WELCOME!

Welcome to the 2019 West Virginia Chapter of The Wildlife Society Conference. This conference promises to be an extremely informative and interesting get together for students, professionals and others involved with the research, management, and conservation of wildlife resources.

Our speakers represent various agencies, institutions, and more. The officers of the WV Chapter of The Wildlife Society would like to thank each and every presenter. Without them, this conference wouldn't be possible. We would also like to personally thank all members of the audience for attending this conference.

Feedback is appreciated to make all future conferences better. Please email any of the officers listed below to voice your comments or concerns.

Thanks again for attending!

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AGENDA

9:30	Registration
10:00	Welcome and Introductions
10:10	Songbird response to young forest management using cut-back borders *Eric Margenau*
10:30	Benthic Macroinvertebrate Community Responses to Imidacloprid Exposure *Sara Crayton*
10:50	Influence of habitat characteristics on nymphal black-legged ticks at Fort Drum, NY *Lucas Price*
11:10	Seasonal differences in bird stopover duration is related to resource availability *Hannah Clipp*
11:30	Determining Presence of Two Rare Amphibians Using Environmental DNA and Conventional Surveys *Margaret Smith*
11:50	**LUNCH**
12:50	**POSTER VIEWING**
1:50	Three Common West Virginia Invasive Trees: Identification, Look Alikes, Threats Posed, and Suggested Methods of Control *Anne Wakeford*
2:10	An Environmental DNA Assay for Quantifying Spotted Salamander Abundance *Yvette Halley*
2:30	Modifying forest ground cover to reduce tick populations *Anthony Mesa*
2:50	**BREAK**
3:10	Spatial and Temporal Dynamics of Songbirds on a Central Appalachian Elevation Gradient *Gordon Dimmig*
3:30	Evaluating the conservation umbrella of the loggerhead shrike in Appalachian pasturelands *Laura Graham*
3:50	**CONFERENCE AWARDS AND PRIZES**

POSTERS

Monitoring Darter Populations in the Potomac Drainage Utilizing Environmental DNA
Connor Cunningham

Dabbling Duck Abundance of Actively and Passively Managed Wetlands during Spring Migration
Zachary Dienes

Rattlesnake Ambush Site Selection in Coastal South Carolina Salt Water Marshes
Emily Mausteller

Home Range of Song Sparrows Across an Urban – Rural Gradient
Alyson Scheibe

18 West Virginia Invasive Plants and Their Native Look Alikes
Anne M. Wakeford

Quantitative PCR (qPCR) Assay for Detecting Spotted Salamander eDNA
Michelle Williams

ORAL PRESENTATIONS

Abstracts are listed as they are presented in the agenda.

Songbird response to young forest management using cut-back borders

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Active management for young forest continues to be a topic of interest among forest ecologists. Young forest, characterized by recently disturbed forest areas with dense understory vegetation, is important for many wildlife species. Unfortunately, its distribution and total area have continued to decline in the eastern United States. We conducted point counts to assess songbird community response to young forest management using cut-back borders on WVDNR lands. We created small tree-cuttings (cut-back borders of 1.1–3.8 acres) to assess which combination of width (15, 30, and 45 m) and harvest intensity (5 and 14 m^2/ha canopy tree removal) was most effective for managing for young forest birds using a before-after-control-impact study design along pipeline corridors, powerline corridors, and wildlife openings (n=9). We present our two-year findings (pre- and post-tree harvest) and evaluate acute avian community responses for guild richness and individual species' abundances. General community trends post-harvest suggest the shrubland guild increased in species richness, interior-edge guild species richness showed varied responses, and forest interior guild species richness decreased. Species-specific assessment indicates shrubland species' abundances (Eastern Towhee [*Pipilo erythrophthalmus*] and Indigo Bunting [*Passerina cyanea*]) increased in wider cut-back borders, while forest interior species' (Hooded Warbler [*Setophaga citrina*] and Scarlet Tanager [*Piranga olivacea*]) abundances remained relatively unchanged regardless of harvest width or intensity. While our results suggest the forest-associated songbird community is initially negatively affected by cut-back borders, the impacts of cut-back borders at the species-level may vary. Results also suggest that young forest-dependent species (i.e., shrubland songbirds) benefited from cut-back borders particularly the wider harvests.

Benthic Macroinvertebrate Community Responses to Imidacloprid Exposure

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The insecticide imidacloprid is widely used to mitigate hemlock (*Tsuga* spp.) mortality resulting from the invasive Hemlock Woolly Adelgid (HWA; *Adelges tsugae*), but evidence suggests that imidacloprid can have negative impacts on adjacent stream systems. Laboratory and mesocosm studies have demonstrated that imidacloprid causes mortality in numerous benthic macroinvertebrate taxa and has sub-lethal impacts such as inhibited mobility, foraging behavior, and feeding. Higher concentrations of imidacloprid in surface water is associated with lower macroinvertebrate abundances. From May-July of 2017 and 2018, we sampled benthic macroinvertebrate communities using D- nets at 24 streams adjacent to HWA treatments and 24 control streams in the Monongahela National Forest, New River Gorge National River, and Gauley River National Recreational Area. Benthic macroinvertebrates were identified to genus or the lowest possible taxonomic level. Body length was measured to allow for estimation of biomass. At each sampling site, we collected stream water and sediment. Ultra-performance liquid chromatography-tandem mass spectrometry ((UP) LC-MS/MS) was used to quantify the concentration of imidacloprid and two of its metabolites (imidacloprid-urea and imidacloprid-olefin) within the stream water and sediment. We calculated GLIMPSS (Genus Level Index of Probably Stream Status) and WVSCI (West Virginia Stream Condition Index) scores which are multi-metric indices of biotic integrity, and estimated biomass. Results will be presented that relate these metrics, biomass, and benthic macroinvertebrate functional groups to imidacloprid and metabolite concentrations and to treatment histories for each site.

Influence of habitat characteristics on nymphal black-legged ticks at Fort Drum, NY

LUCAS PRICE[1], John Edwards, Aaron Maxwell, Sheldon Owen, Christopher Rota, Raymond Rainbolt

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For black-legged ticks (*Ixodes scapularis*), density of nymphs predicts human health risk. Higher tick abundances have been associated with moderately moist soil, understory growth, and forest canopy cover. We assessed tick abundance relations on Fort Drum Military Installation, using 50 tick drag locations, each consisting of 3 50-m transects along a random azimuth 10 m apart. Locations were dragged bi-weekly from mid-May through July 2018. At each tick drag location, we measured tree stem count, basal area, average diameter at breast height of trees, percent canopy cover, average leaf litter depth, percent midstory vegetation cover, percent ground cover, land cover type, soil available water capacity, and volume of coarse woody debris and snags. We created a random forest model in R to estimate nymphal tick abundance. Volume of snags, percent midstory vegetation cover, and soil available water capacity were the most important variables, with this model explaining 22.24% of the variation in abundance. No other model explained more variation. For snag volume and percent midstory vegetation cover, a quadratic relationship is present, with the highest nymphal tick abundances in the middle of the variable ranges. Nymphal tick abundance has a negative relationship with soil available water capacity. Although patterns were seen in other variables (for example, grassland land cover had the lowest nymphal tick abundance), these variables did not improve the model. Based on our findings, habitat attributes we have not measured are contributing to tick abundance. We will examine animal diversity and other variables during future field seasons.

Seasonal differences in bird stopover duration is related to resource availability

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Most long-distance migratory landbirds travel to breeding or wintering grounds in several sustained flights interspersed by stopover periods. The length of time that birds remain at various stopover sites depends on prevailing weather, geographical context, individual physiological condition, and habitat quality. However, no study has examined potential seasonal differences in stopover duration across a network of sites along an ecological barrier. Using weather surveillance radar and transect survey data collected during autumn and spring migration, we investigated relative stopover duration at 19 hardwood forest sites located along the northern Gulf of Mexico coast. We modeled variability in stopover duration among sites and across seasons in terms of the ratio of arthropod prey to migrant bird "predator", distance to the coast, and proportion of hardwood forest within the surrounding landscape. Stopover duration was best explained by a negative relationship with the prey: predator ratio in the autumn and positive relationships with the prey: predator ratio and amount of hardwood forest in the spring. These results suggest that seasonal differences in stopover duration are likely due to relative food availability. Overall, migrating birds stop over more briefly when arthropods are either scarce or plentiful, but increase stopover duration when the arthropod availability is intermediate.

Determining Presence of Two Rare Amphibians Using Environmental DNA and Conventional Surveys

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Longleaf pine savanna is an imperiled ecosystem that has been reduced to less than 4% of its original range. Frosted Flatwoods Salamanders (*Ambystoma cingulatum*) and Dusky Gopher Frogs (*Rana capito*) are two species endemic to this ecosystem. Both species are reduced in abundance and range. They have life histories that largely limit surveys to the breeding season when adults and larvae may be found in ephemeral, upland isolated wetlands. The species' use of aquatic habitats suggests that detection may be improved by including environmental DNA (eDNA), a relatively new survey type that requires less effort for field sampling and thus can be used to cover more sampling sites. We conducted eDNA surveys in combination with trapping, auditory, and visual surveys to sample for the two species. Survey sites were located in the South Carolina Coastal Plain and included sites of previous detection and new sites selected for land use history and habitat characteristics. After large rain events, we filtered 3 to 5 500mL water samples per wetland and amplified DNA fragments with specific primers to detect study species. We detected no evidence of flatwoods salamanders. Of 22 ponds sampled, 8 returned positive eDNA results. We detected gopher frogs by other methods at 3 of the 8 ponds. Most eDNA positive ponds have historically supported breeding populations. Our results demonstrate the potential of eDNA sampling for elusive species and the need for further study on influencing factors of eDNA detection.

Three Common West Virginia Invasive Trees: Identification, Look Alikes, Threats Posed, and Suggested Methods of Control

ANNE M. WAKEFORD[1]

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Invasive trees are becoming a significant problem in the State of West Virginia. Invasive trees threaten ecosystems by aggressively outcompeting native trees. This "take over" by invasive trees frequently results in limited food and habitat for native wildlife. Therefore, it is important to know the similarities and differences between invasive trees and their native look alikes in order to prevent their spread, and thus control them. The purpose of this paper is to show differences and similarities between some of the common West Virginia invasive trees and their native look alikes, discuss the threats posed and suggest methods of control.

An Environmental DNA Assay for Quantifying Spotted Salamander Abundance

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Biodiversity is indicative of eco-health and can be influenced by a variety of factors, including but not limited to: anthropogenic activities, invasive species, and environmental fluctuations. Wetlands offer a variety of ecosystem services such as flood mitigation, drought control, and removal of high nitrate concentrations. Traditionally, in Appalachian streams and wetlands, dobsonfly larvae and salamanders have been used as indicator species for ecosystem viability. In North America, it is estimated that one-half of frog species and one-third of salamander species rely on ephemeral (seasonal) wetlands for embryonic and larval development. The spotted salamander, *Ambystoma maculatum*, is a salamander species endemic to North America; they are a slow moving species with limited dispersal capabilities, and are pond breeding with a high breeding-site fidelity. Which makes them ideal candidates for landscape genetic studies and as an indicator species for ephemeral wetland ecohealth. The non-invasive genetic sampling technique of environmental DNA (eDNA) collections provides a new way to measure population abundance of indicator species in an ecosystem. In the present study, aquarium mesocosms were utilized as models for vernal pools with varying salamander densities in an attempt to utilize eDNA sampling in combination with quantitative PCR (qPCR) to determine if there is a correlation between spotted salamander genetic shedding and species density.

Modifying forest ground cover to reduce tick populations

ANTHONY MESA[1], Lucas Price, John Edwards, Sheldon Owen, Raymond Rainbolt

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Large tick populations in forested areas can pose significant health risks, as ticks can serve as vectors for zoonotic pathogens, such as Lyme disease (*Borrelia burgdorferi)*. Their small size and resilient nature creates difficulties in management. Our objective was to reduce black-legged tick (*Ixodes scapularis*) abundance from coniferous and mixed forests by creating a less desirable environment. Our study site was located on the Fort Drum Military Installation in New York. To alter habitat, we removed pine needle litter from the forest floor. This created a less insulated and drier environment, with the goal of discouraging tick presence. To conduct this research, we sampled control and modified plot within each of the two cover types. Each site had 3 50-meter parallel transects, with 1 transect having the leaf litter raked away for a width of 5-meters. Every week for 4 weeks, and biweekly after, tick populations were sampled using a tick drag method with a 1-m^2 piece of fabric. Collected ticks were counted and categorized by life stage (larva, nymph, or adult). These counts were used as indices of tick abundance and compared between raked and non-raked transects using the χ^2 test. Only larval tick counts were different than expected (assuming no difference between control and treatment sites; $p < 0.01$), but no consistent pattern was present. Larval ticks were higher than expected at one site, and lower at the other. Initial results indicate that this technique is not efficient at decreasing black-legged tick abundance.

Spatial and Temporal Dynamics of Songbirds on a Central Appalachian Elevation Gradient

GORDON DIMMIG[1], Christopher Rota, Petra Wood, Christopher Lituma

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Forests in the central Appalachian Mountains host a diverse assemblage of birds that are distributed along an elevation gradient. Many bird species have restricted breeding ranges in this area, which makes them more vulnerable to environmental changes. In particular, rising temperatures are expected to force montane birds upwards, but empirical support for this hypothesis is weak. Using avian point count data collected over a 26-year period in the Monongahela National Forest, West Virginia, we evaluated the dynamics of a suite of forest bird species to determine how breeding distributions are changing across elevation and time. We used a dynamic multi-species occupancy model to calculate local colonization, extinction, and occupancy probabilities over the study period (1993-2018) for each species. Of the 16 songbird species modeled, we found that occupancy of 5 species increased more at high elevations than low elevations. We also found that occupancy of 2 species increased more at low elevations than high elevations. While one-third of the studied species show signs of a potential upward increase in occupancy, dynamics were highly variable for each species. Furthermore, there were few instances of occupancy decreasing at low elevations over the study period, suggesting that songbirds are not contracting their elevational ranges upwards. These findings provide new insight into how bird distributions are changing along an elevation gradient in the central Appalachians.

Evaluating the conservation umbrella of the loggerhead shrike in Appalachian pasturelands

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Many species of early successional birds, continue to show population declines across North America. One species, the loggerhead shrike (*Lanius ludovicianus*), has declined steadily in the last 50 years, and is a species of conservation concern in West Virginia. Loggerhead shrikes are associated with pastures and other open habitats in the Appalachian region, and their conservation could potentially benefit co-occurring bird species. Thus, the loggerhead shrike may serve as an umbrella species for other early successional birds in the region, but this possibility has not been investigated. I conducted 1444 point avian count surveys in southwestern Virginia and southeastern West Virginia from mid-April to early August in 2017 and 2018 to determine occupancy of early successional birds in the region. I used multi-species occupancy models to explain co-occurrence among 3 species: loggerhead shrike, eastern meadowlark (*Sturnella magna*), and orchard oriole (*Icterus spurius*). Models best explaining occupancy among these species included longitude and % young forest, % shrub, and % pasture within 100m. Detection probability was negatively associated with % cloud cover for eastern meadowlark and loggerhead shrike, and positively associated with orchard oriole detection probability. Pairwise interactions between loggerhead shrike and eastern meadowlark suggest occupancy between the two species is positively correlated, and orchard oriole occupancy is positively correlated with loggerhead shrike occupancy but negatively correlated with eastern meadowlark occupancy. For these 2 species, the loggerhead shrike appears to be a reasonable candidate for an umbrella species, potentially sheltering two early successional bird species in the Appalachian region.

POSTER PRESENTATIONS

Abstracts are listed alphabetically by the last name of the presenter.

Monitoring Darter Populations in the Potomac Drainage Utilizing Environmental DNA

CONNOR CUNNINGHAM[1], Yvette A. Halley, Eric R. Merriam, Jason Morgan, J. Todd Petty, Amy B. Welsh, James T. Anderson

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The use of live bait by anglers, both purchased and wild caught, contribute to the dispersal of aquatic organisms throughout the United States. This is because bait is often released into non-native environments. These introductions can lead to newly established populations that could negatively affect the biodiversity and underlying health of ecosystems. Toward the mid-20th century, the Greenside (*Etheostoma blenniodies*) and Rainbow Darters (*Etheostoma caeruleum*) made an appearance in the Potomac drainage. The origin of their introduction has been widely debated with the most popular hypothesis being that the darters were utilized as bait and consequently were transferred to the drainage basins. Environmental DNA, eDNA, is a non-invasive technique utilized for the monitoring of aquatic species by capturing and extracting genetic material from cells (i.e., hair, feces, urine, feathers, skin, and saliva) that are shed by various organisms into their surrounding environments. It has proven effective for detecting low population density aquatic macroorganisms, which makes it an excellent first line of defense for detecting aquatic invasive species. Our goal is to monitor the spread of various darter species through eDNA collection.

Dabbling Duck Abundance of Actively and Passively Managed Wetlands during Spring Migration

ZACHARY R. DIENES[1], Lindsay A. Leightner, Alex J. Murray, Philip C. Gibson

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Management for migratory waterfowl has been largely focused around wetland management as guided by the North American Waterfowl Management Plan. There are many wetland management programs that provide waterfowl with quality habitat and an abundance of forage. Many of these programs are focused on fall and wintering habitat with few assessments on how these wetlands affect similar waterfowl communities throughout the spring. Our objective was to compare abundance of dabbling ducks between both actively and passively managed wetlands in northeast Ohio and northwest Pennsylvania during the spring migration. We related these differences to variations in available forage between actively and passively managed wetlands. We conducted surveys for dabbling ducks on 8 actively managed wetlands and 11 passively managed wetlands during spring 2018. Following surveys, available forage was sampled and estimated as duck-use-days (DUDs) for 6 actively managed wetlands and 11 passively managed wetlands. We found mallards (*Anas platyrynchus*) to be observed most often across all wetlands, followed by wood ducks (*Aix sponsa*), and gadwall (*Anas strepera*). Abundance of dabbling ducks was higher on passively managed wetlands (p-value = 0.018) and increased with wetland size (p-value < 0.001). Mean DUDs for actively managed wetlands was 4,582±1638 and 3,262±846 for passively managed wetlands, we detected no statistical difference between wetland managements (p-value = 0.437). Although forage resources were similar between actively and passively managed wetlands, dabbling duck abundance was higher on passively managed wetlands. This suggests factors other than available forage influence dabbling duck abundance in wetlands during spring migration.

Rattlesnake Ambush Site Selection in Coastal South Carolina Salt Water Marshes

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The eastern diamondback rattlesnake (*Crotalus adamanteus*; EDB) is a species of conservation concern associated with the imperiled longleaf pine ecosystem (LLP). The LLP is characterized by an open canopy and rich ground cover. Researchers have speculated that the vegetation structure of salt marshes may serve as a surrogate habitat for longleaf pine savannas. Although these marshes have little topography, they provide a heterogeneous landscape with patches of mud flats, sandy hard marsh along upper tidal areas, and salt marsh hummocks throughout. We used radio telemetry to monitor free-ranging EDBs on a South Carolina sea island. The goal of our analysis was to examine EDB habitat use within salt marsh habitats. Preliminary analyses indicate that EDBs tend to use hummocks and shoreline habitat-patches when hunting in salt marshes. Our study illustrates a potential interaction between EDB habitat use along coastal river ways and extreme tidal inundations that would result in a down-river dispersal pattern. Tidally-biased dispersal may misguide EDB conservation if high EDB densities along coastal islands mischaracterize critical habitat for the species.

Home Range of Song Sparrows Across an Urban – Rural Gradient

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The spatial distribution of a species is largely shaped by resource availability and anthropogenic factors like habitat fragmentation. As urbanization continues to intensify the effects of climate and land-use change the spatial distribution of species is expected to shift as a result. Information regarding how a species is distributed is often used as a fundamental building block to answer wildlife conservation and management problems. To begin to understand the factors contributing to a species' altered spatial distribution we must first understand the home range of individuals within a population over time. An individual's home range refers to the area utilized for shelter, food gathering, and reproduction. Knowledge of variation in home range size provides insight to the underlying ecological processes contributing to altered spatial distribution. In attempt to gain this knowledge Song Sparrows at the Core Arboretum in Morgantown, WV were color banded to give each banded bird an individual identity. Consistent efforts were put forth to re-sight and record GPS coordinates of banded birds. These coordinates were then graphed to depict the home range of individuals and begin to understand the spatial distribution of Song Sparrows in the Core Arboretum. Efforts to analyze these home ranges will continue until adequate data is collected to draw conclusions about spatial distribution.

18 West Virginia Invasive Plants and Their Native Look Alikes

ANNE M. WAKEFORD[1]

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Invasive plants are becoming a significant problem in the State of West Virginia. Invasive plants threaten ecosystems by aggressively outcompeting native vegetation. This "take over" by invasive plants frequently results in limited food and habitat for native wildlife. Therefore, it is important to know the similarities and differences between invasive species and their native look alikes in order to prevent their spread, and thus control them. The purpose of this poster is to show differences and similarities between 18 common West Virginia invasive plants and their native look alikes.

Quantitative PCR (qPCR) Assay for Detecting Spotted Salamander eDNA

MICHELLE WILLIAMS[1], Yvette Halley, Amy Welsh, Jim Anderson

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Conservation biology and management are extremely dependent on the knowledge of species distribution. However, the detection and identification of many fish and amphibian communities can prove to be problematic because of the nature of various inhabitants. The recent use of environmental DNA (eDNA) in conjunction with quantitative PCR (qPCR) offers the possibility of using eDNA techniques to determine population abundance in an ecosystem. When compared to traditional methods, eDNA provides a potentially more accessible, cost-effective, and noninvasive sampling technique; making it ideal for species detection across a wide variety of environments. This is especially important for conservation research in aquatic environments, especially wetlands. Due to their sensitivity to habitat fluctuations, amphibians are a popular choice for indicator species to determine the health of an ecosystem. In the present study, an eDNA assay was designed to detect Spotted salamanders, *Ambystoma maculatum*, in wetland vernal pools. Quantitative PCR (qPCR) was used to determine the lowest salamander eDNA level that produces successful detection of the amplicon.

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