NEAFWA ABSTRACT ARCHIVES: 2014 Wildlife Sessions

Birds - General Session 1

Monday, April 14, 2014
10:30 am - 5:00 pm

10:30 am – 10:50 am	**Volunteer Adopt-a-Colony Program Provides Insight into Maine's Great Blue Heron Breeding Population** *Danielle E. D'Auria, Wildlife Division, Research and Assessment Section, Maine Department of Inland Fisheries and Wildlife* The great blue heron was designated as a Species of Special Concern in Maine in 2007 due to a decline in breeding pairs along the coast. Little was known about the inland breeding population before 2009 when the Maine Department of Inland Fisheries and Wildlife (MDIFW) ramped up its monitoring efforts by creating the Heron Observation Network (HERON), a volunteer adopt-a-colony program. Through HERON, volunteers across the state monitor known great blue heron colonies during the breeding season, collecting information that helps MDIFW biologists better understand the species abundance and distribution and prioritize future conservation efforts. In 5 years of operation, 150 volunteers have provided data for over 161 colonies across the state. The data collected includes the number of active and inactive nests, number of young per nest, and number of fledglings observed. Operation of a volunteer citizen science program of this scale can be challenging; certain communication and volunteer management strategies proved to be effective, while others did not. While the number of volunteers involved in monitoring is far more than originally anticipated, the colonies monitored each year has varied greatly making it difficult to assess the inland population?s trend. However, the data will prove to be useful for informing a dual-frame sampling aerial survey that will produce a breeding population estimate for the entire state.
10:50 am – 11:10 am	**Estimating occupancy of ring-necked pheasants (Phasianus colchicus) in western New York State** *Laurel Nowak-Boyd, SUNY College of Environmental Science and Forestry; Jonathan B. Cohen, SUNY College of Environmental Science and Forestry* Ring-necked pheasants (Phasianus colchicus) are a popular game species in New York State whose wild-breeding numbers have declined sharply in recent decades. Habitat management by the New York State Department of Environmental Conservation (DEC) to increase the population has been concentrated on a 147,600 hectare focus area in western New York. Monitoring efforts are being refined within this area to predict and measure the effects of management. The DEC began conducting annual road-based crowing surveys in 2011 to obtain relative abundance estimates for male pheasants during the breeding season and to monitor trends between years. However, the relevance of survey results to actual population trends is unknown. The objectives of this study are to estimate occupancy rates and to determine the relationship between occupancy and patch- and landscape- level habitat variables. We surveyed 156 sites during the breeding seasons of 2011-2013 and analyzed data using single-season occupancy models in Program MARK. Average occupancy probabilities in 600-m radius survey plots were 0.35 ?0.06 SE in 2011, 0.40 ? 0.06 SE in 2012, and 0.21? 0.04 SE in 2013. Although it was only significant in 2013, a positive association between occupancy and the proportion of grassy cover at a survey site was evident in all years, suggesting that current habitat management efforts to increase grassland cover should benefit the pheasant population. The continuation of surveys by the DEC will further elucidate trends in relation to habitat

	variables and help improve habitat management planning to increase the pheasant population in New York.
11:10 am – 11:30 am	**Habitat Preferences and Survival of Nesting Wood Duck Hens and Broods at Great Swamp National Wildlife Refuge, New Jersey** *Megan Spindler, Department of Natural Resources and Biology at Frostburg State University, Frostburg, Maryland, USA; Frank Ammer, Department of Natural Resources and Biology at Frostburg State University, Frostburg, Maryland, USA; Dorothy Fecske, Great Swamp National Wildlife Refuge, Basking Ridge, New Jersey, USA; Thomas Serfass, Department of Natural Resources and Biology at Frostburg State University, Frostburg, Maryland, USA; Casey Wagnon, Department of Natural Resources and Biology at Frostburg State University, Frostburg, Maryland, USA* Established in 1960, the 3,156.5 hectare Great Swamp National Wildlife Refuge (Refuge), located 41.8 km miles west of New York City, serves as important wetland habitat for migrating and breeding waterfowl in an otherwise highly-developed landscape. The Refuge maintains 5 human-made impoundments for wetland habitat and has had an active wood duck (Aix sponsa) nest box program since the 1960s. The number of wood ducks banded on the Refuge in late summer has steadily decreased from 2004 to present ($R2 = 0.255$) as well as the number of Wood Ducks hatching broods in nest boxes ($R2 = 0.324$). However, the number of Wood Ducks initiating, but not completing nests, increased ($R2 = 0.421$) during that period, suggesting a possible increase in predation on nesting females. The purpose of our study is to assess the survival of Wood Duck hens and their broods, and to document Wood Duck habitat preferences during the brood-rearing period, as part of a larger study to evaluate each impoundments ecological contribution to waterfowl. The 2013 field season?s methods included conducting 50 m radius point count bird surveys on each impoundment, vegetation surveys at each point, and brood counts. Wood Ducks were documented more than any other waterfowl species during point counts and brood counts. Plans for the 2014 field season include monitoring 10-20 female Wood Ducks fitted with radio transmitters and continuing brood counts. Findings from this study will assist the Refuge in developing management strategies to maximize each impoundments ecological contribution at a landscape scale.
11:30 am – 11:50 am	**A Comparison of Hemlock Woolly Adelgid Infestation Levels and Acadian Flycatcher Reproductive Success in the Delaware Water Gap National Recreation Area and Delaware State Forest** *Megan Napoli and Dr. Terry Master, East Stroudsburg University* The Eastern Hemlock (Tsuga canadensis) is an ecologically important component of Northeastern Pennsylvania forests that have become threatened by the Hemlock Woolly Adelgid (Adelges tsugae), an invasive aphid-like insect from Japan. The Acadian Flycatcher (Empidonax virescens), is a strongly hemlock-dependent species whose nesting success is being compared across infestation levels found in two hemlock-dominated habitats, ravines with steep sides and fast flowing streams and benches characterized by flat flood plains with meandering streams. Reproductive metrics, including nesting success, pair density, hemlock preference as a nesting substrate and HWA infestation level were measured. A comparison with a previous study in 2001/02 for two of our study sites showed no significant difference in nesting success for either stream (Chisq=1.235, p<0.267), (Chisq=2.935, p<0.087). In the current study, benches had 32 (59%) of all nests located, with 22 (69%) successfully fledging young. Ravine sites had 22 (41%) of all nests, with 19 (83%) of nests successfully fledging young. Nesting success between benches and ravines was not significantly different

(Chisq=2.213, p<0.14). An analysis of Acadian Flycatcher reproductive success across adelgid infestation levels showed that 61% of nests in heavily to moderately infested trees were successful. In low to non-infested trees, 11% of nests were successful and 9% failed. Nesting success across infestation levels were not significantly different (Chisq=0.245, p<0.452). These are preliminary results with an additional field season scheduled for 2014. If cost effective control methods useful at the landscape scale are developed to combat Hemlock Woolly Adelgid infestations, it would be logical to start with the most productive hemlock habitat type. The Acadian Flycatcher may prove to be a useful bioindicator for comparing habitat productivity.

BREAK 11:50 am - 1:30 pm

Birds - General Session 2

1:30 pm – 1:50 pm	**Assessing Golden-winged Warbler Response to NRCS Working Lands for Wildlife Effort in the Appalachian Mountains** *D. McNeil, Indiana University of Pennsylvania; J. Larkin1, Indiana University of Pennsylvania; M. Bakermans, Indiana University of Pennsylvania; P. Wood, West Virginia University; K. Aldinger, West Virginia University; D. Buehler, University of Tennessee; J. Lehman, University of Tennessee; C. Smalling, Appalachian State University; A. Tisdale, Appalachian State University; and J. Jones, Appalachian State University* The Golden-winged Warbler (Vermivora chrysoptera; GWWA) is a migratory songbird that breeds in early successional habitats imbedded in forest-dominated landscapes. Populations of this species have experienced significant declines over the past 50 years. Recent development of a species-specific conservation plan, habitat management guidelines, and identification of conservation focal areas were critical first steps toward the recovery of GWWA breeding populations. We are now faced with the challenges of implementing range-wide efforts to increase the quantity and quality of breeding habitat. The GWWA is one of 7 focal species targeted for habitat management on private lands through the Natural Resource Conservation Service?s (NRCS) Working Lands for Wildlife effort (WLFW). Beginning in 2012, we initiated a monitoring project to evaluate GWWA response to habitat created via conservation practices associated with NRCS-WLFW in NC, PA, TN, and WV. We compared GWWA nesting success and density among 4 NRCS management practices: timber harvest, prescribed grazing, prescribed fire, and brush management. During the 2012 and 2013 field seasons, we conducted 114 and 169 point-counts, territory-mapped 196 and 213 males, and monitored 72 and 129 nests, respectively. We banded 326 GWWA, 13 Blue-winged Warblers, and 51 hybrids over this same period. GWWA nest success varied across study areas and ranged from 33.33%-90.91% with an average study-wide nest success rate of 51.52%. These results and those associated with conservation practice ?based comparisons will be discussed. Ultimately, this research will provide a foundation to reliably evaluate the NRCS-WLFW contribution toward achieving regional GWWA breeding habitat and population goals.
1:50 pm – 2:10 pm	**Habitat Use by Six Obligate Shrubland Bird Species Along Powerline Rights-of-Way in the Champlain Valley, VT** *Christine Peterson, University of Vermont; Allan Strong, University of Vermont; Mark LaBarr, Audubon Vermont; Margaret Fowle, Audubon Vermont* Wildlife species that rely on early successional habitat are showing long-term region-wide declines, including songbirds such as Eastern Towhee (Pipilo erythrophthalmus), Field Sparrow (Spizella pusilla), Prairie Warbler (Setophaga discolor), Blue-winged Warbler (Vermivora pinus), Golden-winged Warbler (Vermivora chrysoptera), and

	Brown Thrasher (Toxostoma rufum). All 6 of these species are listed as Species of Greatest Conservation Need on 3 or more of the New England state?s Wildlife Action Plans and the Golden-winged Warbler is currently under review for federal listing. In areas where vegetation structure is actively maintained in early successional stages, such as powerline rights-of-way (ROWs), there is an opportunity to provide habitat for these species over long time frames. This study focuses on the habitat use of these early successional bird species in the Champlain Valley in Vermont along powerline ROWs. Thirty-four sites determined to include potential suitable habitat were established along ROWs. At each site during the breeding season, trained citizen scientist volunteers used a spot-mapping technique to document species distribution patterns along transects at all sites. Where focal species were encountered, vegetation cover types were recorded every 20 meters. Model selection and multimodel inference were run for each species including additive and interactive model combinations of landcover covariates where AICc scores were used to rank the models. Results indicated that the brush*grass model displayed the best fit with Eastern Towhee and Prairie and Blue-winged warbler abundances (all $p<0.05$). The brush*herbaceous model showed the best fit with Field Sparrow abundance ($p<0.05$). The wetland+grass model ($p<0.01$) and the brush*grass model ($p<0.001$) both fit Golden-winged Warbler abundance, and the herbaceous cover model ($p<0.05$) provided the best fit for Brown Thrasher abundance. The findings from this study will help determine species-specific habitat use to improve management practices that could benefit these declining species.
2:10 pm - 2:30 pm	**Physiological condition and stopover feeding and roosting behavior in migratory shorebirds, in a critically important estuarine environment.** *Sean Rune, UMaine; Rebecca Holberton, UMaine; Lindsay Tudor, MDIF&W* The Gulf of Maine is an important flyway for migratory shorebirds, and provides important stopover habitat, particularly during fall migration. The estuarine environments of the Downeast region are internationally recognized for their importance in this regard. We collected spatial bird movement data using radio telemetry techniques, and also collected biometric data. We installed two automated radio-telemetry stations at the outlets of the Pleasant and Harrington Rivers. These stations consisted of a tower with fixed antennas and an automated telemetry sensor, which continuously recorded detections from VHF transmitter tags. Between 15 August and 15 September, 2013, we captured 95 Semipalmated Sandpipers (Calidris pusilla, SESA hereafter), 6 Least Sandpipers (C. minutilla, LESA), and 7 Semipalmated Plovers (Charadrius semipalmatus, SEPL). We recorded morphological and physiological measurements, and attached radio-transmitter ?nano-tags? to 34 individuals (30 SESA, 2 LESA, 2 SEPL). 32 birds were subsequently detected, with a combined total of 91,678 detections. The mean post-deployment detection period for SESA (n=30) was 14.82 days ? 1.31 SEM. One LESA was detected for 17.97 days, and one SEPL for 22.85 days. On average, juvenile SESA were detected for 52.2% longer post-capture than adults ($p=0.012$, Welch's T-test). We found a negative covariance between size-corrected body mass and detection period ($p=0.002$, least-squares regression), indicating that birds in poorer condition stayed longer in the study site. We will also report some preliminary results from physiological analyses of blood samples collected at capture. These data are useful for informing methodology for ongoing shorebird monitoring programs, and habitat management decisions.
2:30 pm - 2:50 pm	**Using Seabirds to Track Ecosystem Change in the Gulf of Maine** *Linda Welch, Sara Williams, Michael Langlois, and Christa DeRaspe, Maine Coastal Islands NWR, USFWS*

For the past 30 years, Maine Coastal Islands NWR (MCINWR), National Audubon Society, and Maine Department of Inland Fisheries and Wildlife have documented annual population levels, productivity rates, diet composition and feeding rates on 11 managed seabird colonies in Maine. While extensive data has been collected at the colonies, we know very little about the at-sea ecology of birds in the Gulf of Maine. While seabird must return to land to raise their young, they spend the majority of their time at sea foraging for themselves or their chicks. As a result, seabirds are intimately linked to physical and biological characteristics of marine ecosystems. Seabirds need persistent aggregations of prey to be located within commuting distance of their breeding colonies. Recently, seabird managers have observed what appear to be significant changes in forage fish abundance and availability for breeding seabirds. Several colonies have abandoned or experienced complete reproductive failure due to lack of available forage fish. Seabirds are more easily observed, counted, and studied than other marine organisms and changes in ecosystem function will be evident in these upper trophic level predators. MCINWR has begun using satellite tags and coded radio tags to try and determine where the birds are foraging, and what habitat characteristics are associated with those foraging areas. We believe that integrating our monitoring efforts at the breeding colonies, our remote tracking studies, and ongoing at-sea monitoring efforts will demonstrate that seabirds are a vital tool for understanding change within the Gulf of Maine ecosystem.

BREAK 2:50 pm - 3:20 pm

Forest Birds

Using Louisiana Waterthrush (Parkesia motacilla) and Insect Biodiversity to Gauge Productivity in Two Hemock Habitats in Northeastern Pennsylvania
Barnes, Katie B., East Stroudsburg University graduate student; Master, Terry L., Ph.D., Professor of Biological Sciences, East Stroudsburg University

Barnes, K.B.*, T.L. Master. 2012-2013. East Stroudsburg University, Department of Biological Sciences, East Stroudsburg, PA 18301. Using Louisiana Waterthrush (Parkesia motacilla) and Insect Biodiversity to Gauge Productivity in Two Hemlock Habitats in Northeastern Pennsylvania?Eastern Hemlock (Tsuga canadensis) trees are declining as a result of the introduced insect pest, the Hemlock Woolly Adelgid (Adelges tsugae). The threat of losing hemlock habitat and its unique biodiversity has become a concern due to ineffective and costly pest control methods. We compared the biological productivity of two hemlock habitats; headwater ravines with steep gradients and fast flowing streams, and benches where streams meander across flat floodplains. Previous studies indicate the Louisiana Waterthrush (Parkesia motacilla) to be a robust bioindicator of headwater stream ecological integrity. We quantified waterthrush reproductive metrics, foraging behavior, and habitat use on all occupied territories (n=49) to compare productivity among two bench and two ravines sites. Insect diversity and abundance data were collected in order to investigate potential correlation between insect abundance peaks and nesting activity periods. It was found that mayflies, stoneflies, and caddisflies, collectively known as EPT and favored by waterthrushes, dominated the insect taxa on all streams. The insect phenology data indicates peaks of EPT abundances at various time intervals which may suggest a correlation with peaks in waterthrush nesting activity. Louisiana Waterthrush breeding densities were greater on bench sites than ravine sites but the differences were not significant. In 2012, a total of 30 waterthrush nests were found on all streams; 10 out of 30 nests were impacted by predation with high predation on both ravine sites (n=8). In 2013, 22 waterthrush nests were found; 6 were impacted by predation but occurred on all streams. Greater productivity (number of nestlings fledged) was found on bench sites (n=89) compared to ravine sites (n=36).

3:40 pm - 4:00 pm	**Spruce Grouse Breeding Season Patch Occupancy and Home Range Comparisons Across Forest Management Treatments in Maine** *Stephen Dunham, Department of Wildlife Ecology, University of Maine; Daniel Harrison, Department of Wildlife Ecology, University of Maine* Spruce grouse (Falcipennis canadensis) are a medium-sized species of grouse dependent on conifer-dominated forests. Although abundant across Canada and Alaska, their range intersects only the northern edge of the contiguous United States where populations are rare or declining. This area includes the Acadian forests of the Northeast, where spruce grouse are officially designated as ?state endangered? in Vermont and New York, and are ?a species of special concern: near-threatened? in New Hampshire. Although there is no hunting season on the species in Maine, little else is known about their current status. Because commercially managed forests represent > 10 million acres in Maine, forest harvest practices are likely to influence spruce grouse habitat. This study presents patterns of breeding season patch occupancy and brood rearing home range characteristics among stands representing various forest conditions. During the 2012 and 2013 breeding seasons (May-June) we conducted repeated call-back surveys in 28 stands representing five different forest conditions (mature reference sites, regenerating clearcuts, two ages of pre-commercially thinned stands, and selection harvests), and we captured and individually marked 35 adult males grouse during surveys. Additional surveys to locate broods were conducted within 30 stands, and a total of 31 female grouse were captured, of which 26 were equipped with necklace mounted radio transmitters to monitor habitat use, movements, survival, and reproductive success. Vegetation characteristics were measured within surveyed stands and vegetation structure was measured at 20 individual radio locations verified for each of 14 adult females monitored in 2012. We calculated home range characteristics for 22 females for which we obtained ?28 locations. Results comparing patch occupancy rates and home range characteristics across five forest management treatments will be presented.
4:00 pm - 4:20 pm	**Predicting Effects of Future Human Population Growth and Development on a Territorial Forest Songbird: Small Declines in Occupancy Equates to Large Declines in Landscape Carrying Capacity** *Michelle L. Brown, Vermont Cooperative Fish and Wildlife Research Unit; Therese M. Donovan, U.S.G.S., Vermont Cooperative Fish and Wildlife Research Unit; Gregory S. Warrington, University of Vermont; W. Scott Schwenk, Vermont Cooperative Fish and Wildlife Research Unit; David M. Theobald, Colorado State University* Projected increases in human population growth are expected to increase forest loss and fragmentation in the next century at the expense of forest-dwelling wildlife species. In the face of increased development, managers need a spatial quantitative metric to inform decisions that benefit wildlife. We used maximum clique analysis to calculate the landscape carrying capacity, N_k, across the northeastern states of Vermont, New Hampshire, and Massachusetts, USA for the forest-dependent Ovenbird (Seiurus aurocapilla). We classified the year 2000 landscape into four land cover classes based on human housing density: urban, suburban, exurban, and rural development. We sampled each land cover class and estimated Ovenbird N_k from occupancy probability maps for the years 2000 and 2050. The forecasted occupancy maps represented landscape conditions in the year 2050 derived from spatially-explicit growth models. In response to human population growth and development, N_k was predicted to decrease 44% in the landscape classified as exurban development, 25% in urban and suburban development, and 14% in rural development. These decreases far exceeded the decreases in occupancy probabilities that ranged between 3% and 5% across the same sampled sites. Maximum

	clique analysis is a tool that can be used to estimate a species population metric, Nk, and provide decision-makers with straightforward information to inform decisions and communicate with stakeholders.
4:20 pm - 4:40 pm	**Predicting Impacts of Future Human Population Growth and Development on Occupancy Rates of Forest-Dependent Birds** *Michelle L. Brown, Vermont Cooperative Fish and Wildlife Research Unit; Therese M. Donovan, U.S.G.S., Vermont Cooperative Fish and Wildlife Research Unit; W. Scott Schwenk, Vermont Cooperative Fish and Wildlife Research Unit; David M. Theobald, Colorado State University* Forest loss and fragmentation are among the largest threats to forest-dwelling wildlife species today, and projected increases in human population growth are expected to increase these threats in the next century. We combined spatially-explicit growth models with wildlife distribution models to predict the effects of human development on 5 forest-dependent bird species in Vermont, New Hampshire, and Massachusetts. We used single-species occupancy models to derive the probability of occupancy for each species across the study area in the years 2000 and 2050. Over half a million new housing units were predicted to be added to the landscape. The maximum change in housing density was nearly 30 houses per hectare; however, 30% of the towns in the study area were projected to add less than 1 housing unit per hectare. In the face of predicted human growth, the overall occupancy of each species decreased by as much as 38% (ranging from 19% to 38%) in the year 2050. These declines were greater outside of protected areas than within protected lands. Ninety-seven percent of towns experienced some decline in species occupancy within their borders, highlighting the value of spatially-explicit models. The mean decrease in occupancy probability within towns ranged from 3% for hairy woodpecker to 8% for ovenbird and hermit thrush. Reductions in occupancy probability occurred on the perimeters of cities and towns where exurban development is predicted to increase in the study area. This spatial approach to wildlife planning provides data to evaluate trade-offs between development scenarios and forest-dependent species.
4:40 pm - 5:00 pm	**The effects of forest stand improvement practices on forest breeding avian occupancy and abundance in Vermont.** *David T. Rankin, University of New England; Noah G. Perlut, University of New England* Vermont's forest was cleared during settlement, but has largely been allowed to regenerate for the last 100 years. Subsequently, much of Vermont is covered in even-age young forest with little structural diversity and poor growing stock. The Vermont Natural Resource Conservation Service, in conjunction with Audubon Vermont and Vermont Department of Forests, Parks and Recreation, has implemented a forest stand improvement initiative to improve timber quality while increasing habitat diversity for forest breeding songbirds. To evaluate the effectiveness of this program in increasing avian habitat, we used point counts to survey breeding bird communities of harvested and control sites one year before and one to three years after treatment. Occupancy and abundance estimates for 23 species were derived using Program MARK (v. 6.2). Harvesting resulted in an 11.5% decrease in basal area, an 8% decrease in canopy and a 296% increase in piles of woody debris per acre. Post-harvest, occupancy of three songbird species increased significantly—Chestnut-sided Warbler (Setophaga pensylvanica), Eastern Wood-Pewee (Contopus virens) and Mourning Warbler (Geothlypis Philadelphia)—while occupancy of one species—Blackburnian Warbler (Setophaga fusca)—decreased. Three species were significantly more abundant at treated site—Dark-eyed Junco (Junco hyemalis), Rose-breasted Grosbeak (Pheucticus

ludovicianus) and Yellow-bellied Sapsucker (Sphyrapicus varius)—while two species were less abundant—Black-capped Chickadee (Poecile atricapillus) and Hermit Thrush (Catharus guttatus). Overall, our study indicates that this timber stand improvement program has a slight but mainly positive impact on forest breeding bird abundance and site occupancy, however further study is needed to determine the long term effects of forest stand improvements.

Avian Disease

Monday, April 14, 2014
10:30 am - 5:00 pm

10:30 am – 10:50 am	**A Collaborative Investigation of an Emerging Disease Issue in the Northeast; Wellfleet Bay Virus** *Chris Dwyer, US Fish & Wildlife Service; Randy Mickley, USDA-APHIS-Wildlife Services; Dr. Jennifer Ballard, Southeastern Wildlife Disease Study; Dr. Andrew Allison, Cornell University; Brad Allen, ME Department of Inland Fisheries & Wildlife; H. Heusmann, MA Division of Fisheries & Wildlife; Jorge Ayub, MA Department of Conservation & Recreation; Dr. Samantha Gibbs, US Fish & Wildlife Service; Dr. Julie Ellis, Tufts Cummings School of Veterinary Medicine* Various agencies are tasked with some portion of wildlife resource management, but with ever more constrained budgets, and lack of available personnel, combined with the need for specialized field equipment and lab tests, no single agency can easily manage the scope of extensive field investigations that encompass large geographic areas. In Massachusetts, such a collaborative wildlife disease investigation has been underway for several years involving common eiders (Somateria mollissima). Die-offs of these sea ducks have been occurring annually, affecting an increasing number of common eiders on Cape Cod beaches since at least 2006. In 2010 this international multi-agency investigation discovered a new virus, Wellfleet Bay Virus, which was named after the location where it was first detected. Cooperative funding from the US Fish & Wildlife Service?s Avian Health & Disease Program has thus far enabled the collection of several thousand biological samples, hundreds of necropsies, viral transmission studies, genetics studies, and a satellite telemetry study of the affected common eider population. More than eighteen agencies/institutions have taken part in aiding this investigation to understand the potential impacts of this virus and implications for common eider management decisions. This on-going wildlife disease investigation is a model for interagency collaboration.
10:50 am – 11:10 am	**Serosurvey for eastern equine encephalitis virus (EEEV) antibody in passerine birds in Maine** *Elias SP, Maine Medical Center Research Institute; Keenan PC, Biodiversity Research Institute; Lubelczyk CB, Maine Medical Center Research Institute; Morris SR, Canisius College; Evers DC, Biodiversity Research Institute; Smith RP, Maine Medical Center Research Institute* Eastern equine encephalitis virus (EEEv) is a mosquito-borne disease often fatal for humans, livestock, and some wildlife. Since 2001 EEEv was thought confined to southwestern Maine, but the first epizootic outbreak in 2009--killing horses and pheasants--included central Maine foci. Serosurveys since 2009 revealed statewide distribution of EEEv antibodies in deer, moose, and turkeys. EEEv is perpetuated in an enzootic cycle involving ornithophilic mosquitoes, primarily

	Culiseta melanura, and passerines associated with freshwater wetlands. EEEv may over-winter in birds and mosquitoes in temperate zone foci, or be re-introduced each spring. Climate models for Maine predict earlier accumulation of degree-day thresholds and wetter summers, which likely will increase mosquito activity and arboviral amplification. Passerines have been tested for EEEv antibody in MA, NY, and NJ. Our objective is to accumulate a long-term dataset on EEEv antibody prevalence in Maine passerines. In a 2012 pilot study we drew 35 blood samples from seven passerine species mist-netted in Cumberland County, Maine. At the U.S. Centers for Disease Control in Fort Collins, CO, the samples were screened for EEE-neutralizing antibodies by plaque neutralization (PRNT) assay and considered positive for EEE antibodies if they neutralized 80% of a challenge dose of ?100 plaque-forming units of EEE-Sindbis chimeric virus. Two (7.1%) were positive (gray catbird, veery). In 2013, supported by the Maine Outdoor Heritage Fund, we collected 183 samples from 14 species at five sites in three counties (test results available February). Ultimately, we hope to predict of timing and locale of arboviral outbreaks in Maine.
11:10 am – 11:30 am	**Health assessments of Common Loons in New York and New Hampshire** *Nina Schoch, Biodiversity Research Institute's Adirondack Center for Loon Conservation; Michelle Kneeland, BioDiversity Research Institute; Mark Pokras, Tufts Cummings School of Veterinary Medicine, BioDiversity Research Institute; Paul P. Calle, Wildlife Conservation Society; Karen Ingerman, Wildlife Conservation Society; Stephanie James, Wildlife Conservation Society, Sand Road Animal Hospital; Harry Vogel, Loon Preservation Committee* Health assessments were conducted on 149 (103 adult and 46 juvenile) Common Loons (Gavia immer) in New York's Adirondack Park from 2003 to 2012, and on 20 adult Common Loons in New Hampshire from 2008 and 2010. Birds were captured using nightlighting and playback techniques. Blood samples were collected from the tibiotarsal vein for complete blood counts (NH: n=20, NY: n=138) and plasma chemistry profiles (NH: n=12, NY: n=30). There was no significant difference between NH and NY loons for packed cell volume (PCV) and white blood cell counts (WBC). For the plasma chemistry parameters, there was also no significant difference between the NH and NY loons for the concentrations of glucose, total protein, blood urea nitrogen, aspartate aminotransferase, calcium, phosphorus, sodium, chloride, globulin, amylase, uric acids, bile acids, and cholesterol. NY loons had significantly higher levels of albumin, albumin/globulin ration, potassium, calcium/phosphorus ration, and creatine phosphokinase. NH loons had a significantly higher sodium/potassium ratio. This study expands upon previously published hematologic reference ranges for Common Loons, finding similar results for PCV, WBC, total protein, and glucose. The establishment of baseline health parameters for loons and other wildlife species will assist in evaluating the physiologic status of individual animals undergoing rehabilitation for contaminant exposure, catastrophic events such as an oil spill, or during a disease outbreak.
11:30 am – 11:50 am	**Managing gulls to reduce fecal coliform bacteria in a municipal drinking water source** *Benjamin Nugent, U.S Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services* Large numbers of ring-billed gulls (Larus delawarensis), herring gulls (Larus argentatus), and greater black-backed gulls (Larus marinus) roost each night on a municipal drinking water source in Maine and have been identified as the primary source of elevated fecal

	coliform bacteria levels. The lake has a resident gull population of approximately 800, while more than 3,000 gulls have been observed during seasonal migration. To alleviate this public health concern, the U.S Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services program implemented an Integrated Wildlife Damage Management program in 2005. The program included the use of pyrotechnics and watercraft to harass gulls as well as shooting to reinforce and enhance the effectiveness of non-lethal methods. Management activities were effective in keeping gulls off of the drinking water source and lowering coliform bacteria levels to within EPA water quality standards. Additionally, the integrated program also involves an ongoing survey in areas surrounding the lake to identify feeding, loafing and roosting areas that may affect gull movement. Information collected from the survey will result in more effective management practices and contribute to the long term goal of reducing gull use on the lake.

BREAK 11:50 am - 1:30 pm

Fish & Wildlife Disease - General

1:30 pm – 1:50 pm	**White-Nose Syndrome: Current Status of the Disease and the Collaborative Response** *Christina J. Kocer, U.S. Fish and Wildlife Service; Jeremy T. H. Coleman, U.S. Fish and Wildlife Service; Jonathan D. Reichard, U.S. Fish and Wildlife Service* White-nose syndrome (WNS) is an infectious disease responsible for decimating hibernating bat populations in eastern North America. Caused by the fungus Pseudogymnoascus destructans, WNS has spread rapidly since its discovery in New York in 2007, and is now present in 22 states and 5 provinces. As of January 2014 seven North American species have been confirmed with the disease and four others have been identified carrying P. destructans. The fungus infects torpid bats and causes severe damage to the integument, resulting in physiological and behavioral impacts, often leading to mortality. Population declines exceeding 90% are routinely documented in affected hibernacula, and are corroborated by direct counts of summer colonies and by acoustic and trapping indices. A national response plan (2011), provides the framework for a comprehensive North American response, and establishes seven working groups to address 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 has provided over $12 million to researchers and state and federal agencies to address WNS. These efforts have lead to advances in our understanding of hibernation physiology, bat population dynamics, disease ecology, and general behavior. Studies of P. destructans have also revealed links to European bat species that appear to be resilient to impacts of the disease. 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.
1:50 pm – 2:10 pm	**Seasonal prevalence of haemogregarine parasites, in the turtles Chrysemys picta, Chelydra serpentina, Sternotherus odoratus, and Trachemys scripta, from Pennsylvania and New Jersey** *Larry Laubach, East Stroudsburg University; Dr. Jane Huffman, East Stroudsburg University* Haemogregarine parasites, vectored by leeches, are commonly found in freshwater turtles. Differences have been noted in infection prevalence and parasitemia between turtle species. In this study, turtles were trapped in hoop traps or fish and crab traps baited with sardines, from eight locations in eastern Pennsylvania and western New Jersey. Trapping

	was conducted in the fall of 2012, spring of 2013, and the fall of 2013. Blood samples were taken from the subcarapacial venous site from four species of turtles; Chrysemys picta, Chelydra serpentina, Sternotherus odoratus, and Trachemys scripta. The prevalence and severity of haemogregarine infection was recorded from the blood smears. The mean number of cells per field of view was determined for that smear and a parasitemia estimate was made. Multiple stages of intraerythrocytic haemogregarine were observed in this study. Parasitemia was characterized as being low, moderate, or heavy. Comparisons on the seasonal prevalence were made as well as changes in parasitemia. Recaptures did occur, allowing the comparison of these values from some individuals.
2:10 pm - 2:30 pm	**Coyotes (Canis latrans) as a Diagnostic Tool to Determine the Presence of Zoonotic Pathogens** *Thomas F. Rounsville Jr., Northeast Wildlife DNA Laboratory, East Stroudsburg University; Jane E. Huffman, Northeast Wildlife DNA Laboratory, East Stroudsburg University; Abdalla A. Aldras, East Stroudsburg University* Within the past 75 years coyotes (Canis latrans?)?? have drastically expanded their range into nearly all available habitats in North America, becoming one of the most successful mammalian predators on the continent. In the eastern United States, coyotes have become the keystone predators in many habitats where significant anthropogenic disturbance has occurred. While coyotes fulfill this ecological role, their longevity and habits as a generalist predator result in interactions with a diversity of prey species and exposure to the diseases that these organisms carry. Analysis of samples collected from coyotes can determine if certain infectious agents, that may be transmissible to humans, are present in a locality. Screening predators for disease is much more effective than reservoir hosts since predators consume many hosts during their lifetimes?greatly increasing the likelihood of exposure. One hundred and eighty one coyote Nobuto blood strip samples collected from 9 states and 50 counties were screened for antibodies to Borrelia burgdorferi, Yersinia pestis, and Francisella tularensis using the enzyme linked immunosorbent assay (ELISA). Positive results, as determined by at least duplicate redundancy, were then verified by the Western Blot technique. The resultant seroprevalence data was then used to generate a range map of localities where the presence of each pathogen was detected.
2:30 pm - 2:50 pm	**Chronic wasting disease surveillance in New York State using weighted risk factor analysis** *Krysten Schuler Cornell University; Arthur Kirsch, New York State Department of Environmental Conservation; Steve Heerkens, New York State Department of Environmental Conservation; Angela Martin, New York State Department of Environmental Conservation; Nicholas Hollingshead, Cornell University; Elizabeth Bunting, Corenll University; Kevin Hynes, New York State Department of Environmental Conservation; Patrick Martin, New York State Department of Environmental Conservation* Surveillance for Chronic wasting disease (CWD) in New York State has been conducted since 2002 with sample targets based on estimated deer densities. In 2005, two captive locations and two wild white-tailed deer tested positive and a 5-year mandatory-testing containment area was established. In 2012 to improve surveillance effectiveness, we transitioned to a weighted surveillance system incorporating additional risk factors for reintroduction of CWD and possible exposure to wild deer. To determine the spatial distribution of potential risk factors, locations of captive cervid farms, taxidermy businesses, and commercial meat processors were mapped. Specific activities were

	determined via interviews of the owners of these businesses or state agriculture veterinarians during which we gathered information on incoming deer or parts, disposal methods, fence quality, testing history, and additional businesses. These interviews provided important insights. For example, importation of captive cervids had increased in the last 5 years, and out-of-state deer carcasses going to processors or taxidermists comprised less than 5% of the total business. Half of carcasses and parts were disposed of in landfills; the remainder used rendering (25%), composting, and pits. Our new surveillance quotas were calculated by a point system apportioning population estimates and the proportion of cumulative risk locations within the county. Higher point quotas were assigned to counties with greater concentrations of high risk activities or areas. Older age class animals, particularly males, were assigned increased weights toward quotas. An interagency CWD prevention plan was developed to address risk factors and educate the public on CWD efforts.
BREAK 2:50 pm - 3:20 pm	

Animal Damage Control

	Managing Nuisance Black Bear complaints in New Hampshire; a model for State and Federal Cooperation *Robert Calvert, NHFG; Carrie Stengel USDA WS; Joshua Janicke, USDA WS; David Allaben, USDA WS* The USDA, APHIS, Wildlife Services (WS) and the New Hampshire Fish and Game Department (NHFG) is a cooperative wildlife damage control program that combines state and federal expertise, resources and personnel to assist the citizens of New Hampshire in assessing, preventing or reducing wildlife damage to agriculture (AG), property, and natural resources (NR), or when wildlife threatens human health and safety (HH&S). When black bear (Ursa americanus) are considered, this cooperative program allows for more efficient program delivery when dealing with a myriad of nuisance black bear conflicts. Since 2007, NH Wildlife Services employs two full-time, seasonal bear technicians to assist NHFG in mitigating bear complaints. These technicians are assigned areas with historically high bear activity, and respond quickly to complainants with technical and or operational assistance. Assistance can take the form of educational information or site visits that provide abatement equipment loans, damage assessment, and trapping and translocation when warranted. WS maintains a database which collects bear complaints through a toll free bear information phone line as well as from field and NHFG staff. Although cyclical in nature, annual bear complaints historically averaged about 21% of all reported wildlife requests to WS. Since 2009 these bear complaints have shown a marked increase and now average 38% of all complaints. Increases in bear complaints are due, in part, to bears cuing in to anthropogenic attractants such as bird feeders, free-range chickens, unsecured dumpsters and trash when there is a shortage of natural foods. Nuisance bear complaints taken by WS are categorized by resource; Ag, property, HH&S and (NR). Since 2006, WS and NHFG combined, fielded an average of 634 (n=5074) black bear conflict calls per year. A breakdown of these calls showed 51% were related to Prop damage; 27% - HH&S; 22% - Ag, and 1% to NR. Further review and analysis of these trends will be identified and discussed by resource and locale.
3:20 pm - 3:40 pm	
3:40 pm - 4:00 pm	**A Snapshot of the Status of the Nuisance Wildlife Control Industry** *Lynn Braband, Cornell University*

	From diverse, often humble, beginnings in the 1980's and 1990's, the for-profit wildlife damage management sector has evolved into a maturing industry. Professional trade groups have developed and partnered with related organizations, such as the National Pest Management Association. Trade journals are being published, and regular training and networking events are being held at state, regional, and national levels. Professional certification programs, frequently with specialized training, have developed. The industry has collaborated with several universities in training, the development of certification/licensing standards and materials, and outreach to the public. A primary example is the recently launched National Wildlife Control Training Program. An increasing number of states have licensing programs specific to nuisance wildlife control. Possible future directions within the industry, including its relationship to the North American Model of Wildlife Conservation, will be discussed.
4:00 pm - 4:20 pm	**Limiting Bird Damage to Fruit Crops in New York: Damage Assessments and Potential Management Strategies for the Future** *Heidi M. Henrichs, Paul D. Curtis, and Jay R. Boulanger. Department of Natural Resources, Cornell University* Bird damage to fruit crops is an enduring and costly issue facing growers. It is necessary to identify more cost-effective ways with which growers can prevent birds foraging on their crops. This project is part of a multi-state study. The primary goal is to provide fruit producers with cost-effective and environmentally-sustainable strategies for bird damage management, based on robust field testing and clearly-identified costs and benefits. We have completed two seasons of field work in central New York State, including damage assessments, as well as bird surveys at 87 sites. Crops included in the study were sweet cherries, Blue Crop blueberries, Honeycrisp apples, and Pinot Noir wine grapes. Crop loss data from 2012 indicated that fruit location, 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 estimated to be 27%. In blueberry plantings, birds were responsible for damaging 22% of the fruit. Honeycrisp apples had an overall average loss of 2%, and 4% of Pinot Noir wine grapes were damaged by birds. During summer 2013, we pilot tested several strategies for deterring birds, including distress-callers, hawk kites, and air dancers, as well as examining the effects of a combination of methods and change in location on technique effectiveness. Preliminary results indicated only the air dancers significantly reduced fruit losses in blueberries. In 2014, further experimental testing will focus on the use of air dancers as possible bird deterrents.
4:20 pm - 4:40 pm	**Wildilfe strikes with military rotary wing aircraft and civil helicopters** *Brian E. Washburn, USDA/APHIS/Wildlife Services National Wildlife Research Center; Paul J. Cisar, US Army Aberdeen Test Center; Travis L. DeVault, USDA/APHIS/Wildlife Services National Wildlife Research Center* Wildlife collisions with civilian and military aircraft pose significant risks and economic losses. Worldwide, wildlife strikes have resulted in the loss of more than 276 human lives and more than 200 military and civil aircraft since 1988. The 4 military services within the U.S. Department of Defense [i.e., U.S Army (ARMY), U.S. Air Force (USAF), U.S. Navy and U.S. Marine Corps (NAVY), and the U. S. Coast Guard (USCG)] and the Federal Aviation Administration (FAA) maintain records regarding wildlife strikes with military rotary wing aircraft and civil helicopters, respectively. No assessment of wildlife strikes to military rotary wing aircraft has been conducted. Our objective was to conduct a comprehensive analysis of data available from all 4 military services and U.S. civil aviation regarding wildlife strikes with rotary wing aircraft and civil helicopters. We

	acquired all available wildlife strike records from all 4 military services and the FAA?s National Wildlife Strike Database. Month (season), time of day, location (on- or off-airfield), and other factors influenced the frequency of wildlife strikes with military rotary wing aircraft and civil helicopters. The frequency of wildlife strikes was highest during fall and lowest number during winter (December and January). Wildlife strikes occurred most frequently when the aircraft were traveling enroute or were engaged in terrain flight. Raptors and vultures were commonly associated with damaging strikes to military and civil rotary wing aircraft. Wildlife strikes to military rotary wing aircraft and civil helicopters during flight operations are both costly and deadly. Our analyses of wildlife strikes to military and civil rotary wing aircraft have shown important patterns within wildlife strike data for flight operations conducted both on airfields and during off-airfield missions.
4:40 pm - 5:00 pm	**Black-tailed jackrabbits at the John F. Kennedy International Airport?** *Brian E. Washburn, USDA/APHIS/Wildlife Services National Wildlife Research Center; Laura A. Francoeur, Port Authority of New York and New Jersey; Glen E. Bernhardt, USDA/APHIS/Wildlife Services National Wildlife Research Center; Jenny E. Mastantuono, USDA/APHIS/Wildlife Services* The natural distribution of black-tailed jackrabbits (Lepus californicus) ranges throughout much of western North America, where they are found in predominantly open habitats, such as deserts, grasslands, and agricultural areas. These hares also occur in New York State, specifically on the airfield at the John F. Kennedy International Airport (JFKIA) in Jamaica, NY; although the specifics of their introduction are unknown. Beyond being interesting from an ecological standpoint, the presence of this jackrabbit population on the airport has negative impacts: (1) they are an introduced species that could spread to other areas of Long Island and New York State, (2) they are struck by aircraft, and (3) they, and more importantly their carcasses from mortality events, can attract wildlife that pose a serious hazard to aviation safety (e.g., raptors). Although very limited wildlife control activities (i.e., lethal removal) of black-tailed jackrabbits occurred prior to 2011, a population reduction program was implemented in 2011 and 2012. In an effort to better understand this insular population of black-tailed jackrabbits, we examined and summarized jackrabbit-aircraft collisions that occurred at JFKIA during 2000-2012 and conducted lagomorph spotlight surveys of the JFKIA airfield during 1999-2012. On average, 5.5 jackrabbits are killed in aircraft collisions at JFKIA each year. Spotlight surveys after the program was implemented demonstrate the relative abundance of black-tailed jackrabbits at JFKIA was reduced by 86%. Prior to the program their relative abundance was 4.4 ($\pm$ 0.41 SE) jackrabbits per mile driven, whereas it was 0.6 ($\pm$ 0.24 SE) after the program was implemented. In addition, the morphometric characteristics of black-tailed jackrabbits struck by aircraft or collected during wildlife control activities at JFKIA were measured and compared to the characteristics of black-tailed jackrabbits within their natural range.

Turtles

Monday, April 14, 2014
10:30 am - 5:00 pm

10:30 am – 10:50 am	**Home Ranges of Eastern Box Turtles at a Large Scale Solar Facility** *Jennifer Higbie, Environmental Protection Division, Brookhaven National Laboratory, and U. S. Geological Survey, Massachusetts Cooperative Fish and Wildlife Research Unit, University of Massachusetts, Amherst; Timothy Green, Ph.D., CWB, Environmental Protection Division, Brookhaven National Laboratory*

	Disturbances and habitat changes from renewable energy facilities can have a large effect on the home ranges of a variety of species and conditions may impact the ability of individuals to utilize the modified environment. To assess the impacts from changes in vegetation, construction, and fragmentation and to better understand how a large scale solar facility influences home range, we conducted a radio-telemetry study on Eastern box turtles (Terrapene carolina carolina) at a 81 hectare solar facility on Long Island, New York. We tracked 38 turtles (7M: 31F) from 2011-13. We estimated minimum convex polygon and fixed kernel density home ranges using Geospatial Modeling Environment to compare home range estimates between impacted and non-impacted turtles. Home ranges varied greatly and were larger for individuals utilizing or immediately adjacent to the solar facility. Turtles showed seasonal site fidelity to areas immediately adjacent to the facility and seasonal movements within the home range.
10:50 am – 11:10 am	**A new perspective on the regional status of wood turtles (Glyptemys insculpta) in the Northeastern States** *Michael T. Jones, Lisabeth L. Willey, and Paul R. Sievert, Massachusetts Cooperative Fish and Wildlife Research Unit, Amherst, MA; Thomas S.B. Akre, Lorien Lemmon, Jeff Dragon, Smithsonian Conservation Biology Institute; Lori Erb, Mid-Atlantic Center for Herpetology & Conservation; Brian Zarate, New Jersey Division of Fish and Wildlife; Michael Marchand, New Hampshire Fish and Game Department; JD Kleopfer, Virginia Department of Game and Inland Fisheries; Derek Yorks, Jonathan Mays, and Phillip deMaynadier, Maine Department of Inland Fisheries; Glenn Johnson, SUNY Potsdam; Lori Johnson, New England Environmental, Inc.; Kathy Gipe, Pennsylvania Fish and Boat Commission; Kieran O'Malley, West Virginia Division of Natural Resources; Scott Angus, Northeast PARC; Barry Wicklow, St. Anselm College; Jay Drasher, Aqua-Terra Environmental Ltd.; Ed Thompson, Maryland Department of Natural Resources; Deanna McCullum, 5th Canadian Division Support Base Gagetown; Angie Ross and Bill Hoffman, NYS Department of Environmental Conservation; J.W. Tamplin, Northern Iowa University; Thomas Pluto, USACE [ret.]; Hank Gruner, Connecticut Science Center; Jenny Dickson, CT DEEP; Chris Raithel, RI DEM* Wood turtles are a riparian species of regional conservation concern and a high-value focal species for landscape-scale planning. Evidence strongly indicates that wood turtles have undergone recent, widespread decline and that many populations are small and isolated. Threats include the fragmentation of riparian habitats as well as elevated mortality from cars, mowers and farm equipment, collection, and predators (from chipmunks to raccoons). From 2011 to 2013 we developed a status assessment and conservation strategy, supported by NEAFWA's Regional Conservation Needs (RCN) program. We amassed corroborated occurrences and built species distribution models (SDMs) from climatic and stream geomorphology data. We undertook a coordinated, pilot survey effort in ten states, evaluated detection protocols, and preliminarily examined the influence of landscape on abundance. Over 50% of SDM stream habitat in the Northeast Region has urbanization and deforestation characteristics similar to survey sites with repeated negative results, and it appears that wood turtle abundance is best explained by these variables at relatively large scales. New Jersey and Maryland appear to have the largest proportion of potentially impaired SDM habitat in the Northeast Region (over 80%). Maine, West Virginia, and New Hampshire appear to support relatively non-impaired SDM habitat. Approximately 25% of corroborated occurrences are >50% protected, but only 14% of SDM streams are >50% protected. Historic occurrences last observed before 1983 have higher potential impairment values (compared with recent observations) based on urbanization and forest cover. The level of regulatory protections provided to wood turtles and critical components of wood turtle upland habitat do not

	appear to correspond to the high level of concern for wood turtle conservation. To avoid further declines, conservation actions will protect remaining, functional populations in high-quality riparian habitats, and respond to opportunities for riparian restoration and population management on protected lands elsewhere in the range.
11:10 am – 11:30 am	**Long distance movements and habitat colonization by spotted turtles in the Albany Pine Bush Preserve, Albany, NY.** *Karl E. Parker, New York State Department of Environmental Conservation* The Albany Pine Bush Preserve encompasses a 1200 ha globally rare inland pitch pine scrub oak barrens community. A small population of spotted turtles, listed as Special Concern in New York, occupies an isolated pine barrens vernal pond within the preserve. As part of a multi-year study of turtle ecology, the movements of 13 turtles were monitored via radio telemetry in 2013. Three males undertook 4 separate long distance upland movements from the vernal pond, all in a northwesterly direction. In late April, 2 turtles made simultaneous movements from the vernal pond. One turtle successfully crossed a major road located 1.0 km from the vernal pond, and continued west for another 2.3 km, where it spent the summer and fall and ultimately entered hibernation. However, the second adult turtle was killed while trying to cross this same road. In late May, a third turtle moved 1.0 km to the edge of the road, but was returned to the vernal pond to avoid mortality. In late July, it made a second movement to the same general area, but after 3 weeks, returned to the vernal pond on its own. During these movements, utilization of 7 different wetlands was documented. These movements shed light on the behaviors and habitats spotted turtles utilize in making long distance movements. They also demonstrate the challenges of managing a highly fragmented preserve for a small and vulnerable rare species with a propensity to wander. Finally, they highlight the value of long-term studies of rare species.
11:30 am – 11:50 am	**Effects of anthropogenic landscape change on characteristics of Blanding?s turtle populations, with implications for regional conservation.** *Lisabeth L. Willey, Michael T. Jones, and Paul R. Sievert, Massachusetts Cooperative Fish and Wildlife Research Unit, University of Massachusetts, Amherst; Michael Marchand, New Hampshire Fish and Game Department; Jonathan Regosin and Lori Erb, Massachusetts Division of Fisheries and Wildlife; Derek Yorks, Phillip deMaynadier, and Jonathan Mays, Maine Department of Inland Fisheries and Wildlife; Angelena M. Ross, New York State Department of Environmental Conservation; Kathy Gipe and Chris Urban, Pennsylvania Fish and Boat Commission; Glenn Johnson, State University of New York Potsdam; Bryan Windmiller, Grassroots Wildlife Conservation; Mark Grgurovic, Swampwalkers Wetland Ecosystem Specialists; Stephanie Koch, Alison Whitlock and Anthony Tur, U.S. Fish and Wildlife Service* Blanding's turtle (Emydoidea blandingii) is a long-lived, semi-terrestrial species of conservation concern throughout its range. Several isolated, disjunct populations occur in the Northeast. These populations are limited in extent and occur in some of the most heavily developed parts of the region. Blanding's turtles are listed as "Endangered" by the IUCN and a Species of Greatest Conservation Need in all five Northeast states in which they occur. Because they require diverse, interconnected wetland and terrestrial habitats across large areas, they are an important umbrella species, and conservation actions targeting Blanding's turtle likely result in protection of many other species. As part of a regional conservation planning effort (supported by the USFWS Competitive SWG program), we developed and implemented a 5-state standardized monitoring protocol. We sampled known Blanding?s turtle populations as well as random, suitable wetland sites

	throughout the region. We used a combination of N-mixture models and spatially explicit capture-recapture methods to evaluate the effects of landscape characteristics (wetland and nesting availability) and anthropogenic drivers (urbanization, impervious surface cover, and road density) on trap results and population estimates. The highest Blanding's turtle abundances are associated with areas of high wetland abundance and diversity and low impervious surface cover and urbanization. We used these results to rank sites across the region, develop a ?conservation network? of high priority Blanding's turtle sites, and make management recommendations at the regional and site level. We are seeking partners in the implementation of the regional conservation plan and feedback on our approach.
BREAK 11:50 am - 1:30 pm
Herpetofauna - General
1:30 pm – 1:50 pm	**Assessing and Mitigating the Effects of Turtle Road Mortality in Maine and Experimental Tests of Tunnel and Barrier Options for Reducing Road Mortality** *Derek Yorks, Maine Department of Inland Fisheries and Wildlife; Dr. Paul R. Sievert, USGS, MA Cooperative Fish and Wildlife Research Unit, Department of Environmental Conservation, University of Massachusetts Amherst; Dr. Phillip deMaynadier, Maine Department of Inland Fisheries and Wildlife* Roadways are a pervasive feature of northeastern landscapes and can be a significant source of mortality for turtles. In Maine, the negative effects of roadways on rare turtle populations are well documented. Efforts to identify relatively unfragmented blocks of turtle habitat are used in prioritizing lands for conservation by Towns and land trusts. Additionally, the Maine Department of Inland Fisheries and Wildlife (MDIFW) is compiling a database of turtle road crossing hotspots in the form of rare species road reports, radio telemetry, active surveys of road segments, and GIS modeling. Subsequent mitigation actions underway or planned include a) cautionary road signage , b) press releases at the start of the migratory season, c) exclusionary fencing, and d) nest site enhancement to divert turtles from traveling across roads. Until recently, little has been known about the design requirements for successful under-road passages, another mitigation tool increasingly promoted for turtles and other wildlife to move safely between bisected habitat patches. At outdoor laboratories, using a factorial experimental design, we examined movements in response to varying light levels, and barrier opacity for painted turtles (Chrysemys picta, n=833), Blanding's turtles (Emydoidea blandingii, n=49), and spotted turtles (Clemmys guttata, n=49). Additionally, we examined tunnel size, tunnel entrance design, and artificial lighting for painted turtles only. All three species responded poorly to a 0% available light treatment. As the amount of natural light transmitted through the tops of tunnels increased, successful completion of the trials increased. Furthermore, turtles generally moved at a slower rate when traveling along a translucent barrier, compared to an opaque one. Our results indicate the importance of designing road passage structures for freshwater turtles that provide adequate tunnel lighting in combination with specific entrance designs that meet the goals of the project.
1:50 pm – 2:10 pm	**Assessing priority amphibian and reptile conservation areas (PARCAs) in the North Atlantic Landscape Conservation Cooperative** *Allison T. Moody, Department of Wildlife Ecology, University of Maine, Orono; Cynthia Loftin, U.S. Geological Survey, Maine Cooperative Fish and Wildlife Research Unit, University of Maine, Orono; Phillip deMaynadier, Maine Department of Inland Fisheries and Wildlife; William Sutton, School of Agriculture, Forest and Environmental Sciences,*

	Clemson University; Kyle Barrett, School of Agriculture, Forest and Environmental Sciences, Clemson University; Priya Nanjappa, Association of Fish and Wildlife Agencies Reptile and amphibian populations are threatened by habitat loss and fragmentation, climate change, pollution, disease, illegal collection, and introduced species. Yet formulating conservation solutions is limited by a lack of information about their population status and distributions. The Priority Amphibian and Reptile Conservation Area (PARCA) project is a national initiative to develop a network of non-regulatory focus areas that contain specialized habitats required by reptiles and amphibians, and that are resilient to climate change. Comprehensive surveys rarely document species distributions across large regions such as the northeastern U.S., and opportunistic observations can be biased towards easily seen or heard species in accessible areas. As a pilot project for the northeastern United States, we used presence-only species distribution models, expert-derived biotic and abiotic variables, and local expert review to identify PARCAs in Maine that host species of global, national, or regional conservation significance, and areas of exceptional diversity. PARCAs with extensive, contiguous habitat that can support viable populations were given extra weight in the prioritization process. We evaluated our models using area under the curve (AUC) metrics and our predicted species distribution models performed well. Generally, we found PARCAs were focused in southern Maine because many priority species are at their northern range limit in the state. Our PARCAs provide a useful tool to raise public awareness and spark voluntary protection by local conservation partners.
2:10 pm - 2:30 pm	**Post-breeding Habitat Use of the Rare Pure-Diploid Blue-spotted Salamander (Ambystoma laterale)** *Kevin J. Ryan, FB Environmental and University of Maine Wildlife Ecology Department; Aram JK Calhoun, University of Maine Wildlife Ecology Department* The pure-diploid Blue-spotted Salamander (Ambystoma laterale) is among the rarest amphibians in the northeastern North America and data on its ecology are sparse. We assessed the movement ecology and terrestrial habitat use of A. laterale using radio- and PIT telemetry. We radio-tracked 22 A. laterale for a median of 54 days (range 6??126 days) in the spring and summer of 2009 and 2010. Using a modified PIT tag reader, we conducted 34 in situ surveys during spring and summer of 2009 through 2011 resulting in 42 relocations. We detected salamanders at a median straight-line distance of 67 m (range 7?281 m) from their breeding wetland. A life zone encompassing 95% of observed salamander movements would extend 152 m from the edge of the breeding wetland. Eighteen radio-tracked salamanders migrated to upland forest, three to a wet meadow, and one to a red maple swamp. Salamanders used upland forest and wet meadow more often than their availability would predict. We recorded habitat data at 10 m and 1 m diameter circular plots centered on animal locations. At the 10 m scale, salamander presence was positively correlated with percent cover of slash and negatively correlated with percent cover of grass, total basal area of trees, and relative humidity. At the 1 m scale, salamander locations had deeper leaf litter and moister soil than random locations. Our results suggest existing, published recommendations for the conservation of vernal pool species are applicable to A. laterale.
2:30 pm - 2:50 pm	**Hibernation ecology of Lithobates sylvaticus in Maine's montane landscape** *Luke A. Groff, Department of Wildlife Ecology, University of Maine; Cynthia S. Loftin, U.S. Geological Survey, Maine Cooperative Fish and Wildlife Research Unit; Aram J.K. Calhoun, Department of Wildlife Ecology, University of Maine*

Overwintering is a critical period for north temperate and boreal amphibians as snowpack, and therefore hibernation, can persist for five or more months. This is especially true for species such as Lithobates sylvaticus (Wood Frog), because hibernation is immediately followed by a short, explosive breeding season. Hibernaculum selection likely affects individual fitness; freeze-thaw events alter energy reserve consumption, prolonged snowpack reduces risks associated with premature hibernaculum exit, and males hibernating closer to breeding sites will have earlier access to females. Amphibians in alpine or boreal ecosystems may benefit from less severe winters and warmer climates, although a reduction in insulative snowpack while temperatures remain below freezing could increase winter mortality. Extensive laboratory research has focused on physiological adaptations and processes associated with the overwintering period; however, few studies have examined the ecological strategies amphibians use to survive hibernation in regions with severe winters. Our research examines interactions between snowpack, temperature, and habitat features as they affect the hibernation ecology of Lithobates sylvaticus in Maine?s Quebec/New England Boundary Mountain Ecoregion, which boasts one of the coldest climates in New England. In particular, our study (1) assesses hibernaculum selection, (2) compares temperature and humidity profiles across strata and locations, and (3) describes the spatial connectivity of these hibernacula with breeding sites and post-breeding habitat.

BREAK 2:50 pm - 3:20 pm

Survival & Genetics

3:20 pm - 3:40 pm	**Genetic Structure of American Black Bears (Ursus americanus) in New Jersey** *Nicole Chinnici, Northeast Wildlife DNA Laboratory East Stroudsburg University; Dr. Jane Huffman, Northeast Wildlife DNA Laboratory East Stroudsburg University; Thomas Rounsville Jr, Northeast Wildlife DNA Laboratory East Stroudsburg University* Black bears in New Jersey are a contiguous population. Over the last 30 years, NJ's black bear population has been increasing and expanding its range southward and eastward from the forested areas of northwestern NJ. The population has grown due to increased black bear habitat. We evaluated aspects of genetic diversity and gene flow for 4 management zones in NJ using genotypic data from 9 microsatellite loci. Measures of genetic diversity were estimated at the individual level, as well as within and between management areas. Average expected heterozygosity, average number of alleles, total number of alleles, number of unique alleles, average variance in number of repeats, and average range in number of repeats were determined from microsatellite data using the program Cervus 3.0. A total of 78 alleles were observed at the 9 microsatellite loci amplified in a multiplex reaction. The degree of variation ranged from 7 to 12 alleles per locus, with an average of 8.67 alleles per population at each locus. Our results indicated that genetic diversity was high in the black bears. Results from STRUCTURE 2.3.4 suggest that NJ black bears represent a panmictic population.
3:40 pm - 4:00 pm	**Trophic Cascade Effects of Deer Overabundance on Connecticut Native Vegetation and Small Mammal Populations** *Megan A. Floyd, University of Connecticut; S.C. Williams, The Connecticut Agricultural Experiment Station; I.M. Ortega, University of Connecticut* Trophic cascade theory is described as the destabilization of one trophic level resulting in the direct and/or indirect disruption of others. One of the most notable impacts on trophic cascades is the top-down effects of apex predators, which can result in increased herbivore abundance and herbivory impacts. The reduction of grass and shrub layers can diminish small mammal habitat, thus reducing populations. Conversely when an apex

	predator is reintroduced, herbivore populations often decrease, reducing consumption of the shrub layer, resulting in an increase in small mammal populations. However, results indicate that disturbed portions of Northeast ecosystems harbor invasive plant species, which disrupt the trophic cascade. White-tailed deer have become overabundant in Connecticut. Species such as Japanese barberry are flourishing due to the lack of competition with overbrowsed native species. This study attempted to determine the effects of invasives on trophic cascades by determining small mammal population sizes and survival rates. White-footed mice were trapped in three different locations. At each location, three plots were established; an unmanipulated intact barberry stand, an area where barberry was minimal or absent, and an area where barberry was managed. Trapping occurred from May to August, 2007-2013. In program MARK, population size and survival rates were estimated using POPAN and Cormack Jolly-Seber models, respectively. No significant differences were detected between the three plots at any of the three locations. Therefore, the cascade occurring in the Northeast ecosystem was impeded and had no effect on the small mammal trophic level. This study concluded that there is a distinctive trophic cascade, which could assist in wildlife management development.
4:00 pm - 4:20 pm	**The Use of Genetic Data to Examine Patterns of Fisher Recolonization** *Courtney Nicks, Indiana University of Pennsylvania; Hance Ellington, Indiana University of Pennsylvania; Matt Lovallo, Pennsylvania Game Commission; Jeffery Larkin, Indiana University of Pennsylvania; Kristy Pilgrim, USFS Rocky Mountain Research Station; and Michael Schwartz, USFS Rocky Mountain Research Station* The fisher (Pekania pennanti) has suffered declines throughout its historic distribution and has been regionally extirpated in many areas. Efforts to reestablish fisher populations include the implementation of reintroduction programs. These efforts afford the opportunity for fisher populations to recolonize portions of their native range. As fisher populations are reestablished, gene flow and genetic connectivity are critical for long term persistence. To evaluate the genetic patterns observed in Pennsylvania's reestablished fisher population, this study examined fisher hair and tissue samples collected from hair snared, road-killed, and trapper-killed fisher from 2005-2013. Using 12 microsatellite loci, 155 fisher samples were genotyped and examined. Genetic assignment tests were used to group fisher samples into two distinct source history locations derived from 1) 1969 WV reintroduction and 2) the 1994-1998 northern Pennsylvania reintroduction. This analysis provided evidence of slightly lower genetic variation observed among individuals derived from the WV expansion. All pairwise genetic differences of individuals were plotted and groupings were observed according to the source history. Results indicate that fisher dispersal and recolonization patterns are likely promoted or inhibited by landscape-level features. An additional 100 samples collected during the 2013 fisher trapping season are currently being analyzed and coupled with our existing dataset for future analysis. This dataset will use observed genetic patterns to identify and quantify landscape factors that facilitate or inhibit fisher population expansion throughout the Commonwealth. Ultimately, information from this study will provide a better understanding of factors that influence fisher distribution in Pennsylvania, and help guide fisher management.
4:20 pm - 4:40 pm	**Long-term Analysis of the Factors that Affect First-year and Adult Songbird Survival** *Noah Perlut, University of New England; Allan Strong, University of Vermont* Our understanding of most migratory passerine species' full life-cycle—and therefore our

ability to accurately assess population growth—remains poor. Lack of comprehensive data forces biologists to rely on substantial assumptions when parameterizing population models. One of the most common assumptions has been the 50% rule of survival, where first-year (ϕ_{1st}) survival is modeled as half of adult (ϕ_{adult}) survival. Nested into this assumption is that adult survival and birth rates vary inversely; thus, following the 50% rule, this expectation then inherently transfers to first-year survival as well. To our knowledge, no study has simultaneously assessed the factors that affect first-year and adult survival. Using eleven years of field data, we assessed ϕ_{1st} and ϕ_{adult} for two species of migratory grassland songbirds breeding in agricultural fields in Vermont. Across all years, and Northeast Association of Fish and Wildlife Agencies - Schedule for both species and sexes, ϕ_{1st} and ϕ_{adult} differed by 0.04% to 21.2%; ϕ_{1st} averaged 0.41 (range 0.32-0.58) while ϕ_{adult} averaged 0.47 (range 0.41-0.52). Adult survival, which differed between sexes, was positively affected by increased total reproductive effort, nest success and birthrate. Survival of first-year birds was greater for heavier nestlings that fledged earlier in the breeding season. Taken together, adults that lived longer tended to successfully fledge heavy offspring early in the breeding season. Overall, the processes that affected ϕ_{1st} and ϕ_{adult} differed, and failure to account for these differences has the potential to severely bias population projections.

4:40 pm - 5:00 pm	**Genetic Catalog for Allegheny Woodrat Metapopulations: Identifying conservation concerns and guiding management in Pennsylvania** *Bryan M. Tom, Indiana University of Pennsylvania; Joseph E. Duchamp, Indiana University of Pennsylvania; Timothy J. Smyser, Purdue University; Jeffery L. Larkin, Indiana University of Pennsylvania* Allegheny woodrat (Neotoma magister) populations have experienced significant declines in both abundance and distribution over the last few decades. Several causes for these declines have been identified and they are believed to have compounding effects. Recent advances in the understanding of woodrat ecology have led to management actions capable of ameliorating many of these population threats. Woodrats are highly susceptible to the deleterious effects of genetic drift and inbreeding depression (i.e. low genetic diversity) due to their metapopulation structure, limited dispersal capacity, and the low densities found at occupied habitat sites. We are conducting a state-wide assessment of neutral genetic diversity patterns of the Allegheny woodrat to help guide actions intended to increase genetic diversity and promote the long-term persistence of populations in Pennsylvania. We quantified genetic profiles for 274 individual woodrats sampled in southwestern Pennsylvania from 2007-2009. To expand the spatial extent of this study, we sampled an additional 119 individuals in 2013 from habitat sites across the entire active range of woodrats in Pennsylvania. Subsequent genetic analyses will be combined with existing data and discussed. Our goals are to delineate woodrat metapopulations, identify those metapopulations which contain low genetic diversity, and describe natural patterns of connectivity. Ultimately, this data will help inform strategic translocations and introductions from captive breeding colonies to restore genetic diversity at the metapopulation level.
5:00 pm - 5:20 pm	**Wildlife DNA Forensics** *Jane E. Huffman, Northeast Wildlife DNA Laboratory, East Stroudsburg University* Wildlife DNA forensics is concerned with the identification of evidence items in order to determine the species, population, relationship or individual identity of a sample. It has a distinct set of challenges, situated between wildlife conservation research and applied forensic science. Wildlife forensics has benefited from the use of molecular and statistical

techniques used in human forensics. The purpose of any forensic analysis is to provide information or evaluate hypotheses concerning the evidence available. This means that analysis is driven by the questions asked by conservation officers. Individual cases generate individual questions. In wildlife law enforcement the questions asked include: what species is it from, where is it from, who did it come from and was it captive bred? Each of these questions can be answered using a variety of techniques. This presentation will exhibit case studies which represent how those techniques can be utilized.

Monitoring Wildlife Population

Monday, April 14, 2014
10:30 am - 5:00 pm

10:30 am – 10:50 am	**Monitoring the effects of habitat management for the Allegheny Woodrat (Neotoma magister) in Pennsylvania.** *Justin Gross, Indiana University of Pennsylvania, Joseph Duchamp, Jefferey Larkin* Numerous factors are attributed to the continued decline of Allegheny Woodrat (Neotoma magister) populations in Pennsylvania. Of these, habitat degradation can lead to limited food resources and disruption of travel corridors. In recent years, the Pennsylvania Game Commission (PGC) conducted habitat management designed to ameliorate these effects and increase habitat quality at several woodrat sites. To evaluate the effectiveness of PGC management practices, we monitored woodrat survival and abundance at 12 sites (7 controls and 5 treated) before and after habitat manipulation using program MARK. We also quantified several habitat features at each study site pre- and post-treatment to determine whether management activities achieved the desired conditions. Prior to treatment we captured 22 and 20 woodrats at the treated and untreated sites respectively. One year post-treatment we captured 24 and 23 individual woodrats at the treated and controlled sites, respectively. Continued monitoring of woodrat demographics and habitat conditions across these sites will allow for a more thorough evaluation of management and will help further refine management guidelines intended to enhance Allegheny woodrat habitat.
10:50 am – 11:10 am	**Automated acoustic monitoring: reporting survey presence for a northeastern warbler** *Jonathan Katz, Vermont Cooperative Fish and Wildlife Research Unit; Sasha D. Hafner, Hafner Consulting LLC; Therese M. Donovan, U.S.G.S./Vermont Cooperative Fish and Wildlife Research Unit* Inferring species presence from survey results often assumes that the species was perfectly identified, even if imperfectly detected. Traditional monitoring practices use human observers to collect data on species presence, absence, or abundance, but a handful of studies suggest that this assumption is violated to varying degrees by most observers. Using passive automated acoustic monitoring methods - computers that detect and identify distinctive vocalizations in digital recordings - is an attractive means of controlling for interobserver variation by allowing what is essentially a single observer to evaluate surveys from many sites and over many years. Automated acoustic monitoring methods are typically dismissed as monitoring tools due to the higher false positive error rate relative to human observers, but the false positive rate of automated methods is usually expressed as a per song event rate while for human observers it is expressed as a per survey rate. Here we demonstrate a method of using song-type specific template histories and environmental survey covariates to express black-throated green warbler presence at the survey level using the automated detection and classification software monitoR. This strategy allows per event error rates to potentially diminish with each new

	event detected, plus it transforms expression of presence from a binary value to a more useful probability. In our tests this method correctly distinguished black-throated green warbler (Setophaga virens) presence in over 88% of our 52 surveys with few false positive detections.
11:10 am – 11:30 am	**Monitor: an R package for automated acoustic monitoring, tested on two northeastern warblers** *Jonathan Katz, Vermont Cooperative Fish and Wildlife Research Unit; Sasha D. Hafner, Hafner Consulting LLC; Therese M. Donovan, U.S.G.S./Vermont Cooperative Fish and Wildlife Research Unit* Habitat alteration resulting from present climate change and land-use change will likely affect future state parameters of animal populations that dwell in them. Affected parameters are anticipated to include site occupancy and abundance, population range, and phenophase cycles (e.g., arrival dates on breeding grounds for migrant bird species). Detecting these changes will require monitoring many sites for many years, a process that is well suited for an automated system. We developed and tested monitoR, an R package that is designed for long-term, multi-taxa automated passive acoustic monitoring programs. As part of its streamlined workflow monitoR has a direct interface with a user?s MySQL database. We demonstrate that its results can provide reliable site occupancy data, as well as reliable counts of individual song events, by comparing the results from monitoR to those from human observation in the recordings and spectrograms. MonitoR correctly identified presence for black-throated green warbler (Setophaga virens) and ovenbird (Seirus aurocapilla) in 64% and 69% of the surveys using binary point matching, respectively, and 73% and 76% using spectrogram cross-correlation, respectively. Of individual black-throated green warbler song events, 72% of black-throated green warbler songs and 59% of ovenbird songs were identified by binary point matching. Spectrogram cross correlation identified 83% of black-throated green warbler and 66% of ovenbird song events. False positive rates were <1% for song event detection. Our results suggest monitor has high potential benefits for long-term monitoring programs.
11:30 am – 11:50 am	**Do Otter Latrines Act As An Attractant For Other Sympatric Carnivores?** *Casey Wagnon, Frostburg State University; Megan Spindler, Frostburg State University; Thomas Serfass, Frostburg State University; Dorothy Fecske, USFWS, Great Swamp National Wildlife Refuge; Frank Ammer, Frostburg State University* The effectiveness of detecting rare and elusive mammalian carnivores using remote cameras is well documented. Two common approaches used in carnivore camera surveys have been to place cameras perpendicular to roads/game-trails, or to place cameras associated with lures and baits within the surrounding area. Also, camera surveys conducted at river otter (Lontra canadensis) latrines have been a commonly used strategy to monitor otter populations, and may offer a novel approach to detect other carnivores in the surrounding area. A strong odor (often a 'fish-smell') is associated with the accumulation of otter scats and anal secretions amassed at latrines. The strong scent associated with otter latrines may serve as an olfactory attractant to carnivores occupying riparian areas and may therefore function as carnivore-detection 'hotspots'. The purpose of our study was to discern if otter latrines serve as an attractant for other sympatric carnivores at Great Swamp National Wildlife Refuge (GSNWR), Basking Ridge, NJ. For our preliminary assessment, we placed remote cameras at 10 otter latrines for periods ranging from 30 to 225 days and detected 7 out of the 10 documented carnivores occurring at GSNWR. Among these 10 latrines, we detected raccoons (Procyon lotor),

	red fox (Vulpes vulpes), river otters, Virginia opossum (Didelphis virginiana), coyote (Canis latrans), black bear (Ursus americanus), and mink (Mustela vison), respectively at 100%, 90%, 80%, 30%, 20%, 20%, and 10% of the latrine sites. Preliminary results suggest that camera surveys conducted at otter latrines may be effective at detecting other carnivores with home ranges encompassing riparian areas. The second year of our project will compare detection patterns of carnivores at otter latrines to paired, non-latrine sites to determine if our observations were random chance or the result of carnivores being attracted to latrine sites.

BREAK 11:50 am - 1:30 pm

Bat Conservation & Research

	Eastern Small-footed Bat (Myotis Leibii) Ecology at Acadia National Park, Maine *Timothy J. Divoll, Biodiversity Research Institute; Bruce C. Connery, Acadia National Park, National Park Service; Bik Wheeler, Acadia National Park, National Park Service; David G. Buck, Biodiversity Research Institute; Jonathan L. Fiely, Biodiversity Research Institute; Carl J. Anderson, Biodiversity Research Institute; and Dave E. Yates, Biodiversity Research Institute*
1:30 pm – 1:50 pm	Between 2008 and 2012, we captured 166 individual M. leibii foraging on Mount Desert Island at Acadia National Park (ANP) in Maine. Of those banded (n = 155), 11 were recaptured with some of those two years after their initial banding. In addition to mist netting and acoustic surveying our studies included mercury (Hg) analysis, stable isotope (SI) analysis, and radio telemetry to locate roosting sites. M. leibii at ANP appear to maintain a stable population with elevated Hg levels, do not appear to migrate very far, and, in late summer, prefer roosting on top of small mountains under granite rocks in the open on gently sloping granite slabs. Typical maternity roosts remain unknown at this location although compelling data suggest they may utilize a man-made structure. Post-maternity season foraging area requirements were estimated and suggest that this species prefers a mix of heavily wooded forest trails with adjacent open meadows and ponds along with semi-open wetlands. Hibernacula have yet to be discovered here but M. leibii are the first species to be captured in mist nets (April 6) and among the last on the latest date of sampling (September 29), alongside M. lucifugus and M. septentrionalis. Stable isotope analyses show little variation in the M. leibii niche width, slightly more variation in M. septentrionalis, and great variation in the M. lucifugus niche width. Bayesian N-mixing models were used to estimate population size on this coastal island refuge.

	An Assessment of Bat Populations Within the Delaware Water Gap National Recreation Area Following the Emergence of White-Nose Syndrome *Christopher L. Hauer, East Stroudsburg University; Howard P. Whidden, East Stroudsburg University*
1:50 pm – 2:10 pm	We used mist netting, driven acoustic surveys, and emergence counts to assess potential changes in bat populations within the Delaware Water Gap National Recreation Area since the park?s last comprehensive bat survey, performed in 1997-1998. Mist netting in 2013 captured 26 bats and 5 species, with 22 captures (85%) of big brown bat (Eptesicus fuscus), and only 1 each of little brown myotis (Myotis lucifugus), northern long-eared myotis (M. septentrionalis), tricolored bat (Perimyotis subflavus), and eastern red bat (Lasiurus borealis). Similar surveys in 1997-1998 captured 156 bats within the park, including 52 M. lucifugus and 51 M. septentrionalis. We also recorded bat calls along a 68-mile transect using AR125 and AnaBat SD2 acoustic detectors in 2011, 2012, and 2013. The driven acoustic surveys indicate that E. fuscus is the most common and widespread species in the park, followed by L. borealis. Comparatively few calls were

	recorded for Myotis species and P. subflavus. Emergence counts at a maternity colony at Bushkill Outreach (PA) recorded a maximum of 109 (2012) and 295 (2013) emerging M. lucifugus, representing a 90% decline from the 2,500-3,000 individuals that were present in 1997 & 1998. Emergence counts at a barn near Birchenough Pond (NJ) did not show the same extent of decline, but both E. fuscus and M. lucifugus were identified emerging from the barn, suggesting that E. fuscus may have partially displaced the former colony of an estimated 400 M. lucifugus.
2:10 pm - 2:30 pm	**Bat Use of Edge and Interior Habitat in Managed Forest** *Adam J. Mengel, Indiana University of Pennsylvania Biology Department, Joseph E. Duchamp, Indiana University of Pennsylvania Biology Department* The objective of this study was to determine the differences in bat activity levels among two forest treatment types in managed sections of the Delaware State Forest in Pike and Monroe Counties, PA. We sampled wetlands along with two types of upland timber harvest (overstory removals and shelterwood cuts). The average size of overstory removals and shelterwoods was 40.1 and 35.4 hectares, respectively. The study took place from May 21, to July 9, 2013. Bat species were acoustically monitored using Anabat SD1 and SD2 detectors. Detectors were rotated among 6 clusters of sites. Within each cluster, a wetland was sampled along with the two nearby timber harvests. For each harvest, an interior location and an edge location were sampled. Microphones were elevated 1.5m off of the ground using tripods and PVC piping that protected them from precipitation and other damage caused by animals. Bat identifications were obtained using Analook program and neural networks developed in Program R (Britzke et al 2011). Selection of edge vs. interior habitat and shelterwood vs. overstory removal treatments were compared among the different species using a Chi-Square analysis. Vegetation density was also compared to bat activity in the stands to determine their relationship to activity levels. Eptesicus fuscus was found to select interior habitat while Lasiurus borealis and Myotis sodalis used edge habitat more. Eptesicus fuscus, Myotis lucifugus, and Perimyotis subflavus were found to select overstory removal treatments and Lasiurus borealis and Myotis leibii used shelterwood treatment types more. From this data, we are able to conclude that silvicultural treatments and the distance from the edge of harvest do effect habitat selection by bats and that this effect is species specific. These results can help inform management recommendations for specific bat species when planning future timber harvest.
2:30 pm - 2:50 pm	**When, Where, and Why are Bats Offshore, and What are the Implications for Offshore Wind Energy?** *Trevor Peterson, Stantec Consulting; Steve Pelletier, Stantec Consulting; Sarah Boyden, Stantec Consulting; Kristen Watrous, Stantec Consulting; Lindsey Wight, Stantec Consulting* Historical anecdotes and museum records demonstrate that bats occur offshore, occasionally at great distances from the mainland, and most offshore bat observations appear linked to migration. Stantec has undertaken an unprecedented regional acoustic survey of offshore bat activity in the Gulf of Maine, mid-Atlantic coast, and Great Lakes since 2009, demonstrating frequent presence of bats on remote offshore islands, weather buoys, ships, and other structures. Offshore wind projects could therefore pose a mortality risk to bats. However, assessing the risk of such impacts depends on a greater understanding of bat behavior offshore than what can be determined from passive surveys alone. We will present the results of the ongoing acoustic surveys combined with a year 2013 pilot study that demonstrated the feasibility of tracking bats offshore in the Gulf of

	Maine using coded VHF nanotags and an array of over a dozen automated telemetry stations. We will discuss how these combined methods have helped establish when and where bats are present offshore and possible explanations for why they may occur offshore. Ultimately, answers to these questions will help assess pre-construction risk and the degree to which bats and other wildlife may avoid or be attracted to operational offshore wind projects.
BREAK 2:50 pm - 3:20 pm	
Rabbits & Hares	
3:20 pm - 3:40 pm	**Regression tree analysis of snowshoe hare (Lepus americanus) habitat choice in a northern Adirondack Forest** *John Neddermeyer, Paul Smith's College; Claire Atkinson, Paul Smith's College; Chris Malin, Paul Smith's College; Jorie Favreau, Paul Smith's College; Celia Evans, Paul Smith's College* Cover and food availability determine habitat choice for small mammals including snowshoe hares (Lepus americanus). We examined the relative importance of forest structure (cover type and availability at multiple canopy layers) and browse (type and availability) on the presence of snowshoe hare (indicated by pellets and browse) in a spatially heterogeneous northern hardwood forest in the northern Adirondacks. Number of hare pellets, category of browse intensity, and forest structure data were collected in 8 independent subplots within 38 one ha plots in a mixed northern hardwood forest during 2012 and 2013. We determined which combinations of forest structure data indicated subplots with high snowshoe hare presence as indicated by pellets only, browse only, and combined pellets and browse in three separate regression trees. The dominant factor influencing pellet abundance alone was the amount of cover in the sapling layer, while browse intensity was highest in plots with a moderate to high browse layer cover with a mixed or coniferous subdominant canopy. Total presence (subplots with both browse and pellets) was highest in plots with coniferous saplings that had a moderate to high browse layer cover. The value of regression tree analysis is determining if multiple combinations of independent variables (models) can result in similar outcomes for dependent variables. For both browse and pellets we found 1) at least 2 different habitat combinations that resulted in similar outcomes for hare presence, and 2) browse intensity is more of a function of availability and quantity than forest type (deciduous, coniferous, or mixed).
3:40 pm - 4:00 pm	**Snowshoe hare (Lepus americanus) are more active at ambient temperatures below the thermoneutral zone** *John Neddermeyer, Paul Smith's College; Jorie Favreau, Paul Smith's College* Species store body fat, enter states of torpor or hibernation, and avoid cold temperatures by tunneling beneath snow and creating dens in order to survive winter. Snowshoe hare (Lepus americanus) do not employ these strategies. We hypothesized that hare will increase in foraging activity as ambient temperatures drop below their thermoneutral zone (-10?C) in order to fuel the increased metabolic rate associated with low ambient temperatures. Each hare was outfitted with an activity collar to determine when the hare was moving and when the hare was at rest, a stopwatch was used to time the duration of each activity bout, and temperature was taken at 3 points in the hour long observation period. Temperatures were averaged across each observation period and time of observation period was analyzed as hours before and after sunset. A break-point regression analysis determined at which temperature the slope of the line representing activity changed from no slope to a negative slope. A multivariate regression determined, at temperatures below and within the thermoneutral zone which factor, temperature or

	time of day, affected activity. When ambient temperatures were within hare thermoneutral zone temperature did not affect activity. While hares increased activity below the thermoneutral zone (break-point at -10.4?C, r^2=.6931, P<0.05, slope -132.52). -10.4?C represents a physiological threshold below which metabolic rate increases and hare activity is strongly tied to ambient temperature. The lack of energy-stores and the inefficiency of using movement to generate heat leads us to conclude that the increase in activity is associated with foraging.
4:00 pm - 4:20 pm	**Seasonal influences of vegetation on snowshoe hare pellet densities across forest management types in northern Maine** *Sheryn Olson, Department of Wildlife Ecology, University of Maine, Orono; Daniel J. Harrison, Department of Wildlife Ecology, University of Maine, Orono* In Acadian forests, snowshoe hare (Lepus americanus) comprise important prey for a suite of predators, especially federally threatened Canada lynx. Different management coupled with a diverse array of forest types produce habitats supporting vastly different densities of hares. Additionally, hares in the western U.S. respond to forest stand types seasonally, with migration to areas in summer with abundant food and cover. Despite habitat-specific differences in hare survival in the west, seasonal changes in forest selection by hares near the southeastern extent of their range is poorly understood. To assess seasonal changes in use of forest stands by hares, we analyzed semi-annual pellet counts from 2005-2012, across 41 stands assigned to three stand types [mature (MT), selection harvest (SEL), and regenerating conifer (RG)] across a 1,120 km2 study area in northern Maine. At a stand-scale, we expected: 1) more winter than summer pellet densities in all stands resulting from winter diets containing more lignin; and 2) larger summer to winter differences in RG stands relative to other stand-types because of less summer food and cover. As expected, RG stands had significantly larger seasonal differences in hare pellet densities than MT and SEL stands. Within stand types; however, only RG had significantly higher winter pellet densities relative to summer. This may indicate that hares inhabiting MT and SEL stands have higher winter mortality relative to RG stands, that hares migrate from MT and SEL stands to RG stands during winter, or that summer recruitment of hares masks seasonal changes. At the stand scale, analysis of vegetation characteristics affecting seasonal hare use indicate that in both seasons, conifer sapling density, total saplings, and mid-story cover had the largest relative effect on magnitude of change in hare pellet density across seasons.
4:20 pm - 4:40 pm	**A landscape genetics approach for modeling New England cottontail connectivity** *Katrina Papanastassiou, University of New Hampshire; Adrienne I. Kovach, University of New Hampshire; Kate O'Brien, USFWS* 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 relevant concern for the New England cottontail (Sylvilagus transitionalis), 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 landscapes in southern Maine and New Hampshire. Least Cost Path (LCP) algorithms were implemented in ArcGIS in conjunction with resistance maps representing hypothesized costs of dispersal. Using expert opinion values from the Maine Beginning with Habitat Connectivity Project as a starting point, we tested a range of resistance values for roads, development, open water, forest, wetlands, fields,

	and scrub-shrub habitat. Optimal values were chosen as those that produced the highest Mantel correlation of LCP effective distance with individual-based genetic distances (Rousset's a) from 151 cottontail microsatellite genotypes. We found that development, forests, water, fields and interstate highways ? but not other roads ? act as dispersal barriers, while scrub-shrub patches, wetlands and shrubby linear features (powerline right-of-ways and roadsides) act as facilitators of New England cottontail dispersal. The relative influence of specific landscape features differed across the two landscapes, according to differences in landscape composition. Using our findings, we generated a modified connectivity map for New England cottontail. These results can inform shrubland habitat restoration efforts.
4:40 pm - 5:00 pm	**Lessons Learned Working With Partners to Create Habitat for Rare Rabbits** *Kelly Boland and Kate O'Brien, USFWS, Grant Mecozzi, National Wild Turkey Federation, Ken Canfield, Maine Forest Service, Jeff Norment and Andrew Johnson, Natural Resources Conservation Service, Walter Jakubas, Maine Dept of Inland Fisheries and Wildlife* Delivered with a bit of humility, we will share critical lessons we learned when we started asking landowners to manage wildlife habitat for the endangered New England cottontail. Sometimes we asked them to plant a few shrubs, or to allow a field to revert, but more often, we asked them to mow trees, or clear cut. Over 60 shrubland and young forest-dependent wildlife need this under-valued and uncommon habitat layer and it takes some elbow grease to create. Despite some bumps in the road, we worked together, across agency and partner boundaries, to deliver a cohesive product that resulted in successful projects. Understanding landowner motivations and doing your homework (e.g. find good contractors and understand regulations) can make a difficult activity more seamless. Each partner brings a special talent, knowledge, and experience that make the team approach work. We will share stories from the field.
5:00 pm – 5:20 pm	**Lynx in Maine** *Jennifer Vashon, Maine Department of Inland Fisheries and Wildlife*

Birds & Industry

Tuesday, April 15, 2014
10:30 am - 5:00 pm

10:30 am – 10:50 am	**Migration routes and staging areas of Red-throated Loons (Gavia stellata) in the Atlantic Flyway** *Carrie E. Gray, Biodiversity Research Institute, Gorham, ME; Andrew T. Gilbert, Biodiversity Research Institute, Gorham, ME* The Red-throated Loon (Gavia stellata) is listed by the U.S. Fish and Wildlife Service (USFWS) as a species of conservation concern in much of its Arctic breeding range and wintering grounds in the Atlantic Flyway. However, data gaps exist regarding wintering distributions, including concentration and timing of use, migratory routes and stopover areas. In 2012 and 2013, as part of a Bureau of Ocean Energy Management and USFWS project focused on offshore wind energy development and diving birds, we captured Red-throated Loons at sea on their wintering grounds in the Mid-Atlantic region and tagged them with platform terminal transmitters (PTTs). We used satellite tracking to map migratory routes of individuals (N = 23) to and from breeding locations in Quebec, Nunavut, Northwest Territories, and Greenland. We calculated composite kernel density (KDE) maps using GIS from movement data for each loon. Kernel density rasters were

	generated for each animal during one year for each period and all KDE rasters were aggregated and usage was averaged over all animals for the entire utilization area. Spring migration stopover sites included Long Island Sound, Narragansett Bay, Nantucket Sound, Buzzards Bay, Bay of Fundy, Gulf of St. Lawrence, and the St. Lawrence River; autumn stopover sites included Hudson Bay, James Bay, Hudson Strait, Ungava Bay, Gulf of St. Lawrence, and Lake Ontario. These results identify key migration habitats for Red-throated Loons within the Atlantic Flyway and timing of their use for feeding, resting, and molting.
10:50 am – 11:10 am	**Occupancy Patterns of Regionally Declining Grassland Sparrow Populations in a Forested Pennsylvania Landscape** *Jason M. Hill, Pennsylvania Cooperative Fish & Wildlife Research Unit, Duane R. Diefenbach, USGS Pennsylvania Cooperative Fish & Wildlife Research Unit* Organisms can be affected by processes in the surrounding landscape outside the boundary of habitat areas and by local vegetation characteristics. There is substantial interest in understanding how these processes affect populations of grassland birds, which have experienced substantial population declines. Much of our knowledge regarding patterns of occupancy and density stem from prairie systems, while relatively little is known regarding how occurrence and abundance of grassland birds vary in reclaimed surface mine grasslands. Using distance sampling and single-season occupancy models, we investigated how the occupancy probability of Grasshopper (Ammodramus savannarum) and Henslow's Sparrows (A. henslowii) on 61 surface mine grasslands (1,591 ha) in Pennsylvania changed from 2002 through 2011 in response to landscape, grassland, and local vegetation characteristics . A subset (n = 23; 784 ha) of those grasslands were surveyed in 2002, and we estimated changes in sparrow density and vegetation across 10 years. Grasshopper and Henslow's Sparrow populations declined 72% and 49%, respectively from 2002-2011, while overall woody vegetation density increased 2.6 fold. Henslow's Sparrows avoided grasslands with perimeter-area ratios = 0.141 km/ha and woody shrub densities = 0.04 shrubs/m2. Both species occupied grasslands = 13 ha, but occupancy probability declined with increasing grassland perimeter-area ratio and woody shrub density. Grassland size, proximity to nearest neighboring grassland (mean = 0.2 km), and surrounding landscape composition at 0.5 km, 1.5 km, and 3.0 km were not parsimonious predictors of occupancy probability for either species. Our results suggest that reclaimed surface mine grasslands, without management intervention, are ephemeral habitats for Grasshopper and Henslow's Sparrows. Given the forecasted decline in surface coal production for Pennsylvania, it is likely that both species will continue to decline in our study region for the foreseeable future.
11:10 am – 11:30 am	**The influence of silviculture on New England bird communities in northern coniferous forests** *Brian Rolek, Department of Wildlife Ecology, University of Maine; Cynthia Loftin, Maine Cooperative Fish and Wildlife Research Unit, University of Maine; Daniel Harrison, Department of Wildlife Ecology, University of Maine; Petra Bohall Wood, U.S. Geological Survey, West Virginia Cooperative Fish and Wildlife Research Unit, West Virginia University* Spruce-fir forests of the Acadian Region in eastern North America contain several bird species of concern, including Neotropic-Nearctic migrants such as Bay-breasted (Setophaga castanea) and Cape May Warblers (Setophaga tigrina). Their populations have been declining regionally since Breeding Bird Surveys began in 1966, while other

	Neotropic-Nearctic migrants such as the Blackburnian Warbler (Setophaga fusca) are increasing. The Acadian Forest in Bird Conservation Region 14 contains most of the breeding habitat within the coterminous United States for some of these species. This region also contains >15 million acres of commercialized forests where silviculture and management play a large role in altering the landscape. During the summer breeding season of 2013, we sampled 110 coniferous forest stands that had previously received one of five harvest treatments to assess the influence of silviculture on coniferous forest bird communities including: regenerating clearcuts, selection, overstory removal, pre-commercially thinned, and shelterwood harvest compared to mature reference sites. Stands were located throughout northern New England and included sites in the North Maine Woods and at four National Wildlife Refuges. We surveyed 610 locations with point counts and a subset with vegetation surveys. The most detected species per survey were White-throated Sparrow (Zonotrichia albicollis) in regenerating clearcut and shelterwood; Hermit Thrush (Catharus guttatus) in precommercially thinned, mature, and selection; and Magnolia Warbler (Setophaga magnolia) in overstory removal. This is the beginning of a four-year study to assess the effect of silviculture on coniferous forest bird communities and habitat preferences of species within them. Preliminary results and inferences regarding the distribution and relative abundance of focal species will be presented.
11:30 am – 11:50 am	**Long-term Avian Response to Forest Fragmentation from Shale Gas Development** *Petra Wood, U.S. Geological Survey, WV Cooperative Fish and Wildlife Research Unit, West Virginia Univ.; Mack Frantz and James Sheehan, WV Cooperative Fish and Wildlife Research Unit, West Virginia Univ.* The extensive tracts of mature hardwood forest in West Virginia support a high diversity and abundance of breeding songbirds, including several species of high conservation priority in the Appalachian region. To understand effects of shale gas development on breeding songbirds, we conducted point count surveys annually during 2008-2013 at 142 survey stations in a 6,521 ha study area of primarily mature forest in northwestern West Virginia. On the same area during 2009-2013, we also quantified Louisiana Waterthrush (Parkesia motacilla) nesting survival, territory density, and habitat condition on 12 headwater streams. Based on our annual mapping of habitat disturbances related to shale gas development, little shale gas development occurred on the site in 2008 but it has increased annually since that time. In this presentation, we will compare and contrast the spatially explicit response of selected avian species over time and relate the response to habitat change that resulted from development of shale gas infrastructure (well pads, roads, pipelines). For example, abundance and distribution of Cerulean Warblers (Setopha cerulea) has declined ~40% but that of Worm-eating Warblers (Helmitheros vermivorum) only slightly. Brown-headed Cowbirds (Molothrus ater) increased substantially from initially occurring at almost no points to occurring at ~25% of points in 2013. At the same time, we documented parasitism of waterthrush nests in 2013 by cowbirds; no nest parasitism occurred before 2013. Early in the study (2009-2011) when little shale gas activity had occurred, nest survival within territories classed as impacted by shale gas development (43.2%; n=39) was similar to unimpacted territories (46.7%; n=84). However, habitat quality indices were lower for nests in shale gas impacted territories suggesting that habitat quality had declined. Data from 2013 are currently being analyzed, and will be included in the presentation.

BREAK 11:50 am - 1:30 pm

Wind Power

1:30 pm – 1:50 pm	**Post-construction fatality monitoring: study design and analysis for bats and birds** *Derek Hengstenberg, Tetra Tech; Karl Kosciuch, Tetra Tech* Bat and bird fatalities have been documented at wind energy projects throughout the Northeast and as the number of wind projects increases the number of bat and bird fatalities is expected to increase. Obtaining accurate estimates of bat and bird fatalities is important because of the sensitivity of some bat and bird species encountered at wind energy projects. Fatality information is essential to understand the effects of wind energy development on bats and birds. Several factors should be considered when designing a fatality monitoring study including plot size, transect spacing, searchable area, search interval, proportion of turbines sampled, and number of detection biases. We present a review of sampling designs and how different factors interact to influence the fatality estimate and confidence interval. Closely matching search interval to carcass persistence time, increasing the number of detection bias trial carcasses, correcting for the unsearched area of a fatality distribution, and increasing the proportion of turbines searched results in a more precise fatality estimate. Thus, when designing a fatality monitoring study, the study objectives should be carefully considered and study aspects should be optimized within the constraints of the study.
1:50 pm – 2:10 pm	**Assessing the risk of commercial scale offshore wind energy development to birds in the Gulf of Maine: What do we know, and what do we need to know?** *Rebecca Holberton, Lab of Avian Biology, University of Maine, Orono* Interest in the development of commercial scale offshore wind energy has heightened the need to identify areas in the Gulf of Maine (GOM) considered to be low risk to wildlife populations. To do so, one must consider the activities associated with predeployment assessment studies and turbine construction and operation, and how these may impose indirect, sublethal, effects (e.g. habitat displacement, costs of avoidance, noise interference) and direct, lethal, effects (e.g. pollution, collision mortality) on wildlife. Until recently, risk assessment studies for birds at offshore wind sites have been done primarily abroad. Their application to the GOM region may be limited due to the region?s unique topographic and oceanographic features and the complex biology of the over 200 bird species that can be found in the region at some time throughout the year. I will review recent studies being done by a large consortium of researchers on bird movement patterns in the GOM. I will address the question: Can we identify a suitable area for commercial scale wind energy development in the Gulf of Maine?
2:10 pm - 2:30 pm	**Managing the Aerosphere as Wildlife Habitat: A New Approach to Bird and Bat Impacts at Wind Farms.** *Sarah Boucher, Stantec Consulting; Trevor Peterson, Stantec Consulting; Laura Callnan, Stantec Consulting* Wildlife agencies typically assess potential impacts of commercial wind projects on wildlife by reviewing results of a series of pre-construction surveys with the primary goal to avoid high risk areas, stressing the role that topography and proximity to certain habitats or landscape features could have on risk of impacts to wildlife. However, a growing body of post-construction studies demonstrates little correlation between pre-construction survey results and bird and bat mortality patterns, which have been unexpectedly similar among wind projects in habitats ranging from forested ridgelines in the Northeast to flat, agricultural landscapes in the Midwest. Instead, operational factors such as turbine cut-in speed and other variables such as weather and time of year appear to be highly correlated to mortality patterns of birds and bats. Characteristics of the

	"aerosphere", or the air space where birds and bats fly and where wind turbine blades rotate, may affect mortality risk for songbirds and migratory bats to a greater extent than siting, surrounding habitat, or topography. The sophisticated control mechanisms of modern wind turbines present an opportunity for wildlife agencies, scientists, and wind operators to apply management techniques such as variable cut-in speeds and deterrents strategically during periods and conditions with highest risk to birds and bats. We will evaluate the various tools and techniques used to assess wildlife risk at wind projects, analyze the relationship or lack thereof between pre-construction survey results and post-construction mortality monitoring, and suggest specific methods to manage the aerosphere as wildlife habitat.
2:30 pm - 2:50 pm	**Tracking Migratory Movements of Songbirds in the Gulf of Maine using Nano Tag Transmitters** *Jennifer Smetzer, University of Massachusetts, Amherst; David I. King, USDA Forest Service, Northern Research Station, University of Massachusetts, Amherst; Curt Griffin, University of Massachusetts, Amherst* The imminent development of offshore wind resources in the Gulf of Maine could pose a risk to migrant songbirds. To investigate migratory movements in this region, we outfitted 60 red-eyed vireos (Vireo olivaceus) and 23 blackpoll Warblers (Setophega striata) with VHF NanoTag radio transmitters at the Petit Manan National Wildlife Refuge in Milbridge Maine in fall 2013. We tracked birds with 9 automated telemetry receivers we deployed on islands and coastal areas in the Gulf of Maine, and at 23 receivers deployed by collaborators between Nova Scotia and Nantucket Sound. We encountered 92% of the birds at >1 site (mean=4?2 sites range:1-13). Migration rates were highly variable for both red-eyed vireos (36.8?41-km/day range:5-200) and blackpolls (20.8?14-km/day range:4-54 km/day), and generally slower than those typically reported for long-distance migrants. Eighty-two percent (n=19) of blackpolls, and 30% (n=20) of red-eyed vireos made at least one (>24-hr) stop after the banding site within a relatively short (~400-km) stretch of coastline. Blackpolls made more stops than red-eyed vireos (p<0.001), lean red-eyed vireos exhibited lower migration rates than fat individuals (p=0.002), and birds exhibited a greater proportion of detections at offshore sites later in the season (p=0.006). Our results suggest that individuals of both species spend extensive time on stopover in the region, making numerous short-distance flights. This behavior could increase risk of collision with offshore turbines, particularly later in the season, when more over-water movements occur. We are conducting further analyses to identify how demographic factors and weather patterns relate to observed movement patterns.
BREAK 2:50 pm - 3:20 pm

Saltmarsh Sparrows

3:20 pm - 3:40 pm	**Predicting Tidal Marsh Communities via Remote Sensing: A potential tool for adaptive coastal conservation** *Maureen Correll, The University of Maine; Brian Olsen, The University of Maine; Thomas P. Hodgman, Maine Department of Inland Fisheries and Wildlife; Chris Field, The University of Connecticut* Tidal marshes of the northeast are of particular importance and interest to human settlements along the coast due to the significant ecosystem services they provide. Among these services is the maintenance of regional and global biodiversity through support of several vertebrate species obligate to tidal marsh, including the Saltmarsh Sparrow. Although multiple conservation efforts are currently at work to conserve this sparrow?s high-marsh breeding habitat, to date there has been no regional effort to quantify large

	patches of high marsh within the north-eastern coastal complex. Here we present a series of scaled analyses aimed to quantify high-marsh areas through analysis of Landsat Thematic Mapper imagery using established remote sensing methods and validate them against a regional vegetation database collected by the Saltmarsh Habitat and Avian Research Program. We found that while previous efforts have been fruitful in classifying high-marsh and low-marsh areas on smaller scales, regional efforts to do the same have been largely unsuccessful. We explored classification schemes at smaller scales within our region of interest, and also used elevation data as a supplement to spectral reflectance data for classifying high marsh along a portion of our coastal study area. We found increased classification accuracy using LiDAR data inputs, and put forth a strong recommendation for the processing and distribution of regional LiDAR data to support identification of high marsh areas for use in Saltmarsh Sparrow adaptive management planning, as well as in other planning and management efforts.
3:40 pm - 4:00 pm	**Recent trends in Connecticut's tidal marsh vegetation.** *Chris Field, UConn; Dr. Chris Elphick, UConn.* New England's tidal marshes, which typically have low accretion rates and sediment inputs, are the least likely to keep up with sea-level rise. Recent remote sensing models for Long Island Sound predict substantial losses of high marsh, which is critical habitat for Saltmarsh Sparrows (Ammodramus caudactutus). It?s important to monitor tidal marshes to 1) detect changes on the ground over shorter timescales to validate projections and 2) obtain region-specific estimates to determine which regions should be the focus of adaptation efforts. In addition to systematic monitoring, a key strategy for developing regional estimates of marsh vegetation trends should be to make the most of existing datasets, including those that were not explicitly designed to estimate vegetation trends. Recent advances in flexible modeling frameworks make it easier to deal with the challenges of using datasets for unintended purposes. We demonstrate such methods using a dataset that was collected to investigate the habitat preferences of tidal marsh sparrows. We developed a flexible Bayesian model to allocate survey effort and analyze the results of a resurvey of 55 plots across Connecticut that were originally surveyed in 2002-2004. We found a clear pattern of decline in high marsh plant species and an increase in low marsh species. These results are consistent with sea-level rise or the influence of recent hurricanes (Irene and Sandy). Our results suggest that observed shifts in Long Island Sound?s marsh plant distributions are broadly consistent with modeled projections based on remote sensing.
4:00 pm - 4:20 pm	**Latitudinal Trends in Saltmarsh Sparrow (Ammodramus caudacutus) Nest Failure from Competing Risks** *Katharine J. Ruskin, School of Biology & Ecology, Climate Change Institute, University of Maine; Matthew A. Etterson, U.S. Environmental Protection Agency, Mid-Continent Ecology Division; Brian J. Olsen, School of Biology & Ecology, Climate Change Institute, University of Maine; Thomas P. Hodgman, Bird Group, Maine Dept. of Inland Fisheries and Wildlife; Chris S. Elphick, Department of Ecology and Evolutionary Biology, Center for Conservation and Biodiversity, University of Connecticut; Adrienne I. Kovach, Department of Natural Resources and the Environment, University of New Hampshire; W. Gregory Shriver, Department of Entomology and Wildlife Ecology, University of Delaware; Alyssa Borowske, Department of Ecology and Evolutionary Biology, Center for Conservation and Biodiversity, University of Connecticut; Chris R. Field, Department of Ecology and Evolutionary Biology, Center for Conservation and Biodiversity, University of Connecticut; Rebecca A. Kern, Department of Entomology and Wildlife Ecology, University of Delaware; Jennifer Walsh, Department of Natural*

Resources and the Environment, University of New Hampshire

Saltmarsh Sparrows (Ammodramus caudacutus) are endemic to tidal marshes and breed exclusively in the northeastern United States. They are considered globally threatened due to declining populations, habitat loss, and sea level rise. Saltmarsh Sparrows are named on the National Audubon Society?s current WatchList as a species of global conservation concern and on the International Union for Conservation of Nature?s Red List as vulnerable. Working toward an assessment of the Saltmarsh Sparrow?s global population status, we estimated the fecundity of populations across the majority of the species? range. From 2011-2013, we conducted intensive demographic surveys of breeding Saltmarsh Sparrow populations in Maine, New Hampshire, Massachusetts, and New Jersey. We calculated average probabilities of nest failure for each population via MCestimate, a program created by the Environmental Protection Agency to estimate failure probabilities of competing risks by using a Markov Chain framework. Probability of depredation was greatest in New Jersey, and decreased northward in Massachusetts and Maine. We also observed a weak latitudinal trend of increased flooding probability at higher latitudes. However, this trend was complicated by high degrees of interannual variability at all sites. Additionally, failure probabilities at the New Hampshire site deviated from our observed trends in depredation and flooding, likely because the site is farther inland and upriver than our other study sites.

4:20 pm - 4:40 pm	**Evaluating the effectiveness of morphological data for identification of pure and hybrid Saltmarsh and Nelson's sparrows** *Jennifer Walsh, University of New Hampshire; Adrienne I. Kovach, University of New Hampshire* Hybridization is influential in shaping species dynamics and has many evolutionary and conservation implications. Accurate identification of admixed individuals is critical for monitoring abundance and distribution of natural populations. We evaluated the effectiveness of morphological features in identifying admixed individuals in an overlap zone between two tidal marsh birds: Nelson's (Ammodramus nelsoni) and Saltmarsh (A. caudacutus) sparrows. We sampled 230 sparrows from 31 marshes from Maine to Rhode Island, including the 208 km hybrid zone. We scored each individual for 13 morphological traits, including plumage color and definition, and bill color, and also collected morphometric data, including bill measurements, wing chord, and mass. We genotyped individuals at 24 microsatellite loci and used an allele-frequency based approach to calculate a hybrid index for each individual. Individuals were placed in one of three categories (pure Saltmarsh, pure Nelson's, admixed) based on genetic hybrid index values. We used linear discriminant function analysis to identify morphological features that best identified admixed and pure individuals. While all functions performed well in identifying pure Saltmarsh and Nelson's sparrows ($80 - 97\%$ pure individuals were correctly classified), models were unable to classify admixed individuals. The top function failed to classify 32 of the 34 admixed individuals, and 68% of these admixed individuals were instead classified as pure Saltmarsh Sparrow. We posit that extensive backcrossing has generated high variation in morphological features, such that the identification of backcrossed individuals is challenging in the absence of genetic data.
4:40 pm - 5:00 pm	**Factors affecting Saltmarsh and Seaside Sparrow reproductive success in New York City, NY: Implications for tidal marsh management action plans in urban areas.** *Alison R. Kocek, Department of Environmental and Forest Biology, SUNY College of Environmental Science and Forestry; Jonathan B. Cohen, Department of Environmental and Forest Biology, SUNY College of Environmental Science and Forestry*

Sea level rise and anthropogenic factors have accelerated tidal salt marsh loss along the eastern seaboard of the United States. Saltmarsh and seaside sparrows (Ammodramus caudacutus, Ammodramus maritimus), tidal marsh obligate-breeding species, have mirrored this decline. Marsh characteristics that support the reproductive success of these sparrows must be identified to inform marsh restoration plans that may benefit nesting populations of these sparrows. New York City has on-going salt marsh restoration projects which seek to support these imperiled birds. In 2012 and 2013 we surveyed 4 marshes in the NYC area with breeding saltmarsh and seaside sparrows. At each site, we performed twice-weekly grid-searches for nests as well as opportunistic nest searching using adult behavioral clues. Each nest was followed to completion and the fate of all individuals within the nest was monitored. Tidal influx within each nest was obtained by use of iButtons placed in the bottom of each nest and vegetation characteristics immediately surrounding each nest site were recorded. Using a logistic exposure nest survival model, we found that saltmarsh and seaside sparrow nest survival in NYC is affected by site, stage (chick versus egg), and vegetation variables. Within-season adult survival models are pending further analysis but appear to not be a major cause of nest abandonment. Explanations for the outcomes of these survival models and implications for restoration plans in New York City will be discussed.

Rabies

Tuesday, April 15, 2014
10:30 am - 5:00 pm

10:30 am – 10:50 am	**Oral rabies vaccination (ORV) bait stations – experimental and operational use in Massachusetts and Florida** *Brian M. Bjorklund, United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, MA/CT/RI; Betsy S. Haley, United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, FL; Ryan J. R. Bevilacqua, United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, MA/CT/RI; Monte D. Chandler, United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, MA/CT/RI; Anthony G. Duffiney, United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, FL; Robert L. Hale, United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, National Rabies Management Program; Dennis Slate, United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, National Rabies Management Program; Richard B. Chipman, United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, National Rabies Management Program; Timothy P. Algeo, United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, National Rabies Management Program* As part of a larger cooperative effort to contain and eliminate raccoon rabies in the eastern U.S., USDA, APHIS, Wildlife Services (WS) has distributed oral rabies vaccine (ORV) baits via polyvinyl chloride (PVC) bait stations experimentally and operationally in Barnstable County, Massachusetts since 2006, and in five counties in west-central Florida since 2009. ORV bait stations are designed for use primarily in highly-developed areas where conventional aerial and ground bait distribution can pose a safety risk to people and domestic animals. In addition, non-target bait uptake reduces ORV program effectiveness regardless of delivery method, and bait stations may provide an opportunity to reduce non-target competition for baits. In MA, bait station visitation rates for target

raccoons (Procyon lotor) and non-target Virginia opossums (Didelphis virginiana) were similar (1.18:1) from 2006-2009, representing a bait loss approximating 50%. In MA and FL in 2011, alternative bait stations with access tailored to exclude opossums were developed and field tested with no reduction in raccoon bait-uptake. Two candidate designs survived an initial selection process and were deployed in an operational trial in both states. While differences were noted in performance (P = 0.005), these did not support a change from the traditional bait station design, and suggested that other factors play a critical role in bait uptake. Theft or curiosity-visitation to high-visibility white PVC bait stations have been problematic as well. Consequently, in August 2011, we investigated whether camouflage-painted bait station interior temperatures would exceed those of unpainted white bait stations in locations with full sun, partial sun, and full shade in both states to determine potential effect on vaccine-baits.

Camouflaged bait station interiors did not reach higher average temperatures than white bait stations when deployed in at least partially-shaded locations (P = 0.13), typical of bait station locations. Finally, given that WS conducted a second season of ONRAB? ORV bait (Artemis Technologies, Guelph, Ontario, Canada) trials in NH/VT, NY, OH, and WV, we compared bait ONRAB uptake to Raboral V-RG? fishmeal polymer block baits (Merial Limited, Athens, GA, USA) in bait stations in MA and FL during spring 2012. ONRAB bait uptake rate was at least as high as Raboral V-RG. As ORV operations expand into additional developed areas, bait stations will likely become an increasingly applied baiting method of ORV to achieve program goals. Further refinements in bait stations and their deployment will be key to that success.

Review of ORV strategy using Raboral V-RG? for controlling rabies virus circulation in US raccoon populations
Emily W. Lankau, LandCow Consulting

Oral rabies vaccine (ORV) baits have been successfully applied to reducing rabies virus transmission in US wildlife, including coyote and raccoon populations. I performed a historical review of local and regional raccoon ORV campaigns to understanding how different program structures and bait application methods can benefit reduction in virus circulation, or even lead to elimination of raccoon rabies in focal geographic regions. A diversity of raccoon rabies control programs ? including ORV campaigns in Cape May, New Jersey; Cape Cod, Massachusetts; Long Island, New York; and the eastern border of Ohio ? were reviewed to better understand practices contributing to successful and cost-effective ORV campaigns. These programs demonstrate that successful mitigation of human health risks from raccoon rabies can be accomplished in a time- and cost-effective manner using RABORAL V-RG?, especially if doses are distributed at sufficient target density using a multi-modal, biannual approach to effectively reach both juvenile and adult raccoons in heterogeneous urban landscapes. However, review of ORV program history demonstrates that local successes are not sustainable without stable funding and political will to support partnerships among local, state, and federal governments to support a regional programmatic goal of raccoon rabies virus variant elimination from the eastern United States.

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10:50 am – 11:10 am

11:10 am – 11:30 am	**Brief History of Oral Rabies Vaccination in the U.S. with Emphasis on the Role of Enhanced Surveillance** *Kathleen M. Nelson, USDA, APHIS, Wildlife Services, National Rabies Management Program, Concord, NH; Dennis Slate, USDA, APHIS, Wildlife Services, National Rabies Management Program, Concord, NH; Jordona D. Kirby, USDA, APHIS, Wildlife Services, National Rabies Management Program, Knoxville, TN; Richard B. Chipman, USDA, APHIS, Wildlife Services, National Rabies Management Program, Concord, NH* Oral rabies vaccination (ORV) began in the U.S. in the early 1990s, with the goal of preventing the raccoon (Procyon lotor) variant of rabies from spreading to populated vacation areas of Cape May, New Jersey and Cape Cod, Massachusetts. Wildlife Services? (WS) involvement in ORV began in 1995 to prevent additional spread of canine rabies in coyotes (Canis latrans) in south Texas. In 1996, ORV began in west-central Texas to control rabies in gray foxes (Urocyon cinereoargenteus). In 1997, WS participated in cooperative ORV projects in Ohio and Vermont to prevent the spread of raccoon rabies. Since 1998, when WS received its first federal appropriation for rabies management, the program expanded to 19 states. Goals were based on public and animal health and the financial and qualitative benefits from preventing rabies range expansion, while exploring elimination. In 2013, WS and cooperators distributed >6.7 million baits to combat raccoon rabies in 14 eastern states, and canine, gray fox and skunk (Mephitis mephitis) rabies in Texas. Laboratory-based surveillance is a cornerstone of wildlife rabies management, with success measured by the absence of cases. Enhanced rabies surveillance may include: suspect animals without an exposure record, road kills, animals captured during ORV monitoring (or an outbreak) with lesions or behaviors suggestive of rabies, and nuisance animals. Enhanced surveillance occurs in proximity to ORV zones, or where rabies research and management is conducted; and as a complement to public health surveillance activities, better defines the spatial distribution of specific rabies variants. Since 2005, WS collaborated with states and CDC to apply a real-time rabies diagnostic test to increase surveillance to support ORV decisions. ORV has led to: no appreciable spread of raccoon rabies, the elimination of canine rabies in coyotes (2007), and near elimination of gray fox rabies in Texas (only one case since 2007).
11:30 am – 11:50 am	**Measuring Non-Euclidean Movement Patterns in Structured Habitat Networks Using Spatial Capture-recapture Models** *Chris S. Sutherland, New York Cooperative Fish and Wildlife Research Unit, Department of Natural Resources, Cornell University; J. Andrew Royle, USGS Patuxent Wildlife Research Center; Angela K. Fuller,U.S. Geological Survey, New York Cooperative Fish and Wildlife Research Unit, Department of Natural Resources, Cornell University* The manner in which animals utilize a landscape is determined largely by the configuration of suitable habitat. As such, Euclidean distance measures may not be sufficient to adequately characterize landscape connectivity. This is particularly true for riparian species such as American mink (Neovison vison) whose movements are often restricted to linear corridors (i.e. stream and rivers). The challenge therefore is to incorporate such 'ecological distances' into analyses of animal movements and subsequent density estimates. Spatial Capture Recapture models (SCR) describe how the detectability of individuals decrease the farther their activity centers are from a 'trap'. This requires detections of unique individuals at multiple spatial locations; the distances between those locations are typically measured using Euclidean distances. We conducted a non-invasive genetic study that sampled scat to identify individual mink. We developed an ecologically relevant distance metric, calculated as the stream distance between detections, to characterize river network connectivity and estimate mink density. We

	demonstrate that ecologically meaningful measures of landscape connectivity can be incorporated into the SCR framework when landscapes are highly heterogeneous or contain movement barriers or corridors. The use of such 'ecological distances' can reduce the potential for biased estimates of density.
BREAK 11:50 am - 1:30 pm	

Mammals & Parasites

1:30 pm – 1:50 pm	**Prevalence of Borrelia burgdorferi and Borrelia miyamotoi in two primary reservoir hosts and two potential arthropod vectors in New Jersey, Pennsylvania, and Connecticut** *Meaghan Butler, Northeast Wildlife DNA Lab, East Stroudsburg University; Dr. Jane Huffman, Northeast Wildlife DNA Lab, East Stroudsburg University; Thomas Rounsville Jr., Northeast Wildlife DNA Lab, East Stroudsburg University* Borrelia burgdorferi (Lyme disease) and Borrelia miyamotoi (relapsing fever) are tick borne pathogens. These pathogens are maintained within the environment through vertebrate reservoir hosts. This study examines multiple components of the B. burgdorferi and B. miyamotoi transmission cycles. The infection rates of recognized reservoir hosts, the white footed mouse, Peromyscus leucopus, and the eastern wild turkey, Meleagris gallopavo,were analyzed, as was the prevalence of infection in the principal vector, Ixodes scapularis, and a possible vector, Amblyomma americanum. Peromyscus leucopus were trapped throughout all four seasons of 2013 in New Jersey, Pennsylvania, and Connecticut. Splenic tissue was examined for the two pathogens. Blood and skin tissue samples from the eastern wild turkeys of NJ were also tested for the two pathogens. Ixodes scapularis and A. americanum were collected from various sources and tested for B. burgdorferi and B. miyamotoi. All samples were extracted using the MoBio Tissue and Cells DNA extraction kit and PCR was performed using a Borrelia genus specific primer that targets the intergenic spacer region of the bacterial genome. The results were then analyzed seasonally, regionally, and by vector life stage.
1:50 pm – 2:10 pm	**Case-Control Study of NJ Black Bears (Ursus Americanus) Infected with Babesia spp.** *Shawqui Darwish, Northeast Wildlife DNA Lab, East Stroudsburg University; Dr. Jane Huffman, Northeast Wildlife DNA Lab, East Stroudsburg University; Thomas Rounsville Jr, Northeast Wildlife DNA Lab, East Stroudsburg University* Babesia spp. are intraerythrocytic protozoan parasites of animals and humans that cause babesiosis, a zoonotic disease transmitted primarily by tick vectors. Although a variety of species or types of Babesia have been described in the literature as causing infection in humans, the rodent parasite Babesia microti has emerged as the focal point of human disease. In this study, black bears in NJ were live-trapped and blood samples were taken from 2006 to 2013 during multiple seasons. Throughout this follow-up period some animals were first time captures and others were recaptures. DNA extraction was performed on all samples and amplified using the polymerase chain reaction using genus specific primers. A total of 63 black bears were enrolled in the study. Of the 25 bears that tested positive for Babesia at baseline, 52% of them cleared the infection and 48% persisted with infection at follow-up. Of the remaining 38 bears that tested negative for Babesia at baseline, 71% of them remained free of infection and 29% acquired infections at follow-up. All positive samples were sequenced to determine the species of Babesia infecting the black bears. Correlation analysis of these findings may reveal predisposing factors that influence the prevalence of Babesia in black bears.

2:10 pm - 2:30 pm	**Lung parasite surveys of Maine moose (Alces alces)** *Anne Lichtenwalner, Cooperative Extension and School of Food and Agriculture, University of Maine; Lee Kantar, Maine Department of Inland Fish and Wildlife; Jordan Gagne, School of Food and Agriculture, University of Maine; Nirajan Adhikari, School of Food and Agriculture, University of Maine; Ann Bryant, School of Food and Agriculture, University of Maine* A number of parasites have been reported in moose, and these opportunistic pathogens may detract from the overall health of moose, depending on environmental conditions. Although Maine moose populations have been reported to be static or increasing, monitoring parasites may provide useful information for wildlife management. During the fall 2012 and 2013 moose hunts, lungs collected by hunters were evaluated by the University of Maine Animal Health Lab (UMAHL). During the 2012 hunt, 8 of 54 lung sets evaluated (15%) were positive for lungworms and 21 of 54 (39%) were positive for cysts consistent with Echinococcus granulosus (EG) in appearance. During the 2013 hunt, 28 of 90 lung sets evaluated (31%) contained lungworms and 50 of 90 (56%) contained EG-like cysts. Of the 50 lung sets affected with cysts in 2013, 5 were heavily infested (>100 cysts) and 34 had fewer than 10 cysts. Of the lungs affected with lungworms in 2013, 16 lung sets contained greater than 20 worms. A distinctive gross morphology of lungworm-affected lungs was noted, consisting of a ?checkerboard pattern? of consolidation and ischemia. These lesions were consistent with the location of masses of lungworms in the bronchioles. Genetic and morphologic identification of these lungworms is consistent with a Dictyocaulus species. Cysts consistent with EG during 2012 were determined to be the G8 genotype. While the prevalence of both lungworms and lung cysts appears to have increased in Maine moose, the significance of these parasites for general health of the Maine moose population is not established.
2:30 pm - 2:50 pm	**Can Coordinated Recreational Hunting Reduce Tick Abundances? Exploring the Deer Density Divide between a Municipality and its Hunters** *Scott C. Williams, The Connecticut Agricultural Experiment Station; Anthony J. DeNicola, White Buffalo, Inc.; Kirby Stafford, III, The Connecticut Agricultural Experiment Station; Laura E. Hayes, The Connecticut Agricultural Experiment Station* In fall 2012, The Connecticut Agricultural Experiment Station was awarded the three-year Centers for Disease Control (CDC) grant "An Integrated and Individual Tick Management Program to Reduce Risk of Lyme Disease in a Residential Endemic Area." One treatment is substantial white-tailed deer reduction (< 10 deer/square mile (SM) remaining) using sharpshooting techniques. The Town of Redding in Fairfield County was selected because of the commitment of its elected officials to reduce the threat of tick-borne diseases by attempting to achieve a town-wide goal of 10-12 deer/SM. Coordinated hunting has occurred since 2006, when densities were estimated at 60-70/SM, with a "Deer Warden" (DW) system that manages hunters and serves as agents of the Town Conservation Commission. A post-hunt aerial survey in February 2012 estimated 30 deer/SM on 13% of Redding. That same month, 51 deer were removed from two separate one SM areas by sharpshooting, reducing town-wide density by 1.6 deer/SM and local densities to < 10 deer/SM. In April, the DWs resigned en masse because they felt the Town's target deer density was too low, and in part due to the sharpshoot. A new group of DWs were assigned, who still feel the Town's goals are "dangerously low" and are attempting to convince private landowners to cease participation in the CDC grant. The new DWs have voiced their opposition to the deer removal aspect of the CDC grant to their State Representative, Town officials, the Wildlife Director, and State biologists. Redding hunters were successful in reducing town-wide deer densities from 60-70 to

	approximately 30/SM, and want to sustain that density despite Town goals. If hunters continue to act in their own self-interest, and not in the interest of the entity they are serving, support for hunting as the primary deer management tool will erode over time.
BREAK 2:50 pm - 3:20 pm	

Moose & Deer

3:20 pm - 3:40 pm	**Validity of Hunter Surveys for Daily Effort and Deer Sightings in Vermont** *Shawn P. Haskell, Vermont Fish and Wildlife Department (former), Maine Department of Inland Fisheries & Wildlife (current)* Wildlife managers of harvested big game species, such as white-tailed deer (Odocoileus virginianus), often rely on indices of abundance to monitor population trends and to estimate relative abundance among management units within a jurisdictional unit. Reliable estimates of hunters' hunting effort, harvest, and deer sightings can be used for estimates of relative abundance or population size by catch-per- unit-effort models. I used likelihood-based information-theoretic evidence to show that random mailing surveys of licensed hunters in Vermont, USA, provided reliable knowledge regarding 1) daily hunter effort, and 2) deer sightings as a convenience index of abundance, during identically structured 16-day antlered-deer-only rifle seasons in mid–late November, 2000–2009. As a covariate explaining daily probability of capture in a harvest-based catch-effort multinomial-likelihood removal model, within-year daily hunter-effort data outperformed a larger data set pooled across years, suggesting that within-year data captured information regarding variability of daily hunter effort among years. Two independent indices of relative abundance that were hunter sighting rates of deer and results of the harvest-based removal models were well-correlated at the regional level (n ¼ 60, r2 ¼ 0.74, P 0.001). Vermont's deer management program uses estimates of relative deer abundance from survey data of hunter effort and deer sightings to help prescribe annual antlerless deer harvests at the regional level, and lesser spatial extents, within its jurisdiction. Other states may find such data similarly valid and useful.
3:40 pm - 4:00 pm	**Use of Aerial Surveys to estimate and monitor moose population dynamics** *Lee E. Kantar, Maine Department of Inland Fisheries and Wildlife, Wildlife Division-Research and Assessment Section* Robust population estimates of moose are critical to ensure that harvest rates are appropriate and biologically sustainable while also addressing values of other user groups. Throughout the 2000?s the Maine Department of Inland Fisheries and Wildlife (MDIFW) used the relationship between moose sightings by deer hunters and moose abundance to produce density indices within Wildlife Management Districts (WMD). Due to the marked decline of deer hunters in much of northern Maine after the 2008-09 winters that invalidated the use of this technique, we tested a double-count aerial survey method to estimate moose abundance in 9 northern WMDs. Density estimates ranged from 0.4-4.0 moose/km2, sightability was high (>70%) for all moose group sizes (e.g., 1, 2, or >3 moose), and moose were well distributed across the landscape in early winter. In addition, we paired double-count surveys with composition flights that allow calculation of bull to cow to calf ratios (B:C, range 56-133:100; C:C, range 26-52:100). Combined these two types of aerial survey describe important population parameters that are fundamental to the annual moose permit allocation process and meeting management goals and objectives. Data generated from the surveys replace information from the deer hunter sighting survey. Finally we demonstrate that utilization of helicopters for aerial survey of moose is practical and efficient for winter conditions experienced in the state of Maine.

4:00 pm - 4:20 pm	**Developing and validating a habitat suitability model for urban white-tailed deer.** *Chellby Kilheffer, M. S. Candidate, SUNY ESF; H. Brian Underwood, Research Wildlife Biologist, USGS Patuxent Wildlife Research Center SUNY ESF* While habitat quality has been explored for rural deer, very little is understood about features of the urban landscape that represent highly suitable habitat. In addition, most habitat suitability models for deer were developed for large (>1000 km2) spatial extents. To date, there exists very little understanding of the factors that contribute to space use by deer over smaller spatial extents. In this study, we used high-resolution, digital ortho-photography to characterize habitat suitability for a 29 km2 urban area of metropolitan Syracuse, NY. In addition, we estimated deer abundance over the study area from ground-based distance sampling. We extracted landscape characteristics from 1 km2 blocks and recorded the number of detections and total effort expended in each block to estimate proportion of the study area occupied. Finally, we used classified images from two other study areas of approximately the same size to validate statistical models of occupancy. The models identified a gradient of urbanization based on the ratios of the percentages of impervious surfaces and natural vegetation, which delineated occupied from unoccupied blocks. We also explored the ability of patch metrics, based on functional land cover-types of forage and cover values, to predict fine grained occupancy in the validation datasets derived from aerial surveys. Merits and pitfalls of this approach to modeling habitat suitability are discussed in detail.
4:20 pm - 4:40 pm	**Coyote abundance and patterns of ungulate browsing in the Adirondack Park, NY** *Andre-Anne Chenaille, Paul Smith's College; Sabrina A. Dalinsky, Paul Smith's College; Lewis M. Lolya, Paul Smith's College; Jennifer L. Maguder, Paul Smith's College; Chloe Mattilio, Paul Smith's College; Grace Mayhew, Paul Smith's College; Joshua L. B. Pierce, Paul Smith's College; Erin Regan, Paul Smith's College; and David A. Patrick, Paul Smith's College* Predators can play an important role in influencing forest structure by modifying patterns of ungulate browse. White-tailed deer (Odocoileus virginianus) are the most common ungulate throughout most of the eastern United States. Eastern coyote (Canis latrans) are known to depredate deer, however the role of coyotes in modifying patterns of deer browsing in the region remains poorly understood. Our study focused on the Adirondack Park, NY. Coyotes in this region tend to use forestry roads as travel-ways. Road edges also provide abundant woody browse for ungulate species. To determine if the relative abundance of coyote's influences patterns of ungulate browse we counted coyote scats along 500-m forest road transects (n = 17) and enumerated browse and visual obscurity in paired browse plots on the road edge and 50-m into the forest interior at each site. Browsing at the transect scale was not influenced by the relative abundance of coyotes as inferred from the number of scats (p = 0.545). Similarly, the relative abundance of coyotes did not influence the proportion of browse on the forest edge versus the interior (p = 0.413) and visual obscurity did not influence browsing at the plot level (p = 0.873). Our results indicate that the relative abundance of predators is not a dominant factor driving patterns of ungulate browsing. These findings are intriguing as we observed considerable variation in the use of roadways by coyotes and preliminary analysis of coyote scats indicates that white-tailed deer form a substantial source of prey in the area.
4:40 pm - 5:00 pm	**Stochastic population dynamics of unmanaged white-tailed deer populations.** *Wilkinson, Sarah A., Department of Environmental & Forest Biology, SUNY-ESF; Underwood, H. Brian. USGS Patuxent Wildlife Research Center, Syracuse Field Station, SUNY-ESF*

In many parts of the eastern U.S., white-tailed deer populations in some protected areas have existed for decades at high (>50 km2) densities. Yet our understanding of how such densities are sustained for so long is poor. While a great deal of research has been devoted to the density dependent aspects of deer population dynamics, specifically the effects of density on harvest and yield, much less attention has been paid to understanding the effects of environmental stochasticity on long-term population variability. Embarking on deer density reduction without a broader understanding of population dynamics could lead to mistakes in management and lost credibility. The stochastic version of theta-logistic model integrates both density dependence and environmental stochasticity. Using data from 16 cooperating national parks, we estimated model parameters with datasets varying in length from 7-13 years and conducted Monte Carlo style simulations to explore bias. Finally, we partitioned variance around population density into sampling and process components to characterize thresholds of data quality (ratios of process to sampling variance) required to estimate model parameters with reasonable precision and minimal bias. Our results indicate that density dependent responses of deer differ across parks, and that an expectation of a generalized relationship for the species is probably unreasonable. In addition, we demonstrate that variability in population size over time is positively related to environmental stochasticity, and that more variable populations are limited by lower carrying capacities. Implications for herd reduction strategies are discussed.

Public Input

Tuesday, April 15, 2014
10:30 am - 5:00 pm

10:30 am – 10:50 am	**Black Bears and Bear Management: Understanding the Social and Human Dimensions** *Mark Damian Duda, Responsive Management* The U.S. enjoys abundant and diverse wildlife populations, but at the same time, the country is also experiencing rapid growth in human populations and increasing urbanization. As development to accommodate human populations leads to wildlife habitat fragmentation and more human-wildlife encounters, wildlife management has become increasingly complex. Also, the intersection between large mammals and human populations is perhaps even more complex given the added element of human fears and misconceptions regarding some of these species. These unique circumstances necessitate informed management decisions that simultaneously address public issues and concerns while also maintaining stable wildlife populations and habitat. Highlighting public opinion research from more than 15 studies, this presentation focuses specifically on the social and human dimensions of black bears and black bear management issues in the Northeast United States, presenting the findings of regional studies as well as studies on black bears conducted specifically for Maryland, New Hampshire, Pennsylvania, Virginia, and West Virginia. Public opinion on bears and bear management efforts is diverse, and successful wildlife management strategies are developed not only through biological research to optimize bear populations and habitat but also through human dimensions research to strike a balance between differences in public opinion. This presentation will explore the following topics: Bear populations and habitat, levels of tolerance, wildlife management expectations, and public response. Ultimately, the goal of this presentation is to help

	wildlife professionals better understand the social and human dimensions related to bears to better inform policies and decision-making regarding bear management issues.
10:50 am – 11:10 am	**Exploring Alternative Methods for Data Collection for the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation** *Mark Damian Duda, Responsive Management* Although the National Survey is the premier informational resource on fishing, hunting, and wildlife-viewing participation and economics, its cost to the Federal government makes it worth exploring whether alternative approaches to the survey data collection can lead to a simpler, more efficient, and more cost-effective process. Responsive Management is conducting two projects concerning the National Survey. The first replicates the current methodology in two sample states to assess the current methods. The second project examines the feasibility, effectiveness, validity, and reliability of new and potentially markedly improved alternative approaches to National Survey data collection. Specifically, this project will seek to identify the most cost-effective and accurate alternatives to the current methodology to allow for testing of the alternatives in 2015. This project will provide a platform and work plan for eventually testing and refining the methodology for conducting the 2016 National Survey. This presentation discusses the project and its eventual outcome, and the presentation includes a participatory session that allows audience members to provide their input regarding the data that the National Survey needs to collect and analyze.
11:10 am – 11:30 am	**Urban Waters Federal Partnership - Conservation for People** *Rachel Muir, Maine Department of Inland Fisheries and Wildlife*
11:30 am – 11:50 am	**More than just a survey: the lessons we learned about coordination and outreach while recruiting volunteers to search for New England cottontails in Maine** *Mao Lin, U.S. Fish and Wildlife Service - Gulf of Maine Coastal Program; Lynn Wolfe, U.S. Fish and Wildlife Service - Rachel Carson National Wildlife Refuge; Lindsey Fenderson, U.S. Fish and Wildlife Service - Rachel Carson National Wildlife Refuge; Cory Stearns, Maine Department of Inland Fisheries and Wildlife* Rare and secretive species like the New England cottontail (Sylvilagus transitionalis) can be difficult to find in the wild. In the winters of 2011-2013, U.S. Fish and Wildlife biologists in Maine renewed an effort to search for the cottontail in its historic range north and west of Portland. Using GIS, we identified sites in the region with potential for supporting the species. Working in partnership with Maine Department of Inland Fisheries and Wildlife and other partners, two volunteer trainings were held in order to increase our capacity for surveying the many sites that were identified. Ultimately, we did not detect any New England cottontails. However, in this presentation we discuss our process for setting up the survey effort and what we learned, including team formation, coordination, outreach strategies and volunteer engagement. We hope that this non-scientific but detailed analysis of our cottontail tracking effort will help biologists working on similar projects by charting a course that avoids pitfalls, strengthens partnerships, and increases public understanding of important wildlife conservation issues.
BREAK 11:50 am - 1:30 pm	

Landscape Conservation Strategies

1:30 pm – 1:50 pm	**An Evaluation of Northeast Terrestrial and Aquatic Habitats** *Mark G. Anderson*, Arlene Olivero Sheldon, Melissa Clark, Charles Ferree, Katherine*

	Weaver and Alex Jospe, The Nature Conservancy, Eastern Conservation Science office This year the Nature Conservancy, in conjunction with the State Agencies and US Fish and Wildlife, released maps, guides, and condition information on 124 habitats found in the Northeast. Each habitat was mapped across its range, and characterized with respect to its vegetation, ecological setting, similar habitat types and associated wildlife or species of concern. We also summarized information on the habitat?s acreage and protection levels within each state. Finally we evaluated each habitat across its entire range for condition factors such as predicted loss to development, habitat patch size, amount of core area, stand age, and other factors. For aquatic systems we summarize the number of dams, length of connected network, impervious surfaces in the watershed and other factors. In this presentation we will present the findings from this study and highlight the habitats that are most in need of conservation attention.
1:50 pm – 2:10 pm	**Climate Change and Biodiversity in Maine: Vulnerability of Key Habitats and Priority Species** *Phillip deMaynadier, Maine Department of Inland Fisheries and Wildlife; Andrew Whitman, Manomet Center for Conservation Sciences; Andrew Cutko, Maine Department of Agriculture, Conservation and Forestry; Steve Walker, Maine Coast Heritage Trust; Barbara Vickery, The Nature Conservancy; Sally Stockwell, Maine Audubon; Robert Houston, U.S. Fish and Wildlife Service* Maine's ecosystems and species will be affected by climate change in many ways, and are projected to experience a larger temperature change than other regions in the U.S. outside of the Northeast. While populations of some species and their habitats will increase, climate change could lead to extirpation of other species and significant losses of natural habitat. In an effort to understand which of Maine's species and habitats are most vulnerable to climate change impacts, MDIFW recently collaborated with the Manomet Center for Conservation Science and other partners on a climate change vulnerability assessment, an approach recommended by national groups such as the Association of Fish and Wildlife Agencies. The project involved over 100 professional biologists in an expert-opinion elicitation process to assessing the vulnerability of 442 Maine species, and multiple habitat types. The assessment concluded that climate change greatly increases the vulnerability of more than one-third of Maine's species of conservation concern: 168 species (37%) were ranked as highly vulnerable and another 171 species (38%) as moderately vulnerable. Ecosystems in Maine hosting a disproportionate number of these vulnerable species include alpine tundra, montane forest, and peatlands (bogs and fens). The results of this assessment will be used by MDIFW during revisions of the State's Wildlife Action Plan in 2014 to formulate adaptive strategies for conserving climate-sensitive species. The final vulnerability assessment report entitled Climate Change and Biodiversity in Maine: Vulnerability of Habitats and Priority Species can be viewed here: https://www.manomet.org/publications-tools/climate-change
2:10 pm - 2:30 pm	**The value of maps in natural resource management: applying Expected Value of Sample Information** *Jonathan W. Cummings, Vermont Cooperative Fish and Wildlife Research Unit, Rubenstein School of Environment and Natural Resources, University of Vermont; Therese M. Donovan, U.S.G.S., Vermont Cooperative Fish and Wildlife Research Unit, Rubenstein School of Environment and Natural Resources, University of Vermont* Many of today?s most pressing challenges such as climate change, human population

	growth and development are often assessed at the landscape scale. Consequently, demand for spatially explicit scientific information has increased. However, mapping scientific information is costly and often includes many sources of uncertainty. This creates challenges when evaluating whether a desired management outcome will be achieved and whether the benefits of mapping are cost effective. We apply the Expected Value of Sample Information methodology to the collection and use spatial information as a means of addressing the cost and benefits of data collection to reduce uncertainty. The method: 1) allows an assessment of the benefits of investment in improved mapping efforts, 2) enables an analysis of the relative gains of mapping efforts in comparison to acting with current knowledge, and 3) allows comparisons of multiple potential mapping effort with each other. We demonstrate the method with hypothetical examples of natural resource decision making with and without the benefits of additional spatial data. The examples illustrate that using this method identifies a map's value, enables the selection of mapping efforts that will be of greatest value and allows for efficient allocation of a budget to the most beneficial projects.
2:30 pm - 2:50 pm	**The North Atlantic Vernal Pool Data Cooperative: Compiling and Modeling Location Data for Conservation Planning** *Dan Lambert, High Branch Conservation Services; Steven Faccio and Kent McFarland, Vermont Center for Ecostudies; Jarlath O'Neil-Dunne, Sean MacFaden, and Ernest Buford, University of Vermont Spatial Analysis Lab* The first step in developing effective conservation strategies for vernal pools and associated wildlife species is to know where on the landscape these small wetlands exist. Organized mapping efforts have occurred in several states in the Northeast and Mid-Atlantic regions, however these projects have used varying methods to identify pool locations. Additional data are scattered among non-governmental organizations, universities, herp atlas projects, natural resource agencies, municipalities, forestry professionals, and environmental consultants. Assembling information into a single, comprehensive GIS dataset could help advance vernal pool conservation and promote collaboration among vernal pool stakeholders. This presentation will introduce the Vernal Pool Data Cooperative (VPDC), a new conservation mapping and planning project funded by the North Atlantic Landscape Conservation Cooperative. Beginning this year, VPDC partners will compile potential and verified vernal pool locations in all or part of thirteen states and four Canadian provinces. This database will provide a common framework for: organizing observational and geospatial data; visualizing and analyzing information; and cataloguing data sources, field methods, and use restrictions. The VPDC will also develop a method to identify potential vernal pools using Light Detection and Ranging (LiDAR) technology and object-based image analysis, a technique that focuses on meaningful landscape objects rather than individual pixels. Once validated and refined, this remote-sensing approach may be used to fill geospatial data gaps and guide landscape-level conservation planning.
BREAK 2:50 pm - 3:20 pm	
Habitat Restoration	
3:20 pm - 3:40 pm	**River bird diet and reproduction as restoration baselines - tracking implications of dam removal and return of diadromous fishes.** *Erynn M. Call and Malcolm L. Hunter, Maine Department of Inland Fisheries and Wildlife, University of Maine* Restoration of rivers and fish populations through dam removal is being pursued widely, including within Maine?s largest watershed, the Penobscot River. This project addresses

	understanding the linkages among at least three key natural resources--birds, fish, and rivers?in the context of removal of the two lowermost dams on the Penobscot River and return of upriver spawning opportunities for sea-run fish. River-associated birds are indicators of environmental change in watersheds because they are predators of fish, and therefore often top predators in the aquatic food web. To track implications of dam removal and the expected return of abundant diadromous fish prey, we examined two baseline measures, 1) the relative importance of sea-run fish in the diet of four river bird species, bald eagle (Haliaeetus leucocephalus), osprey (Pandion haliaetus), belted kingfisher (Megaceryle alcyon), and tree swallow (Tachycineta bicolor), and 2) nest distribution and brood size of osprey; a species that may experience interspecific competition with bald eagles. We expect these measures will reflect changes to the river system post-dam removal as diadromous fish populations recover, proliferate, and integrate into the food web.
3:40 pm - 4:00 pm	**USFWS Funding Opportunities for Northeast Coastal Conservation** *Mitch Hartley, ACJV/USFWS; Lia McLaughlin, USFWS; Colleen Sculley, USFWS* The US Fish & Wildlife Service provides funding for coastal habitat protection, restoration, and enhancement through many of its programs. Over the last five years, the North American Wetlands Conservation Act (NAWCA) and National Coastal Wetland Conservation (NCWC) grant programs have awarded $36M and $22M respectively, to projects in Northeastern states. These grants, which leverage additional funds from state, federal, and NGO partners and private landowners, will achieve $167M and $46M worth of conservation delivery on 122,300 and 8,200 acres, respectively. We provide a brief overview of those two FWS grant programs, and describe which types of projects compete well and how we work with state, federal, and NGO partners to develop successful proposals that achieve significant and lasting protection and restoration of coastal (and interior) wetland ecosystems throughout the Northeast. In contrast to these ongoing funding efforts, Congress recently provided one-time funds to help areas affected by Hurricane Sandy. In addition to funding repair work, Congress included funding to help mitigate impacts of future storms. FWS received $102M for 31 projects that mitigate storm damages and improve the resiliency of lands and assets. Department of the Interior allocated an additional $100M, administered through the National Fish and Wildlife Foundation, for competitive grants to non-profit organizations, Tribes, academic institutions, states, and local agencies for storm resiliency projects. We will provide an update on the status of this funding, explain how we are coordinating with other agencies and organizations, and describe our communication efforts to share information on project locations, implementation, and outcomes.
4:00 pm - 4:20 pm	**A comparison of Lepidoptera communities inhabiting restored and degraded pitch pine-scrub oak barrens in Pennsylvania** *Wendy Leuenberger, Indiana University of Pennsylvania; Scott Bearer, The Nature Conservancy; Pat McElhenny, The Nature Conservancy; Jeffery Larkin, Indiana University of Pennsylvania* Scrub oak barrens were once distributed throughout portions of the northeastern United States. This fire-dependent community covered approximately two million acres in Pennsylvania during the mid-1900s, but was reduced to about 17,600 acres by the late-1900s. Decline of scrub oak barrens is attributed to human development, fire suppression, and colonization by fire-intolerant trees. In recent years, the Pennsylvania Game Commission and The Nature Conservancy have partnered to restore large amounts of degraded scrub oak barrens through prescribed fire. Scrub oak barrens are a state

imperiled ecosystem, and support high species richness including several endemic species. For example, scrub oak barrens are known for supporting high Lepidoptera (butterfly and moth) diversity. Our study examined Lepidoptera communities in recently burned scrub oak barrens in northeastern Pennsylvania. We used black light traps and bait stations to compare Lepidoptera diversity and abundance across six burned sites and three degraded unburned sites. Sites were sampled two nights per month in June, July, and August 2012. A total of 13,386 individuals were identified, representing 384 species. Seven species are rare or state listed with three species exclusive to treatment sites. No differences in Lepidoptera species richness, diversity or evenness were found between burned and unburned scrub oak barrens. Several species (n=203) were found in both burned and unburned sites. However, several species were unique to burned (n=49) and unburned sites (n=132). Our data suggest scrub oak barrens should be managed to create a mosaic of burned and unburned patches if Lepidoptera diversity is a conservation goal.

4:20 pm - 4:40 pm	**The application of spatial modeling tools to assess the effect of landscape on native bee abundance in Maine's wild blueberries.** *Shannon J. Chapin, Department of Wildlife Ecology, University of Maine, Orono; Cynthia S. Loftin, U.S. Geological Survey, Maine Cooperative Fish and Wildlife Research Unit; Frank Drummond, School of Biology and Ecology, University of Maine, Orono* Non-native honeybees historically have been used to pollinate many crops throughout the United States, however, recent population declines have brought to light the need for a more sustainable pollination plan. Native bees are an available ecosystem service that can play an important role in pollination. We are investigating the landscape factors that influence native bee richness and abundance, with a focus on the native bees that pollinate Maine's wild blueberries. We are applying the InVEST Crop Pollination modeling tool, which predicts pollinator abundance based on available floral resources and nesting habitat, to the Downeast Maine landscape to examine relationships between native bee abundance and landscape pattern and arrangement. Field collected data over several years on bee abundance and diversity is being used to validate the model?s assumptions. We are evaluating how variation and uncertainty in parameter choice influences model output with our sensitivity and optimization analysis. Our expert survey placed high value on agriculture, developed, shrub, blueberries, and non-conifer forested classes, however, preliminary model results indicate that bee abundance predictions are most sensitive to parameter changes for nesting substrate and spring and summer floral resources in the deciduous/mixed forest and blueberry land cover classes. Our research is one component of an interdisciplinary multi-state, multi-institution project that is exploring the ecology, sociology and economics of native bee conservation in the Northeast.