue to be applied to measure the population size of New England cottontail and monitor the response of habitat management to the occupancy of New England cottontail. We also are in the process of developing genomic tools that will allow us to define New England cottontail conservation units, which will inform pairing decisions for the captive breeding program. The collaboration of multiple agencies and academic researchers is essential in translating research findings into applied management decisions to increase the efficacy of management decisions.

BREAK 9:40 a.m.

Landbird diversity in early-successional forest openings: Does forest management for a prospective umbrella (gamebird) species benefit non-target species?

Roger Masse, University of Rhode Island; Brian Tefft, Rhode Island Department of Environmental Management; Scott McWilliams, University of Rhode Island

**10:20
a.m.**

Land managers often target conservation shortcuts (e.g., umbrella species) with hopes that non-target species benefit, but the effectiveness of these shortcuts is seldom verified. Declines of early-successional forest across the Northeast, USA, during that past 60 years has caused populations of associated wildlife to decline and active forest management is necessary to conserve these species. The American woodcock requires early-successional forest openings to breed and so this upland shorebird represents a prospective umbrella species for early-successional forest wildlife. We compared landbird communities at managed early-successional forest openings used by breeding woodcock (i.e., singing grounds) and random forest sites to determine whether woodcock habitat management benefits a greater diversity of non-target species. We identified 38 – 51 bird species during 50-m radius point counts conducted at singing grounds and random forest sites, and 62 – 73% of the more frequently occurring species were more common at singing grounds. Early-successional bird species were more abundant at singing grounds and scarce or absent at random forest sites while the opposite was true for more mature forest bird species. The total number and diversity of birds were ≥ 1.5 times greater at singing grounds than random forest sites. Habitat management to conserve woodcock populations simultaneously benefits a diverse community of non-target landbirds. Thus, the woodcock can serve as an effective umbrella species, especially for early-successional forest birds, but complementary umbrella species such as the ovenbird should be considered to aid in the conservation of bird species that breed in more mature forest.

Impacts of native warm-season grassland restoration and expansion on rare grassland birds in Massachusetts

Christopher Buelow, Tim Simmons — Massachusetts Division of Fisheries & Wildlife, Natural Heritage & Endangered Species Program

**10:40
a.m.**

Sandplain Grasslands are globally rare natural communities that are restricted to the North American coastal plain and support a wealth of rare, imperiled, and often highly specialized species. This community is fire-adapted, historically relying upon periodic fire to eliminate invading woody vegetation and to invigorate the native warm season grasses that dominate the community. Of all the rare species associated with this habitat, perhaps none is as readily an indicator of a Sandplain Grassland health as the state-listed grasshopper sparrow. Sandplain grassland restoration efforts at two sites in Massachusetts have involved management practices such as extensive invasive plant control and prescribed burning in existing grassland areas, as well as tree clearing, stump removal, harrowing, and seeding of native warm season grasses on post-agricultural forestlands adjacent to the existing grasslands. Grassland birds require extensive contiguous areas of open grassland with uninterrupted sight lines. Clearing of tree hedgerows within existing grasslands, and expansion of open grasslands into adjacent post-agricultural forest

	<p>proved key to enhancing local populations of rare grassland birds. At the Frances Crane Wildlife Management Area in Falmouth, restoration efforts over the past 14 years have increased the number of nesting pairs of grasshopper sparrows from 1 to 13, and in 2014 attracted a breeding pair of the extremely rare upland sandpiper. Despite successful restoration efforts, illegal ATV trespass remains a serious threat to recovery of rare grassland birds.</p>
<p>11:00 a.m.</p>	<p>Evaluation of the Effectiveness of Parent-reared Versus Non-Parent Reared Semi-Wild Northern Bobwhites for Reintroduction on Long Island, New York <i>William Macaluso, University of Delaware; Dr. Christopher Williams, University of Delaware; Dr. Theron Terhune, Tall Timbers Research Station</i></p> <p>Historically, pen-reared game birds exhibit low survival rates in the wild, this limits their usefulness for re-introduction efforts. Recent research in the Southeast has suggested that a new parent-rearing technique involving pre and post-hatch imprinting of wild strain northern bobwhites (<i>Colinus virginianus</i>) on adult bobwhites may be a viable option for restoring bobwhite populations. We tested this method against a more traditional game bird propagation tool (Surrogators) on Long Island, New York to measure its effectiveness on the edge of the species' range. In August and October of 2013 we released a total of 186 birds, divided between the parent-raised and traditionally-reared treatments. We marked each bird with a uniquely numbered aluminum leg band as well as a color band to indicate its treatment group. We gave a subset of each group radio-collars (16 parent-raised and 56 traditionally-reared) to assess survival rates and habitat selection between the two groups. We used a staggered entry approach to estimate survival rates for each treatment. Parent-raised bobwhites had a survival rate of 0.108 19 weeks post-release, traditionally-raised birds showed a significantly higher survival rate of 0.340 in the same time period ($p < 0.001$). Parent-raised bobwhites had a mean weight at release of 67.8g, traditionally-raised birds had a significantly higher weight at 93.8g. We are currently reanalyzing our data to test for a correlation between weight at release and survival. Our preliminary results indicate that parent-raised bobwhites are not an improvement over traditional propagation methods for re-establishing populations on the northern edge of their range.</p>
<p>11:20 a.m.</p>	<p>Habitat Associations of Nesting Whip-poor-wills on a Managed Pitch Pine-Scrub Oak Barren <i>Michael E. Akresh, Department of Environmental Conservation, University of Massachusetts Amherst; David I. King U.S. Forest Service Northern Research Station, University of Massachusetts Amherst</i></p> <p>Relatively little is known of the breeding ecology of the eastern whip-poor-will, a threatened, aerial insectivorous bird that occupies early-successional habitats created by disturbance. Between 2006 and 2013 we studied whip-poor-will habitat associations, roost and nest site characteristics and nest survival on a managed pitch pine-scrub oak barren in Western Massachusetts. The abundance of calling whip-poor-wills was greater in open-canopy habitats such as scrub oak barrens and heavily thinned pitch pine stands, compared to closed-canopy pitch pine and deciduous forest. The majority of roosts and nests were in these same open-canopy habitats, and nests tended to be located under remnant trees or in habitat patches at least 2 years since treatment. Nest survival was relatively high (63%, $n=21$) through incubation, consistent with other published studies of whip-poor-wills and other nightjars. Our observations that the abundance of calling whip-poor-wills is highest in open-canopy habitat is consistent with prior published accounts, however it has been suggested that closed-canopy forest adjacent to shrubland habitat is needed for nesting. While we are unable to determine whether nesting and roosting occurred in closed canopy forest at our site since we only searched for nests and encountered roosts in open-canopy habitats, our results confirm a substantial proportion of the whip-poor-wills at our study site nested and roosted in open habitats, and that nest survival was reasonably high in these habitats. We conclude that creating and maintaining open canopy</p>

	habitats in pitch pine-scrub oak barrens increases habitat suitable for whip-poor-will courtship, roosting and nesting.
11:40 a.m.	<p>Connections Between Birds, Fruit Crops, and the Agricultural Landscape: Implications for Reducing Bird Damage <i>Heidi M. Henrichs, Paul D. Curtis, Jason R. Boulanger — Department of Natural Resources, Cornell University</i></p> <p>Bird damage to fruit crops is an enduring and costly issue facing growers, necessitating research to identify cost-effective solutions. This project was part of a multi-state USDA study, with the primary goal of providing fruit producers with best strategies for bird damage management based on robust field testing and clearly-identified costs and benefits. We completed three seasons of field work in central New York State, including damage assessments and bird surveys at 96 sites. Our study crops included sweet cherries, Blue Crop blueberries, Honeycrisp apples, and Pinot Noir wine grapes. Crop-loss data indicated that fruit location (i.e., within the edge or interior of a plot) did not have a statistically-significant effect on the presence of bird damage. For sweet cherry sites, overall average crop loss was approximately 13% during the 2012 and 2013 growing seasons. In blueberry plantings, birds damaged 15% of the fruit during both years, collectively. Apples had an overall average loss of 1.5%, and 3.4% of wine grapes were damaged by birds. During 2013, we pilot tested several strategies for deterring birds, including distress-callers, hawk kites, and air dancers. We also examined the effects of combining methods, and changing device location, on technique effectiveness. Based on 2013 results, further experimental testing in 2014 focused on the use of air dancers. We will present overall study results, including deterrent viability, landscape implications, and bird behaviors.</p>
BREAK 12:00 p.m.	
1:00 p.m.	<p>Estimating American mink, Neovison vison, density in complex river networks using spatial capture-recapture <i>Chris Sutherland, New York Cooperative Fish and Wildlife Research Unit, Cornell University; Angela Fuller, U.S. Geological Survey, New York Cooperative Fish and Wildlife Research Unit, Cornell University; Andy Royle, U.S. Geological Survey, Patuxent Wildlife Research Center, Laurel, MD</i></p> <p>American mink, Neovison vison, are riparian habitat specialists, generalist predators, and aquatic community regulators. However, despite being both biologically and economically important, estimates of population size and status assessments are rare, largely due to logistical and technical challenges with monitoring small carnivores. For instance, mink are elusive, wide ranging and occur at relatively low density making them difficult to capture, and estimating population size requires intensive sampling over large spatial scales. The concurrence of the use of scat detection dogs, the ability to identify individuals using non-invasive genetic sampling, and the development of spatial capture-recapture models, together provide a means to sample elusive species, such as mink, efficiently over large areas. Moreover, unlike conventional capture recapture in which the area being sampled is not known, spatial capture-recapture provides estimates of absolute density allowing formal comparisons of populations to be made. In this paper we demonstrate how the combination of these exciting developments in ecological monitoring and analytical methods can be used to assess the status of a species that is important, yet difficult to study.</p>
1:20 p.m.	<p>Activity levels of mesocarnivores in mature hardwood and young forest in the northeast, quantified via the use of remote camera-trap data <i>Kelly O'Connor, Kelly Niland, Eric McKean, Tracy AG Rittenhouse — UCONN</i></p> <p>The activity level of mammalian mesocarnivores may serve as an important indicator of foraging</p>

	<p>effort and potential exposure risk for common prey species, but has historically been difficult to quantify and has relied on direct, field-based observations. Using remote camera-trap sensors and recently published methodology on quantifying activity patterns (Rowcliffe et al, 2014), we estimated activity schedules and daily proportion of time spent active for five mesocarnivore species encountered throughout New England: 1) Coyote (<i>Canis latrans</i>), 2) Bobcat (<i>Lynx rufus</i>), 3) Raccoon (<i>Procyon lotor</i>), 4) Virginia Opossum (<i>Didelphis virginiana</i>), and Red Fox (<i>Vulpes vulpes</i>). In addition, we tested for differences in the activity levels of these species when detected in two major habitat types found in the region: 1) Upland hardwood forest, and 2) young/early successional forest. We set a total of 10 camera traps at 4 sites that contained a mix of early successional and mature forest, distributing cameras evenly between the two habitat types. We retrieved images from cameras from December 2014 to March 2015. All five of our target species were observed during the monitoring period, with the majority of activity for all target species occurring in young forest. We provide evidence that R package Activity, a new method for analyzing camera data, can be used to better inform managers on the degree to which a number of species are active within a habitat patch.</p>
<p>1:40 p.m.</p>	<p>A survey for eastern spotted skunk (<i>Spilogale putorius</i>) in western Maryland and a review of its distribution in the central Appalachians <i>K.J. Pearce, Appalachian Laboratory, University of Maryland Center for Environmental Science, Frostburg, MD; T.L. Serfass, Department of Biology and Natural Resources, Frostburg State University, Frostburg, MD; J. M. McCann, Maryland Department of Natural Resources, Natural Heritage Program, Frostburg, MD; D.J. Feller, Wildlife and Heritage Service, Maryland Dept. of Natural Resources, Appalachian Laboratory, Frostburg, MD; G. G. Turner, Bureau of Wildlife Management, Pennsylvania Game Commission, Harrisburg, PA</i></p> <p>The eastern spotted skunk (<i>Spilogale putorius</i>) is a species of conservation concern throughout much of its range which encompasses most of midwestern and southeastern regions of the United States. The historic northeastern range of this species reaches into southern Pennsylvania, with records from 3 south-central counties. There is little information about its status and distribution in the central Appalachians, including western Maryland, where there have been no definitive records since 1967 and the species' status in the state remains uncertain. Recent camera trap records from Pennsylvania and West Virginia, however, raise the possibility that it is still extant in Maryland and have spurred regional interest in that status, distribution and habitat associations of this species. The objectives of our study are to review the historical distribution of the eastern spotted skunk in Pennsylvania, Maryland and West Virginia, use camera traps and track plates to determine if the species currently occurs in Maryland, and if so, document its distribution, relative abundance and habitat associations. Surveys will focus on historical locations that still contain potential habitat including Maryland sections of mountain ridges where the species was recently documented in Pennsylvania and West Virginia and areas where there have been reliable reports from trappers, natural resource professionals and other knowledgeable individuals. The surveys will be conducted during fall-winter months of 2014-2015 and 2015-2016 and will include portions of Garrett, Allegany and Washington counties. This information will be used to identify and prioritize areas in Maryland to focus further conservation activities for this species.</p>
<p>2:00 p.m.</p>	<p>Documenting Elimination of Eurasian Swine in New York State <i>Daniel Hojnacki, Justin Gansowski — USDA Wildlife Services; Kelly Stang, New York State Department of Environmental Conservation</i></p> <p>Feral swine are a non-native invasive species found throughout the United States, with an estimated population of 6 million individuals. Accidental and intentional releases from enclosed shooting facilities and domestic swine operations have allowed these animals to proliferate across the landscape. Feral swine cause large-scale ecological, agricultural, and property damage along with the threat of disease. In 2008, four breeding populations of feral swine were discovered in</p>

six counties of New York State. Through new regulations and extensive elimination efforts by USDA Wildlife Services and New York State Department of Environmental Conservation, New York's feral swine population has been reduced significantly. Feral swine have not been detected in four of the six counties where elimination efforts have been applied. To determine if a feral swine population has been eliminated, an extensive monitoring program needs to be implemented. USDA Wildlife Services has developed a five-prong approach monitoring program which includes: on the ground management and surveillance, an early detection network, collaborating with law enforcement, aerial surveillance, and lastly canine surveillance. In an effort to become the first state to completely eliminate Eurasian Boar from the landscape, a successful eradication program must have an intensive monitoring program. The details of the five-prong approach monitoring program will be discussed.

2:20 p.m. **Rapid response and removal of Eurasian boars after outbreaks from hunting preserves in New York**
Mark Jackling, Daniel M. Hojnacki, and Justin T. Gansowski — USDA-APHIS, Wildlife Services

Feral swine (*Sus scrofa*) are a growing problem across the U.S. and a serious concern in the state of New York. The spread of feral swine in New York has been tied to the growing popularity of stocking Eurasian wild boar for use in high-fence hunting preserves. Feral swine escape from these facilities or are intentionally released into the wild to provide hunting opportunities. Wildlife Services has been successful in eliminating the few isolated populations that persisted in New York for several years. However, the challenge of detecting and removing Eurasian wild boars as individuals or groups escape from these high-fence facilities continues. Squelching these outbreaks before the animals disperse, colonize new areas, and begin to reproduce requires an increased sense of urgency and is critical for our goal of eradication of feral swine in New York. The unique challenges associated with managing abrupt outbreaks of Eurasian boars in close proximity to high-fence hunting preserves are numerous and include unpredictable behavioral patterns, access to private property, and interference by hunters trying to capitalize on the novel opportunity to shoot a wild boar. In this presentation we share valuable lessons learned and guidance on managing feral swine in these unique and complex situations.

BREAK 2:40 p.m.

3:20 p.m. **Modeling of the effects of landscape composition on habitat suitability of urban white-tailed deer**
Chellby R. Kilheffer, Department of Environmental & Forest Biology, SUNY College of Environmental Science & Forestry; H. Brian Underwood, USGS Patuxent Wildlife Research Center, SUNY College of Environmental Science & Forestry, Syracuse, New York

While urban greening has ecological and social benefits for human, very little is documented of its effects on local wildlife populations. Of concern are human-tolerant species that have a propensity to attain high density and create severe quality of life issues for urban residents. White-tailed deer (*Odocoileus virginianus*) have been invading urban landscapes in the eastern United States for decades, but knowledge of habitat suitability for deer comes from rural studies occurring over large spatial extents. In this study, we explore habitat suitability for deer across heterogeneous, peri-urban landscapes in upstate New York. Using replicated counts of deer in three metropolitan areas and high-resolution orthoimagery, we predicted both occurrence and abundance of deer from binomial, N-mixture models and land cover composition. Habitat suitability for deer was inversely proportional to the percentage of impervious cover and directly proportional to the percentage of tree cover. The probability of at least one deer observed in 1-km² survey units was between 62% and 83% for average amounts of impervious cover encountered. Land use in each study area may explain differences in the observed relationship between occurrence and impervious cover, but the relationship between tree cover and abundance

	<p>was remarkably consistent between study areas. The amount of impervious cover defines potential habitat across the landscape and the amount of tree cover sets the upper limit on abundance. Our findings have important implications for urban greening projects that alter impervious and tree cover due to the indirect effects on urban deer populations.</p>
<p>3:40 p.m.</p>	<p>Deer impacts on forest regeneration at spatial scales relevant to management decisions <i>Mark R. Lesser, State University of New York – College of Environmental Science and Forestry; P. Curtis, Cornell University; J. Hurst, New York State Department of Environmental Conservation; J. Frair, State University of New York, College of Environmental Science and Forestry; M. Dovciak, State University of New York, College of Environmental Science and Forestry</i></p> <p>Deer (Cervidae) have been implicated as a major factor in suppressing forest regeneration across temperate regions of the globe. Deer browse may alter forest composition by removing significant proportions of seedlings from the understory, thus changing successional pathways and canopy composition. However, the majority of studies have considered deer impacts on forest regeneration only over fine spatial scales with results varying substantially at greater spatial scales due to variation in habitat conditions and deer concentrations. Determining how local effects scale up to broad spatial scales relevant to deer management is challenging due to the complexity and interactions of the many factors involved. We used the Forest Inventory and Analysis Database (FIA) to obtain forest regeneration data for 1652 plots across New York State. For select tree species, seedling and sapling abundance was tabulated. Species abundance was modelled against deer browse pressure (DBP), estimated from deer harvest data for 92 broad-scale wildlife management units. Other covariates in the model were climate variables, stand level factors, and land cover variables. We placed a 2-km-radius buffer around each plot and derived area and perimeter estimates for land cover categories using the National Landcover Database. For most tree species we found significant interactions between broad-scale DBP and local-scale land-cover variables, suggesting that regional deer densities are strongly mediated by local land-use patterns, which in turn determine impacts on species abundance. These findings provide the basis to link localized impacts on tree regeneration with deer densities at spatial scales that are relevant to management decisions.</p>
<p>4:00 p.m.</p>	<p>Natural and anthropogenic drivers of bobcat (<i>Lynx rufus</i>) population structure in New England <i>Rory P. Carroll, Marian K. Litvaitis, Brittaney Buchanan, John A. Litvaitis — University of New Hampshire</i></p> <p>Population structure results from spatial variability of effective dispersal events between subpopulations and is driven by geographic distance and environmental factors. Anthropogenic disturbances, especially high traffic-volume roads, are becoming a ubiquitous environmental obstacle for dispersing individuals in the northeastern United States. This is particularly true for wide-ranging carnivores such as the bobcat (<i>Lynx rufus</i>), which has been shown to be sensitive to fragmentation. To determine the relative effects of anthropogenic and natural features on bobcat dispersal, we genotyped 250 samples collected from New Hampshire, Maine, Massachusetts, Vermont, and southern Quebec, Canada at 16 microsatellite loci. Analysis in GENELAND and STRUCTURE revealed that bobcats in the region are divided into at least 4 subpopulations. Using the observed genetic structure and GIS-based software packages (e.g. MEMGENE), we determined areas on the landscape that act as putative corridors or as barriers and identified associated landscape features for each. Initial results suggest that developed areas and portions of interstate highways I-89, I-91, and I-93 are dividing bobcat populations. Corridors for gene flow exist in the Lakes Region of central New Hampshire, portions of western Maine, and northern Massachusetts. Our research will highlight conservation zones critical for the maintenance of</p>

	genetically healthy populations of bobcats, a taxon that may function as an umbrella species for many northeastern faunae.
4:20 p.m.	<p>Developing a habitat suitability index for managed New England cottontail habitats <i>Alena Warren, John A. Litvaitis — University of New Hampshire; Don Keirstead, Natural Resources Conservation Service</i></p> <p>In response to a range-wide decline in abundance and distribution, state and federal agencies are collaborating to increase the abundance of habitat for New England cottontails (<i>Sylvilagus transitionalis</i>, NEC). Although the basic features of NEC habitat are well established (e.g., dense understory cover interspersed with grassy openings), there is no standard protocol for describing relative quality. We have developed a habitat suitability index (HSI) as a tool for evaluating NEC-managed sites. Our approach was based on the HSI models designed the U.S. Fish and Wildlife Service. First, we identified a series of candidate variables that describe life requisites of NEC (security cover, movement cover, subterranean cover, and summer/winter forage) and potential detriments to habitat quality (invasive plants). Next, we asked a panel of biologists familiar with NEC (experts) to rank our candidate variables. A preliminary HSI model was constructed using the top rank variables. We then used that model to sample 60 sites managed for NEC in New England and eastern New York. Our expert panel then ranked the same 60 sites from 1 (unsuitable) to 5 (optimal). Finally, we optimized our model to improve agreement with expert opinions for the 60 sites. We believe that the resulting model should provide a flexible, objective approach toward evaluating sites managed for NEC. Specific applications may include determining when a site is suitable for releasing translocated or captive breed rabbits, and identifying habitat features that need modification as forest succession progresses.</p>
Wildlife #4	
Tuesday, April 21, 2015	
8:00 a.m. - 5:00 p.m.	
8:00 a.m.	<p>Population dynamics of Common eiders in the St. Lawrence estuary, Quebec <i>Jean-François Giroux, Anik Pannetier Lebeuf — Université du Québec à Montréal; Eric T. Reed, Environment Canada</i></p> <p>Sound management of bird populations rests upon an adequate understanding of their dynamics. The aim of our study was to look at trends in population size of Common eiders (<i>Somateria mollissima dresseri</i>) breeding in the St. Lawrence estuary. Population growth rates were estimated using capture-recapture data of females in four of the main colonies totalling about 12,500 nests (Île Blanche, Île aux Fraises, Île aux Pommes, and Île Bicquette) and compared with nest count data. During the last decade, the breeding population of common eiders slightly increased on Île Blanche (95% CI $\lambda = 1.04 - 1.09$ based on recaptures, and $1.00 - 1.06$ based on nest counts) and Île aux Fraises ($1.04 - 1.13$ and $0.97 - 1.07$, respectively). On Île aux Pommes, population size was relatively stable ($0.95 - 1.02$ and $0.97 - 1.02$, respectively), whereas it decreased on Île Bicquette ($0.93 - 1.01$ and $0.93 - 0.98$). Yet, long-term trends based on nest counts showed significant declines between 1984 and 2013 on Île Blanche ($0.97 - 0.99$) and Île aux Fraises ($0.95 - 0.97$) and an increase on Île aux Pommes ($1.01 - 1.03$). Survival rate estimated for adult females was very high ($0.87 - 0.95$), and showed no variation among regions of the St. Lawrence estuary. Fidelity to the breeding region was also very high ($0.88 - 0.98$). However, a lower site fidelity was detected for newly-captured birds ($0.54 - 0.64$). Based on band recoveries, eiders from the upper estuary were harvested to a greater extent in Maine while those from the mid and lower estuary were recovered principally in Quebec and Maine.</p>
8:20 a.m.	<p>Habitat Use and Movement Ecology of Common Eider and Black Scoters During Winter in Southern New England <i>Joshua Beuth, Department of Natural Resources Science, University of Rhode Island and Rhode</i></p>

	<p><i>Island Department of Environmental Management; JASON OSENKOWSKI: Rhode Island Department of Environmental Management, West Kingston, RI; PAMELA LORING, PETER W.C. PATON, SCOTT R. MCWILLIAMS: Department of Natural Resources Science, University of Rhode Island, Kingston, Rhode Island; SCOTT GILLILAND: Environment Canada, Newfoundland & Labrador, Canada; JEAN-PIERRE SAVARD: Environment Canada, Québec, Canada</i></p> <p>Southern New England provides critical habitat for seaducks during winter and migratory staging periods and is a priority area for developing offshore wind energy facilities. However, little is known about the movement ecology and habitat use of common seaduck species including black scoters (<i>Melanitta americana</i>) and common eider (<i>Somateria mollissima</i>) in this region. We used satellite telemetry to track black scoters (n = 75) and common eider (n = 24) and then delineated their migratory phenology, length of stay on winter grounds, winter home range size and site fidelity, key habitat characteristics associated with core-use areas, and relative probabilities of use across a 3,800-km² marine spatial planning area. Black scoters spent nearly 5 months in southern New England, with wide variation among individuals in the size of winter utilization distributions (range 16–12,367 km²), in their fidelity to core-use areas between winters, and in the frequency of short forays to regions as far south as South Carolina. Common eider also spent about 5 months in southern New England during winter although they were relatively sedentary with small mean individual core use areas (mean = 39 km²) and utilization distributions (mean = 199 km²). Winter core use areas inhabited by both species were located closer to shore, at shallower water depths, with fine- to coarse-sediment grain size, and higher probability of hard-bottom occurrence relative to available areas. Resource selection functions and habitat-use models indicated that a 5-turbine wind energy facility proposed for relatively shallow (<20 m deep), nearshore habitats (<5 km), over hard-bottomed or coarse-sand substrate will likely displace foraging black scoters and common eider wintering, whereas a proposed 200-turbine facility in federal lease block zones located farther offshore will more likely affect seaducks moving among core-use areas and during migration between wintering and breeding grounds.</p>
<p>8:40 a.m.</p>	<p>Pre-Fledging Survival of Canada Geese in Southern Quebec <i>Amélie Fontaine, Université du Québec à Montréal; Eric T. Reed, Environment Canada; Jean Rodrigue, Environment Canada; Jean-François Giroux, Université du Québec à Montréal</i></p> <p>Temperate Canada geese (<i>Branta canadensis maxima</i>) are considered very abundant in many regions of United States and Canada, causing potential ecological, economical and health problems. Understanding the different components that affect their population dynamics is essential for the management of this natural resource. In 1992, a population of Canada geese became established in southern Quebec and has been growing steadily since then. The objectives of our study were to estimate pre-fledging survival rate and to evaluate factors that affect it. Between 2005 and 2014, 8,679 goslings have been marked with web tags at hatching. We recaptured and banded 3,922 of these birds before fledging while 338 were recaptured and banded in subsequent years as after-hatch year birds. We used multistate recapture and recovery models to look at the effects of year, hatch date, initial brood size, mother age, natal area and weather on pre-fledging survival. Survival varied between 0.35 (95% CI: 0.25 – 0.74) and 0.81 (0.73 – 0.94) over a period of ten years. Survival estimates varied little between two adjacent natal areas. This study provided the first estimates of true pre-fledging survival for a temperate Canada geese population. In addition, it highlights the use of an innovative and robust method to evaluate an important demographic parameter and evaluate factors influencing it.</p>
<p>9:00 a.m.</p>	<p>Bioenergetics and behavior of wintering American black ducks in managed and unmanaged wetlands <i>Mark C. Livolsi, University of Delaware; John M. Coluccy, Ducks Unlimited; Matthew T. DiBona, Delaware Department of Natural Resources and Environmental Control; Christopher</i></p>

K. Williams, University of Delaware

Saltmarshes and impounded wetlands in Delaware are important wintering habitats for American black ducks (*Anas rubripes*). Bioenergetics models estimate black duck populations based on energy supply and demand. However, little is known about the relative energetic importance of managed impoundments compared with unmanaged saltmarshes. Our objective was to quantify the energetic carrying capacity of black ducks in these habitats. We estimated duck-use days by collecting soil core, nekton, and saltmarsh snail samples in October, January, and March 2011–2013. We multiplied mass of food items by true metabolizable energy values to determine available food energy. We found impoundments had significantly more energy (362,480.19 kcal/ha on average) than most saltmarsh habitats. We estimated 1.60×10^{10} kcal available in total in a 16.1 km buffer from the bayshore. To estimate energy demand, we constructed time-energy budgets using 10-minute instantaneous scan samples ($n = 1,725$) between November–March 2011–2013 over the 24-hr period. We estimated daily energy expenditure over the winter period to be between 283.09–341.33 kcal/bird/day. Thus, we estimated between 4.68×10^7 – 5.64×10^7 available duck use-days. We also compared proportion of time spent in various behaviors. Proportions of feeding, sleeping, and swimming behaviors were significantly higher in impoundments than saltmarshes. Our results suggest that impoundments are valuable habitats for wintering black ducks, serving as energy-dense refugia for feeding and sleeping compared with neighboring saltmarshes. With the threat of sea level rise looming, we recommend that managers consider maintaining impoundments for future black duck populations.

Habitat Preferences and Survival of Nesting Wood Duck Hens and Broods at Great Swamp National Wildlife Refuge, New Jersey

Megan Spindler, Frank Ammer — Frostburg State University, Maryland; Thomas Serfass, Frostburg State University, Maryland & Appalachian Laboratory, University of Maryland Center for Environmental Sciences; Dorothy Fecske, Great Swamp National Wildlife Refuge, Basking Ridge, New Jersey; Casey Wagnon, Frostburg State University, Maryland; Steven Henry, Great Swamp National Wildlife Refuge, Basking Ridge, New Jersey

9:20
a.m.

Since its establishment in 1960, the 3,156.5 hectare Great Swamp National Wildlife Refuge (Refuge), located 41.8 km miles west of New York City, has served as important wetland habitat for migrating and breeding waterfowl in an otherwise highly-developed landscape. The Refuge maintains 5 wetland impoundments totaling 230 hectares and has had an active wood duck (*Aix sponsa*) nest box program since the late 1960s. Herein, we review outcomes of the project based on radio-monitoring hens to determine: 1) selection of nest boxes in relation to riparian habitat characteristics, and 2) habitat preferences during the brood-rearing. Nest initiation rates for boxes located on a forested edge, impoundment edge, riverine edge, or no edge were 71%, 77%, 59% and 74%, respectively; nest success (hatch) rates for these boxes were 40%, 41%, 33% and 43% . On average, hen brood-rearing locations ($n = 70$) contained 44.4% emergent vegetation (SD = 29), 23.7% bottomland forest (SD = 29.3), 13.2% scrub-shrub vegetation (SD = 19.7), 12.8% submerged aquatic vegetation (SD = 20.2), 5.0% open water (SD = 11.7), 0.6% other vegetation (SD = 2.7), and 0.3% upland forest (SD = 1.5). Findings from this research, as a part of a larger study to evaluate each impoundment's ecological contribution to waterfowl and other Refuge priority species, will assist the Refuge in developing and implementing management strategies to maximize each impoundment's ecological contribution to wood duck production at a landscape scale.

BREAK 9:40 a.m.

10:20
a.m.

Scat Detection Dogs Survey Moose at Low Densities in New York

Heidi Kretser, Michale Glennon — Wildlife Conservation Society; Alice Whitelaw, Aimee Hurt — Working Dogs for Conservation; Christine Pilgrim, Michael Schwartz — Rocky Mountain

	<p><i>Research Station Genetics Lab</i></p> <p>Collection of mammal occurrence data in areas of low population density poses challenges for biologists who wish to learn more about a species to make management decisions. We sought to assess the feasibility of using conservation detection dogs to search for moose fecal pellets in the Adirondack Park in Northern New York State, and to investigate whether DNA extraction from moose fecal pellets would be feasible. In May 2008, two conservation detection dog teams surveyed 20 transects for moose scat. We located 138 moose scats. In 2011 we successfully amplified DNA from 39 scats and were able to uniquely identify 26 individuals. With some modification to the scat storage methods employed here, scat detection dogs demonstrate a feasible non-invasive alternative method to studying moose in the Adirondack Park.</p>
<p>10:40 a.m.</p>	<p>Estimating the occurrence of moose in New York using hunter survey data <i>Nathan Crum, New York Cooperative Fish and Wildlife Research Unit, Department of Natural Resources, Cornell University, Ithaca, NY; Angela Fuller, U.S. Geological Survey, New York Cooperative Fish and Wildlife Research Unit, Department of Natural Resources, Cornell University, Ithaca, NY; Chris Sutherland, New York Cooperative Fish and Wildlife Research Unit, Department of Natural Resources, Cornell University, Ithaca, NY; Jeremy Hurst, New York State Department of Environmental Conservation</i></p> <p>Monitoring rare and elusive species can be difficult, especially across large areas, making conventional methods of population monitoring costly and logistically challenging. Alternatively, citizen science can produce large amounts of detection/non-detection data across large areas that can be used for wildlife monitoring. For instance, citizen science can facilitate the monitoring of moose populations, which is especially important given their recent apparent declines in the Northeast and Upper Midwest. To better understand patterns of occurrence of moose across New York, we utilized data from a survey of ~11,000 hunters distributed by the New York State Department of Environmental Conservation during 2012-2014. The survey collected information from hunters on detection/non-detection of moose and other species. Using occupancy models to analyze spatially referenced moose observations from these surveys, we estimated patterns of occurrence of moose in New York in relation to landcover characteristics, climate effects, and interspecific interactions. Our results indicate that areas of coniferous forest with low white-tailed deer density have the highest probability of moose occupancy. Surprisingly, early successional forest does not seem to influence moose occupancy in New York, despite being preferred moose habitat. By locating areas where moose are most likely to occur, our work can highlight areas of interest for future moose research and management efforts across New York.</p>
<p>11:00 a.m.</p>	<p>Documenting moose (<i>Alces alces</i>) population size and distribution across public and private lands in the Adirondack Park, New York <i>Paul Schuette, Jacqueline Frair —SUNY ESF; Jeremy Hurst, Ed Reed, Ben Tabor — NY State Department of Environmental Conservation</i></p> <p>After a 120 year absence, moose (<i>Alces alces</i>) began naturally recolonizing northern New York in the 1980s. Although several northeastern states experienced eruptive moose population growth over the past few decades, the status and trends in New York's moose population remain relatively unknown. A well-documented decline of moose in Minnesota has urged New York and other southern range states to monitor resident moose and identify the factors limiting their population size and distribution. In January 2015, we initiated winter helicopter surveys to estimate moose population size and distribution in the Adirondack Park, a 6.1 million acre protected area consisting of private and public lands. We are using a modified distance sampling approach that incorporates mark-recapture and adaptive sampling strategies to account for anticipated low moose detectability in forested habitats and high clustering. We are deploying GPS collars on adult moose to build a sightability model to test our ability to detect moose, to</p>

	<p>provide fine-scale spatial data on moose habitat use, and to document survival and reproduction. Data from Year 1 will help guide our moose monitoring strategy in future years. Overall, we aim to develop a cost-effective strategy that can accurately detect population trends (increasing, decreasing, stable) in the New York moose population with high precision. This presentation will provide an overview of our modified distance sampling approach and the status of GPS collared animals for building a sightability model. We anticipate our research approach will be useful for wildlife management and conservation programs across the northeast.</p>
<p>11:20 a.m.</p>	<p>Habitat-use Analysis and Survey Development for the Neotropical River Otter (<i>Lontra longicaudis</i>) in Costa Rica <i>Karen Zusi, Boston University; Dr. Thomas Serfass, Frostburg State University</i></p> <p>With global biodiversity on a steady decline, accurate information on the health and size of current species populations is critical to constructing appropriate conservation strategies. The neotropical river otter (<i>Lontra longicaudis</i>) was classified by the International Union for the Conservation of Nature as “Data Deficient” in 2008. Since then, studies have been conducted on some aspects of the species’ diet, habitat use, and genetic population structure, but there are no standardized methods for efficiently surveying the species in the wild. I compared habitat characteristics of 53 neotropical river otter scent-marking sites (scats and anal gland secretions) to 46 randomly-selected unmarked sites along three rivers in the dam-impacted Peñas Blancas river basin, Costa Rica, and constructed predictive logistic regression models to develop survey protocols for the species. Scent-marking sites were strongly associated with the presence of rocks protruding from the surface of the water, the availability of resting sites on the riverbanks (rock crevices, earthen burrows, and dense vegetation), and the absence of woody debris. Human impacts to the land surrounding the surveyed rivers did not appear to negatively affect marking intensity if these other factors were present; however, otters did not mark in the dam and reservoir area itself. Marked sites were exclusively on rocks or fallen trees, in sharp contrast to the communal latrine areas that the North American river otter (<i>Lontra canadensis</i>) creates at water’s edge. Surveys for the neotropical river otter based on scent-marking should be conducted in rocky areas with ample resting sites available.</p>
<p>11:40 a.m.</p>	<p>Population Genetics of the North American River Otter (<i>Lontra canadensis</i>) in the Eastern U.S. <i>Nikolai Kolba, Jane E. Huffman — East Stroudsburg University, Northeast Wildlife DNA Laboratory, East Stroudsburg, PA</i></p> <p>The numbers of North American river otter (<i>Lontra canadensis</i>) were believed to have been reduced due to habitat loss from the European colonization in North America and in more recent times due to anthropogenic modifications of their habitat and trapping. The river otter has been successfully reintroduced in a number of states including: IL, NC, NY, PA and WV. In this study the genetic structure of river otters was evaluated from IL, NC, NJ, NY, PA, RI, VT and WV. A total of 584 tissue samples were collected from otters harvested by trappers, state agencies, accidental trappings, and vehicle strikes. DNA was extracted from a variety of tissues (ear punch, liver, muscle, skin scrapings, spleen, tongue, and toe pad) and amplified using 10 polymorphic DNA microsatellite loci to determine the allelic frequencies. The utilization of a Bayesian clustering algorithm along with other population genetic metrics revealed that there were 5 genetically distinct population clusters identified: the Northeast (VT & RI), Mid-Atlantic (NJ, NY, PA, excluding WV), West Virginia, North Carolina and Illinois. Genetic differentiation was significant ($F_{ST} = 0.149$; $P < 0.001$), suggesting gene flow is restricted among geographically separated populations. Inbreeding was not detected in any population. The findings of this study also identify dispersal corridors and highlight areas where habitat restoration and reintroductions would be ideal to improve gene flow and assist in recovery of the species in certain locations, such as Pennsylvania.</p>

BREAK 12:00 p.m.

Linking Landscapes for Massachusetts Wildlife: “A Model in Wildlife and Transportation Coordination”

David Paulson, Massachusetts Division of Fisheries and Wildlife - Natural Heritage and Endangered Species Program; Timothy Dexter, Massachusetts Department of Transportation – Highway Division

**1:20
p.m.**

Linking Landscapes for Massachusetts Wildlife (Linking Landscapes) is a partnership that was established in 2008 between the Massachusetts Division of Fisheries and Wildlife (MassWildlife) and Massachusetts Department of Transportation Highway Division (MassDOT). Its goal is to reduce wildlife-vehicle collisions and improve public safety; enhance, protect, and restore habitat impacted by roads; incorporate conservation priorities into transportation planning and design; and implement wildlife transportation research. From identifying road mortality hotspots to building nesting boxes to restoring wetlands of high conservation value, community engagement and science based prioritization is at the core of Linking Landscapes. The program grew out of a broader cooperative agreement to streamline the environmental review process. Linking Landscapes is a model partnership that has resulted in faster reviews, cost-savings, and the protection of endangered species and their habitat. Together, MassDOT and MassWildlife are working to implement MassDOT’s GreenDOT goal of enhancing the ecological performance of MassDOT impacted land.

Staying Connected in the Northern Appalachians A Public-Private partnership focused on Habitat Connectivity

Jens Hilke, Conservation Planning Biologist, Vermont Fish & Wildlife Department, Essex Junction, VT; John Austin, Lands & Habitat Program Manager, Vermont Fish & Wildlife Department, Montpelier, VT

**1:40
p.m.**

The Staying Connected Initiative (SCI) was launched in 2009 with support from one of the first nationally awarded Competitive State Wildlife Grants from US Fish & Wildlife Service, and has become one of the most visible examples of landscape conservation in the East. SCI’s mission is to sustain forested connections across the 80+ million acre Northern Appalachian–Acadian region of the northeastern US and southeastern Canada for the benefit of wildlife and people. The initiative brings together a diverse network of organizations across this transboundary area, led by a core group of more than 20 public agencies and NGOs. SCI grew out of the regional scale science of Two Countries, One Forest which identified “no regrets” habitat linkages that are essential for keeping this region functionally connected. SCI has since conducted finer-scale modeling within each of those linkages to identify likely pathways for wildlife movement and priority areas for conservation action – habitat “stepping stones” and pinchpoints, critical road segments, communities with key forested areas. SCI partners deploy a multi-faceted conservation approach of place-based work and regional strategies to sustain landscape connectivity in these areas, including land protection, land use planning technical assistance, road barrier mitigation, policy work, and community outreach and engagement. This presentation will describe SCI’s innovative approach to translating science into a diverse mix of conservation action at multiple scales – from parcel-specific to ecoregional, and will explore the promise and challenges of building and sustaining a bi-national partnership spanning 5 states, 3 provinces, and 80+ million acres.

Permeable Landscapes for Adaptation to Climate Change

Mark D. Anderson, Melissa Clark — The Nature Conservancy, Eastern Conservation Science Office, Boston MA

**2:00
p.m.**

In response to climate change, species ranges are shifting northward and upslope at rates of 10-20

	<p>km per decade. How do conservationists ensure that the landscape remains permeable enough to allow such large scale movement particularly by populations that disperse slowly? In this spatial study we look at two landscape features that may facilitate permeability. The first, riparian climate corridors are stretches of intact floodplain that cross large temperature gradients. The second, range shift linkages are areas of land where northward and upslope movements become concentrated due to roads and development patterns. We modeled these feature by integrating a downscaled temperature model into a more traditional connectivity analysis. For the riparian climate corridors we created units using a 30 m floodplain model, and ranked the units based on attributes such as the length of their temperature gradients and the degree of canopy cover. For the range shift linkages we used a wall-to-wall CIRCUITSCAPE analysis to examine northward movement patterns through a landscape of variable resistance. The results highlight places that may be regionally important for facilitating adaptation.</p>
<p>2:20 p.m.</p>	<p>Trends in Human-wildlife Interactions as Related to Land Use in Massachusetts <i>Michael Huguenin, Massachusetts Division of Fisheries and Wildlife; Stephen DeStefano, U. S. Geological Survey, Massachusetts Cooperative Fish and Wildlife Research Unit, University of Massachusetts-Amherst</i></p> <p>We conducted a study of human-wildlife interactions in Massachusetts, USA between May 2010 and May 2014. Our objectives were to (1) compile and summarize public-generated reports on human-wildlife interactions across Massachusetts; and (2) investigate patterns in reports of human-wildlife interactions as they relate to landscape composition and configuration variables. We collected unsolicited reports of human-wildlife interaction submitted to the Massachusetts Division of Fisheries and Wildlife (MDFW) through phone calls, emails, and face-to-face communications from the public. We received 5,183 reports from 351 of 351 towns in Massachusetts regarding 107 different wildlife species ranging from moose (<i>Alces alces</i>) to honey bees (<i>Apis mellifera</i>). Bears (<i>Ursus americanus</i>) (659, 13%), coyotes (<i>Canis latrans</i>) (581, 11%), and foxes (<i>Vulpes vulpes</i> and <i>Urocyon cinereoargenteus</i>) (521, 10%) were the most common species reported. Property disturbance/damage was the most common report type (1,391, 27%), concern for the welfare of wildlife was the most common concern type (1,077, 21%). We tested for differences in reporting rates of human-wildlife interactions among seasons (spring, summer, fall, and winter) and among 5 urban-suburban development categories (low, medium-low, medium, medium-high, high). The distribution of total animal report records were greater than expected for spring and for summer and less than expected for fall and for winter. We then conducted multiple regression analyses to examine how total reports of human-wildlife interactions, as well as reports of human and species-specific interactions (bears, coyotes, foxes, deer (<i>Odocoileus virginianus</i>), and birds of prey) related to median home value and landscape composition and configuration.</p>
<p>BREAK 2:40 p.m.</p>	
<p>3:20 p.m.</p>	<p>Genetic analysis of a hybrid zone between Saltmarsh and Nelson's sparrows: implications for conservation <i>Jennifer Walsh and Adrienne I. Kovach, University of New Hampshire</i></p> <p>Hybridization is influential in shaping species dynamics and has many conservation implications. Identifying the spatial extent of a hybrid zone along with patterns of introgression is critical for monitoring hybrid abundance and for predicting how the distribution of hybrids may change over time. We used a suite of genetic markers to test for patterns of asymmetrical introgression and evaluate the geographic extent of a hybrid zone between two tidal marsh birds: Nelson's (<i>Ammodramus nelsoni</i>) and Saltmarsh (<i>A. caudacutus</i>) sparrows. We sampled 286 sparrows from 32 marshes from Maine to Connecticut, with intensive sampling across the putative 208 km hybrid zone. To identify patterns of differential introgression we genotyped all individuals at 12</p>

	<p>neutral and 12 diagnostic microsatellite loci and 5 genes (z-linked, mitochondrial, and nuclear). We used geographic clines to assess the transition from Nelson's to Saltmarsh alleles across the sampling transect and calculated hybrid zone width and center for each marker type. We further evaluated patterns of asymmetrical introgression by comparing clines at individual loci against a multilocus expectation. Markers under stronger selection produced the narrowest estimates for hybrid zone width (299 km for z-linked markers) and neutral markers provided the widest estimates (470 km). Across all markers, the center of the hybrid zone was consistently estimated to occur near Yarmouth, Maine. Widespread admixture outside of the currently hypothesized hybrid zone suggests that extensive backcrossing and dispersal likely contribute to the spread of introgressed alleles well beyond the geographic limits of the pure species, especially at the southern extent. These findings suggest either an expansion of the hybrid zone or a greater prevalence of introgression than previously suspected.</p>
<p>3:40 p.m.</p>	<p>Monitoring Common Tern and Roseate Tern Nesting Habitat <i>Kevin Rogers, Peter Paton — Department of Natural Resources Science, University of Rhode Island</i></p> <p>Tern nesting-colony managers throughout New England are implementing various habitat management strategies to enhance productivity for both Roseate (<i>Sterna dougallii</i>) and Common Tern (<i>S. hirundo</i>). We are developing rapid assessment protocols that will allow colony managers to be able to assess the effectiveness of their habitat treatments. We used digital photographs to quantify habitat characteristics at three spatial scales (nest, productivity plot, and island-wide) using imagery from a variety of platforms. During 2014, we assessed habitats at six colonies (Great Gull, Falkner, Bird, Ram, Monomoy, and Penikese). We used ImageJ software to quantify vegetation coverage at nests (n = 376) and productivity plots (n = 48), and documented distinct differences between Common and Roseate Terns. We also explored the use of UAVs after the nesting season to collect 2D and 3D data on an island-wide scale, and the potential disturbance terns will be discussed.</p>
<p>4:00 p.m.</p>	<p>Effects of disturbance on staging roseate terns (<i>Sterna dougallii</i>) in the Cape Cod National Seashore <i>Melissa Althouse, Jonathan Cohen, Ph.D. — State University of New York, College of Environmental Science and Forestry</i></p> <p>Despite ongoing management efforts at breeding colony sites, the federally-endangered Northwest Atlantic breeding population of roseate terns (<i>Sterna dougallii</i>) (ROST) has declined more than 20% since 2000. The results of a 20-year study of adult survival strongly suggested that post-fledging survival during the first year of life could be a major factor limiting population recovery and driving the decline, and that over 90% of the population stages in and around Cape Cod, MA in the fall. The purpose of this research is to (1) examine geographic and temporal variation in the use of staging sites at Cape Cod National Seashore (CCNS) by ROST, (2) quantify rates and causes of naturally-occurring and human-related disturbances, and (3) document effects that disturbances may have on the behavior of mixed species flocks of common terns (<i>S. hirundo</i>) (COTE) and ROST, and their use of CCNS staging areas. Preliminary results indicate that ROST flocks are subject to frequent flushing by human activity at most sites within the CCNS. We will present a comparison of time-activity budgets among sites with varying disturbance levels, including reference sites outside of CCNS. Flock responses varied significantly based on disturbance source type (natural or anthropogenic) and distance to the disturbance. These results will inform management actions that minimize and mitigate disturbance.</p>
<p>4:20 p.m.</p>	<p>Common loon chick translocation and captive rearing: 2014 Minnesota pilot study <i>Michelle Kneeland, Dave Evers, Jim Paruk — Biodiversity Research Institute; Mark Pokras,</i></p>

Tufts Cummings School of Veterinary Medicine; Nina Schoch, Kristin Kovach, Ginger Stout — Biodiversity Research Institute

Avian chick translocation and captive rearing has been implemented as an adjunctive method to aid the restoration of many species to their former ranges. Common loons are a threatened species in the western United States, and there is concern about the future long-term stability of the population. Because loons are long-lived and slow to reproduce and colonize new areas, chick translocation may be a viable method to restore loons to areas of their former breeding range. Results of a 2014 pilot loon chick translocation project conducted in Minnesota will be reviewed. Five common loon chicks at 6-10 weeks of age were translocated from northern Minnesota lakes to a rearing facility located on Fish Lake in southern Minnesota, just beyond the current breeding range. Chicks were reared in captivity on the lake until able to forage and survive independently, and then soft released onto the lake. Chicks were then banded and tracked via VHF transmitters after fledging and departure from the release lake. Long term monitoring will be conducted to determine if translocated chicks return to the release area to establish new breeding territories. This pilot study can serve as a basis for future loon translocation projects in Massachusetts and the western United States.

Evaluating Health Parameters, Disease Presence and Contaminants in a Multiregional Health Assessment of Common Loons (*Gavia immer*)

Michelle Kneeland, Virginia Stout, Nina Schoch — Biodiversity Research Institute; Mark Pokras, Cummings School of Veterinary Medicine at Tufts University; David Evers, Biodiversity Research Institute

4:40
p.m.

The summer of 2014 began a four year collaborative Common Loons (*Gavia immer*) health assessment across North America involving multiple non-profit organizations, state fish and wildlife agencies, and universities. In the first year of this study, samples were collected from 170 loons from four regions across the continent, including the Northeast, (Maine, Massachusetts, New Hampshire, and New York), Midwest (Minnesota), and West (Wyoming, Montana, British Columbia, and Saskatchewan). The goal of the study is to establish a comprehensive health assessment of the Common Loon population across these regions. Selected health parameters were chosen to provide an understanding of (1) the overall general health condition; (2) exposure to contaminants; and (3) the local and regional population composition and variability of the birds exposed to a contaminant. The general health parameter analyses included complete blood count, blood chemistries, packed cell volume, blood lactate, stable isotopes, and genetic profiling. The health parameters for disease presence included aspergillosis antigen, hemoparasites, avian influenza virus, bornavirus, and tick diseases. Toxicology analyses included mercury, heavy metals, persistent organic pollutants, lead, and cyanotoxins. The results of this study will 1) provide vital baseline health data on Common Loons, 2) quantify exposure to environmental contaminants and biotoxins and assess the resulting health impacts, and 3) measure exposure and shedding of important viral diseases of conservation and public health concern. This information will help 4) guide and prioritize loon conservation efforts across the continent and 5) provide published loon health parameters for wildlife veterinarians and rehabilitators.