

**Association of Field Ornithologists and
Wilson Ornithological Society Joint
Meeting**



June 7-9, 2018

Chattanooga, TN

**Welcome to the 2018 joint meeting of the Association of Field
Ornithologists and Wilson Ornithological Society!**

Nestled between Lookout Mountain, Walden's Ridge, and the Tennessee River, Chattanooga is aptly referred to as the Scenic City. There are plenty of outdoor, cultural, and family attractions, as well as many fine places to eat. The region is rich in bird diversity, with nearly 200 regularly occurring species, including migratory songbirds, waterfowl, raptors, wading birds, and shorebirds. I hope you have the opportunity to explore all that Chattanooga has to offer! This meeting will feature nearly 100 oral and poster presentations, including a symposium on bird conservation in the Appalachian Mountains and two excellent plenary speakers. In addition to an opening reception, a poster reception, and a closing banquet (at the Tennessee Aquarium!), there is also a Student and Early Professionals luncheon, and an LGBTQ luncheon, so there are plenty of opportunities for networking and socializing! We want this to be an enjoyable, informative, and inclusive meeting for everyone, so please make sure you read the Code of Conduct on Page 3. Y'all enjoy the conference!

David Aborn
Local Organizing Chairperson

ORGANIZING COMMITTEE



Chair: David Aborn, University of Tennessee at Chattanooga and Association of Field Ornithologists

Mark Deustchlander, Hobart and William Smith Colleges and President, Wilson Ornithological Society

Paul Rodewald, Cornell Laboratory of Ornithology and President, Association of Field Ornithologists

Scientific Program

Mary Bomberger Brown, University of Nebraska-Lincoln and Wilson Ornithological Society

Dan Cristol, College of William and Mary and Association of Field Ornithologists

Travel Awards

Julie Jedlicka, Missouri Western University and Association of Field Ornithologists

Dennis Siegfried, Southwest Baptist University and Wilson Ornithological Society

Student Presentation Awards

Jim Chace, Salve Regina University and Wilson Ornithological Society

Angela Tringali, Archbold Biological Station and Association of Field Ornithologists

Student and Early Professionals Activities

Auriel Fournier, Mississippi State University and Wilson Ornithological Society

Jen Smith, Virginia Tech University and Association of Field Ornithologists

AFO-WOS CODE OF CONDUCT

The Association of Field Ornithologists' (AFO) and the Wilson Ornithological Society (WOS) are committed to providing a safe, hospitable, and productive environment for everyone participating in our 2018 joint meeting (June 6 – 9) in Chattanooga TN, regardless of gender, race, ethnic origin, nationality, religion, age, marital status, sexual orientation, gender identity, disabilities, physical appearance or any other protected status. We realize that effective communication requires that we treat each other with respect and courtesy in face-to-face, written, and electronic interactions and that we respect the intellectual property of our colleagues. AFO and WOS' Code of Professional Conduct is intended to 1) advance the mission of our societies through the open, respectful, and honest communication of research and exchange of ideas, 2) to promote equality of opportunity and treatment for all members and participants in this meeting, 3) to assure appropriate accessibility of accurate and reliable information to colleagues, policy makers, and the public and, 4) to encourage the effective and ethical professional development of researchers. We represent the field of ornithology and it is imperative that we behave as professionals to each other, society employees, and meeting participants, volunteers, exhibitors, sponsors, and venue staff. This code applies to all venues during the conference, including but not limited to the conference facilities, the convention center, hotels, informal social gatherings and field trips.

Participants in the meeting should be able to engage in open discussions free of discrimination, harassment and retaliation. Harassment in any form will not be tolerated. Harassment includes offensive gestures or verbal comments communicated directly or through social media, deliberate intimidation, stalking, following, unwanted photography, video or audio recording, sustained disruption of talks or other events, inappropriate physical contact, and any unwelcome attention. Participants asked to stop harassing behavior are expected to comply immediately.

Reporting an Incident: Any individual who is aware of breaches of this Code, you should contact the AFO President, Paul Rodewald (pgr35@cornell.edu), the WOS President, Mark Deutschlandler (deutschlande@hws.edu) and/or authorities (such as the local meeting organizers) specified in the meeting program. The person reporting, who may be a complainant or witness and may or may not be a meeting registrant, is not required or expected to discuss the concern with the alleged offender. All complaints will be treated seriously and reviewed promptly by the meeting organizer, and or the Executive Committees of both AFO and WOS, and may be investigated by them or their designee. Confidentiality will be honored to the extent permitted, as long as the rights of others are not compromised.

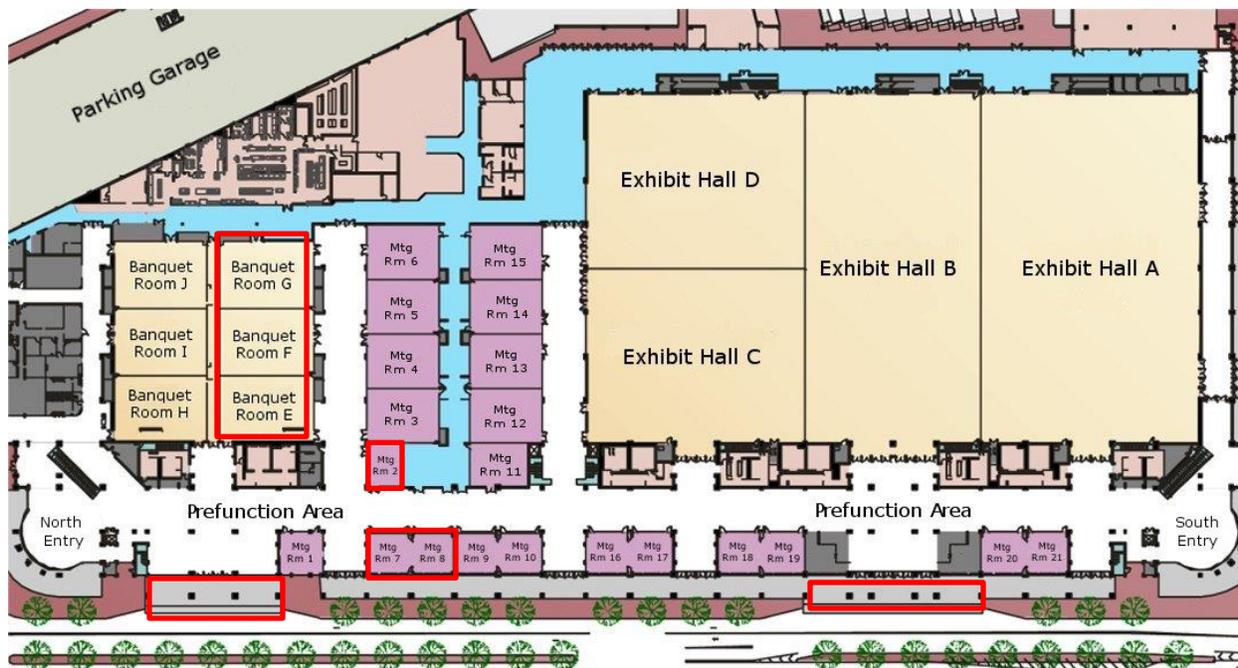
Disciplinary Action: Individuals found to have engaged in behavior prohibited by this policy as well as those making allegations of a breach of Code in bad faith, will be subject to disciplinary action. The Executive Committees of the AFO and WOS may take any action, jointly or individually, they deem legally appropriate, ranging from a written warning or ejection/prohibition from the specific activity in question (e.g. annual meeting, workshop,

publication, etc.), to the reporting of their behavior to their employer. Repeat offenders may be subject to further disciplinary action, such as being banned from participating in future society activities, meetings, publications, or other programs. AFO and WOS Bylaws permit Council to terminate the membership of any Member.

Retaliation Is Prohibited: Neither AFO nor WOS will tolerate any form of retaliation against individuals who file a complaint or assist in an investigation. Retaliation is a serious violation of this policy and, like any breach of the Code itself, will be subject to disciplinary action.

Questions & Appeals: Any questions regarding this policy should be directed to the local meeting organizers, as specified in the Meeting Program. If an individual involved in any reported incident is dissatisfied with the disciplinary action, he or she may appeal to the AFO and WOS Executive Committees.

Chattanooga Convention Center, Registration, Presentation Guidelines, and Field Trips



The plenary talks and oral presentations will take place in Meeting Rooms 7 and 8. The posters, vendors, and opening reception will be in Banquet Rooms E/F. Registration materials and on-site registration will be in Meeting Room 2. The Student and Early Professionals Luncheon will take place in Banquet Room G. There is complimentary Wi-Fi throughout the building.

Registration

Attendees may pick up their registration materials starting at 3:00 PM on Wednesday, June 6. The registration room will be open all day on Thursday, June 7. On-site registration will be available both days. Your meeting bag will have maps, bus routes, dining guides, a discount coupon for the Tennessee Aquarium, and other goodies!

Presentation Guidelines

Presenters may start loading their talks in their appropriate Meeting Room at 3:00 PM on Wednesday, June 6. For those who are unable to load their presentations on Wednesday, there will be opportunities to load them Thursday before the plenary talk, as well as during the morning coffee break, lunch break, and afternoon break. Presenters will have a total of 15 minutes to talk; ideally 12 minutes for their presentation and 3 minutes for questions. At the end of the 12 minute period, the session moderator will hold up 3 fingers, indicating you have 3 minutes left. When you have 1 minute left, the moderator will stand up, and you should start

concluding your talk. When you are out of time, the moderator will move toward the podium to introduce the next speaker. At this point, your time is up and you should return to your seat. In the event a talk gets cancelled, that time slot may be used as a question/discussion period for any of the previous presentations.

Field Trips

Buses and vans for the field trips and for the banquet at the Tennessee Aquarium will meet outside of the Prefunction Areas. The bus for the Aquarium will start loading between 5:00 and 5:30 PM, and will start bringing people back to the Convention Center around 9:00 PM. For the field trips, meet at the following times:

Honors Golf Course (June 7 and 8)-5:00 PM

Chattanooga Nature Center (June 8 and 9)-6:00 AM

Tennessee River Gorge Banding Station (June 9)-Group 1-6:00 AM, Group 2-12:00 PM

Your name badges indicate which trips you have registered for, as well as whether you purchased a banquet ticket:

AQ = Aquarium Banquet

HC7 = Honors Course trip on June 7

HC8 = Honors Course trip on June 8

CNC8 = Chattanooga Nature Center trip on June 8

CNC9 = Chattanooga Nature Center trip on June 9

TRGT = Tennessee River Gorge Banding Station trip in June 9

Chattanooga Convention Center Green Policy

The Convention Center performs multiple sustainable practices to be energy efficient and stay environmentally friendly. They were the first Center in the nation to incorporate the sophisticated “day lighting” technology in the exhibit halls, which allows natural sunlight to filter in through 30-foot ceiling openings and complement the buildings artificial light.

They have raised the bar in the meetings industry and “green” meetings are the standard for all events held at the Convention Center. Practices include:

- Recycling: Convenient access to recycling is available for all meeting attendees. The facility actively collects for recycling all materials that are recyclable in the area.

- Water: Water will be served in pitchers.
- Food Service: Washable, reusable cups, “glasses” dishes are used. If disposables must be used, there will be no “Styrofoam” (expanded polystyrene) and disposables are high recycled content and/or bio-based and must be collected for recycling.
- Writing Materials: Pens and pads will not be placed unless ordered by the client.
- White Boards: White boards and markers will be used instead of flip charts.
- Box Lunches: Box lunches are not served (unless group is departing for an excursion). If box lunches are requested, the lunches are served in other than virgin paper.
- Communications: All communication with potential guests is electronic, other than what is legally or brand-standard required to be maintained in “hard copy” form.
- Environmental Controls: Temperature in the meeting room is individually controlled and is maintained between 68 and 72 degrees (winter/summer).
- Table Cloths: If cloth tablecloths are used, they will be washed during the event only if visibly soiled.
- Signage: Event signage lists all “green activities” practiced in the planning and operation of the event.
- Leftover Food: All remaining food items will be donated.

The Chattanooga Convention Center is Green Certified through the:



SAVE THE DATE!

In 2019, the Association of Field Ornithologists and the Wilson Ornithological Society will hold a joint annual conference in Cape May, New Jersey from 27-30 October. The meeting venue will be the oceanfront Grand Hotel (<http://www.grandcapemay.com/>), where reasonably priced accommodations will be available for participants. Fall migration is a spectacle in Cape May where migrating raptors, waterbirds and songbirds can all be viewed on the NJ coast. Our local hosts will be the Director, David LaPuma, and staff members of the Cape May Bird Observatory of New Jersey Audubon. Save that date and plan on a fantastic fall meeting in 2019. If you have questions about the meeting, please contact WOS President Mark Deutschlander (deutschlander@hws.edu) or soon-to-be AFO President Dan Ardia (dardia@fandm.edu).



THURSDAY June 7

Oral Presentation Schedule for Chattanooga 2018

THURSDAY	Meeting Room 7	Meeting Room 8
8:00	Announcements	
8:15 WOS Plenary	Margaret Morse Nice Lecture: <i>The challenges of long-term research: getting the work done and keeping it relevant</i> Reed Bowman , Archbold Biological Station	
9:30	WOS Business Meeting	
10:00 Coffee Break		
THURSDAY Session 1	MIGRATION: Rush	SPACE-USE & OCCUPANCY: Bellman
10:30 #01, #02	<i>Investigating molt and migration strategies in a long-distance migratory songbird by using stable-isotope analysis;</i> Ellyne Geurts^S & Kevin Fraser; Dept. Biological Sciences, University of Manitoba	<i>The effects of urban extent on avian diversity: a citizen science and GIS study;</i> Caryn D. Ross^S & David Aborn; Dept. Biology, Geology & Environmental Science, University of Tennessee at Chattanooga
10:45 #03, #04	<i>Energetic condition and mass gain in six species of parulid warbler during stopover along the southern shore of Lake Ontario;</i> Madison O. Sutton^S , J.A. Holzschuh, B.J. Cosentino & M.E. Deuschlander; Dept. Biology, Hobart & William Smith Colleges	<i>Eastern Whip-poor-wills in North Carolina: temporal trends and site-level predictors of site occupancy;</i> Scott M. Pearson¹ & Christine A. Kelly ² ; ¹ Dept. Natural Sciences, Mars Hill University, ² North Carolina Wildlife Resources Commission
11:00 #05, #06	<i>Importance of barrier and nearshore islands for migrant and wintering shorebirds in Mississippi;</i> Abigail J. Darrah¹ , Timothy D. Meehan ² & Nicole L. Michel ³ ; ¹ Audubon Mississippi Coastal Bird Stewardship Program, ² National Audubon Society, ³ National Audubon Society, San Francisco	<i>Evaluating relationships between eastern hemlock decline and Louisiana Waterthrush demographics and behavior in Great Smoky Mountains National Park;</i> Lee C. Bryant^{1,S} , Tiffany A. Beachy ² & Than J. Boves ¹ ; ¹ Dept. Biological Sciences, Arkansas State University, ² Great Smoky Mountains Institute at Tremont
11:15 #07, #08	<i>Geographic variation in two candidate genes related to migratory behavior in Blackpoll Warbler (<i>Setophaga striata</i>);</i> Joel Ralston , Lydia Lorenc & Melissa Montes; Dept. Biology, Saint Mary's College, IN	<i>Evening point counts produce similar occupancy estimates as morning point counts for some species;</i> Neil A. Gilbert^S & Paige F. B. Ferguson; Dept. Biological Sciences, University of Alabama
11:30 #09, #10	<i>First flights: investigating the spatio-temporal patterns of juvenile songbirds on their inaugural fall migration;</i> Kevin C. Fraser , Saeedeh Bani Assadi, Amélie Roberto-Charron & Alisha Ritchie; Dept. Biological Sciences, University of Manitoba	<i>Nonbreeding Swainson's Warblers modify their space-use strategy in response to seasonal environmental change;</i> Alicia R. Brunner^{1,S} , Peter P. Marra ² & Chris M. Tonra ¹ ; ¹ School of Environment & Natural Resources, The Ohio State University, ² Smithsonian Migratory Bird Center
THURSDAY 11:45 #11, #12	<i>Residence of Tennessee Warblers (<i>Oreothlypis peregrina</i>) at an inland stopover site during fall migration: comparing estimates derived using stable isotope and mark-recapture analyses;</i> Aung N. Chan ¹ , Eric C. Soehren ² , Mary Miller ³ & Scott A. Rush⁴ ; ¹ Dept. of Fish,	<i>Experimental investigation of the impact of wader predation on benthic macrofauna in Merja Zerga lagoon, Morocco;</i> Feirouz Touhami^S , Abdelaziz Benhoussa, Hocein Bazaïri & Bouabid Badaoui; Biodiversity, Ecology & Genome Laboratory and Plant &

	Wildlife & Conservation Biology, Colorado State University, ² Alabama Dept. Conservation & Natural Resources, State Lands Division, Wehle Land Conservation Center, ³ USDA Forest Service, Cherokee National Forest, ⁴ Dept. Wildlife, Fisheries & Aquaculture, Mississippi State University	Microbial Biotechnology, Biodiversity and Environment Research Center, University Mohammed V, Morocco
12:00 #13, #14	<i>The response of songbirds to hurricanes during autumn migration</i> ; Theodore J. Zenal Jr. ^{1,2} , Frank R. Moore ¹ , Jeffrey J. Buler ³ & Jaclyn Smolinsky ³ ; ¹ Dept. Biological Sciences, University of Southern Mississippi, ² Dept. Natural Resources & Environmental Sciences University of Illinois, ³ Dept. Entomology & Wildlife Ecology, University of Delaware	<i>Integrating survey and behavior data in the analysis of habitat use by birds in road borders of Argentine Pampas</i> ; Daniela M. Depalma ^{S,1,2} , Myriam E. Mermoz ² , Alejandra C. Valverde ³ & Pablo Picca ³ ; ¹ Dept. Ecología, Genética y Evolución, Universidad de Buenos Aires ² Instituto de Ecología, Genética y Evolución de Buenos Aires, ³ Dept. Biodiversidad y Biología Experimental, Universidad de Buenos Aires, Argentina
12:15 #16		<i>Traits explaining shrub encroachment and land use effects on bird occupancy in an African savanna</i> ; Richard A. Stanton ^{S, Jr} , Robert J. Fletcher, Jr ² , Muzi Sibiya ³ , Ara Monadjem ^{3,4} & Robert A. McCleery ² ; ¹ Intersdisciplinary Ecology Program, School of Natural Resources & the Environment, University of Florida, ² Dept. Wildlife Ecology and Conservation, University of Florida, ³ All Out Africa Research Unit, Dept. Biological Sciences, University of Swaziland, ⁴ Mammal Research Institute, Dept. of Zoology & Entomology, University of Pretoria, South Africa
12:30 Lunch Break	*****	*****
THURSDAY Session 2	CONSERVATION: Gawlik	VOCALIZATION & COMMUNICATION: Ballentine
2:00 #17, #18	<i>Desert riparian bird and butterfly community response to removal of an invasive grass along the Rio Grande in Big Bend National Park, Texas</i> ; Julie Coffey ^{1,S} , Eric Wood ¹ , Heather Mackey ¹ & Lars Pomara ² ; ¹ Dept. Biology, California State University - Los Angeles, ² USDA Forest Service, Southern Research Station - Asheville	<i>The effect of environmental conditions on the detection frequency of owl calls</i> ; Allison Pudlo ^S , Laura Kloepper & Joel Ralston; Dept. Biology, Saint Mary's College - Notre Dame, IN
THURSDAY 2:15 #19, #20	<i>Interactive impacts of by-catch take and elite consumption of illegal wildlife</i> ; R.L. Stirnemann ¹ , I.A. Stirnemann ² , D. Abbot ⁵ , D. Biggs ^{3,4} & R. Heinsohn ¹ ; ¹ Fenner School of Environment & Society, The Australian National University, Acton, Australia ² Biodiversity & Ecosystem Research Group, Institute of Landscape Ecology, University of Münster, Germany, ³ ARC Centre of Excellence	<i>When to change your tune? Unpaired and paired male House Wrens respond differently to anthropogenic noise</i> ; Erin E. Grabarczyk ^{S,1} , Monique Pipkin ² , Maarten J. Vonhof ^{1,3} & Sharon A. Gill ¹ ; ¹ Dept. Biological Sciences, Western Michigan University,

	for Environmental Decisions, Biodiversity & Conservation Science, University of Queensland, Brisbane, Australia, ⁴ Dept. Conservation Ecology and Entomology, Stellenbosch University, Stellenbosch, South Africa, ⁵ IUCN Sustainable Use & Livelihoods Specialist Group, Gland, Switzerland	² Ecology Program, The Pennsylvania State University, ³ Institute of the Environment & Sustainability, Western Michigan University
2:30 #21, #22	<i>Rodent eradications on islands and their effect on rails (Rallidae) as non-target species</i> ; Simon Ward ¹ , Auriel M.V. Fournier ² & Alexander L. Bond ^{3,4} ; ¹ School of Biological & Chemical Sciences, Queen Mary University of London, United Kingdom; ² Mississippi State University - Biloxi; ³ RSPB Centre for Conservation Science, United Kingdom	<i>Complex evolutionary interactions between mating system and learned song in passerine birds</i> ; Kate T. Snyder ^S & Nicole Creanza; Dept. Biological Sciences, Vanderbilt University
2:45 #23, #24	<i>Naturalized citizen psittacines in southern California offer conservation opportunities for endangered Mexican species</i> ; Brooke Durham ; Independent researcher	<i>The effect of whisper calls on settlement decisions in female Veeries (Catharus fuscescens)</i> ; William Fetzner ^S & Kenneth Schmidt; Dept. Biological Sciences, Texas Tech University
3:00 #25, #26	<i>Captive rear and release: conservation tool or high trophic level bird feeder?</i> Rebecca Perkins ^{1,5} & Clint Boal ² ; ¹ Dept. Natural Resources, Texas Tech University, ² USGS, Texas Cooperative Fish & Wildlife Research Unit, Texas Tech University	Responses to song playback by male chickadees in a rapidly moving hybrid zone; Katherine A. Monroe, Emily S. Burton, John C. Szot & Robert L. Curry ; Dept. Biology, Villanova University
3:15 #27	<i>Effects of invasive plant control efforts on marsh breeding birds at a wetland complex along southern Lake Erie</i> ; Sarah Sargent ¹ , Christopher H. Lundberg ² & Anne Balogh ³ ; ¹ National Audubon Society, Meadville, PA; ² Dept. Biology, Allegheny College, ³ Licking County Parks Dept., Granville, OH	
3:30 Coffee Break	*****	*****
THURSDAY Session 3	CONSERVATION , continued	HABITAT SELECTION: J. Smith
4:00 #28, #29	<i>Is mercury pollution a conservation concern for songbirds?</i> Daniel A. Cristol , Andrew J. Rapp & Nicholas J. Lignore; Dept Biology, College of William & Mary	<i>Courting risk: do consequences exist for American Woodcock selecting post-industrial habitat for courtship?</i> Kathleen E. Farley ^{1,5} , Nicholas J. Henshue ² , Derrick Ofori-Boateng ¹ & Claus Holzapfel ¹ ; ¹ Dept. Biological Sciences, Rutgers University-Newark, ² Dept. Earth Sciences, University at Buffalo
4:15 #30, #31	<i>Mercury contaminated riparian spiders: toxicological implications for passerine birds inhabiting Tennessee's Appalachian Mountains</i> ; Gale B. Beaubien ^{1,5} , Connor I. Olson ^{2,5} , Scott A. Rush ³ , David McKinney ⁴ & Ryan R. Otter ^{1,2} ; ¹ Molecular Biosciences Interdisciplinary Ph.D. Program, Middle Tennessee State University, ² Dept. Biology, Middle Tennessee State University	<i>White-headed Woodpecker (Picoides albolarvatus) nesting habitat selection at multiple scales</i> ; Kathryn Purcell ¹ , Eric McGregor ¹ & James Baldwin ² ; ¹ USDA Forest Service, Pacific Southwest Research Station - Fresno, ² USDA Forest Service, Pacific Southwest Research Station - Albany

	³ Dept. Wildlife, Fisheries & Aquaculture, Mississippi State University, ⁴ Tennessee Wildlife Resources Agency	
4:30 #32, #33	<i>Infestation by the exotic fruit fly, <i>Drosophila suzukii</i>, reduces local abundance of frugivorous birds in an Appalachian forest</i> ; Scott Stoleson ¹ & Christopher Lituma ² ; ¹ USDA Forest Service, Northern Research Station – Irvine, ² West Virginia University	<i>Winter roost-site selection by Red-headed Woodpeckers in a burned forest stand</i> ; Benjamin Nickley ^S & Lesley P. Bulluck; Dept. Biology, Virginia Commonwealth University
4:45 #34		<i>Piping Plover (<i>Charadrius melodus</i>) habitat selection of human-created restoration habitat and storm-created overwash on Fire Island, New York</i> ; Henrietta A. Bellman ^S , Samantha G. Robinson, Katie M. Walker, Shannon Ritter, James D. Fraser, Daniel H. Catlin & Sarah M. Karpanty; Dept. Fish & Wildlife Conservation, Virginia Tech
5:00 Break	*****	*****
7:00 Poster reception	Ballroom E/F	
	EVEN-numbered posters present 7:00-8:30 pm ODD-numbered posters present 8:30-10:00 pm	
P01		<i>Changes in nesting phenology and delayed incubation of Tree Swallows in Ohio from 1966-2016</i> ; Weber, Ryan ^S , Jason Courter & Mike Watson
P02		<i>Carolina Chickadees (<i>Poecile carolinensis</i>) increase nest visitation rate in response to a novel predator, the House Wren (<i>Troglodytes aedon</i>)</i> ; Dunn ^S , Lex, J. Lindley McKay, Lucy M. Avina & Olga Milenkaya
P03		<i>Sex differences in fecal sac removal from Carolina Chickadee (<i>Poecile carolinensis</i>) nests</i> ; Koch, Samuel ^S & Lindsey Walters
P04		<i>A survey of wintering waterfowl on the bays and estuaries of the Florida/Alabama Gulf Coast</i> ; Nash ^S , Cody , Rob Holbrook & Philip Darby
P05		<i>Migratory patterns in male and female Common Yellowthroats (<i>Geothlypis trichas</i>) at different spring migratory sites</i> ; Roberts, Kelly ^S , Veronica Schabert, Kristen Covino & Andrea Patterson
P06		<i>Age-specific variation between migration patterns of the Common Yellowthroat (<i>Geothlypis trichas</i>)</i> ; Schabert, Veronica ^S , Kelly Roberts, Kristen Covino & Andrea Patterson
P07		<i>Predation rates on model caterpillars are higher suburbs than in the city or country</i> ; Schall, Amanda, Christina Shonk,

		Sebastian Moreno, Madelyn Dolinsky^S , Emily Russavage, Ana Rahman, Zoya Rahman, Emily Kamieniecki, Keri Skvarla, Michael A. Steele & Jeffrey Stratford
P08		<i>Avian nest site selection and reproductive success</i> ; Thammarat, Chayata^S & Julie Jedlicka
P09		<i>Energetic condition and differential migration during fall and spring migration in Ruby-crowned Kinglets: a test of the insurance and breeding hypotheses</i> ; Martel^S, Grace , Bradley Cosentino, and Mark E. Deutschlander
P10		<i>An experimental test of the relationship between yolk testosterone and the social environment in a colonial passerine</i> ; Bentz, Alexandra B.^S , Victoria A. Andreasen & Kristen J. Navara
P11		<i>Passerine occurrence and seed dispersal post-wildfire within the Flipper Bend Woods of Signal Mountain, Tennessee</i> ; Feely, Mary^S & David Aborn
P12		<i>Daily survival rates of Brown Pelican (<i>Pelecanus occidentalis carolinensis</i>) nests and chicks and their relationships with nest habitat</i> ; Streker, Rochelle^S , Patrick Jodice & Juliet Lamb
P13		<i>Post-fledging habitat use and movements of Worm-eating Warblers (<i>Helmitheros vermivorum</i>) in the Tennessee River Gorge</i> ; Youngman, Holland^S , Rick Huffines & David Aborn
P14		<i>Seasonal rainfall influences intra- and inter-seasonal variation in territoriality of a wintering migratory songbird</i> ; Dossman^S, Bryant C. , Amanda D. Rodewald & Peter P. Marra
P15		<i>Evaluating the impact of overnight en route weather over the Gulf of Mexico on lean mass of spring migrants</i> ; Gutierrez Ramirez, Mariamar^S , Joely DeSimone, Michael S. Griego, Cory R. Elowe & Alexander R. Gerson
P16		<i>Resource use and interspecific interactions in a Namibian cavity-nesting community</i> ; Millican^S, David & Jeff Walters
P17		The evolution of Chipping Sparrow song: a geographic comparison of genetic and cultural variation ; Searfoss, Abigail M.^S , Desmond Fugar, Wan-chun Liu & Nicole Creanza
P18		<i>Suburban forests buffer effects of bird blow fly ectoparasitism on nestling Wood</i>

		<i>Thrushes (Hylocichla mustelina)</i> ; Straley, Katherine^S , Paige Warren & David King
P19		<i>Current threats faced by Neotropical parrot populations</i> ; Berkunsky, Igor with 101 co-authors
P20		<i>Want an internship after graduation? The Avian Ecology Program at Archbold Biological Stations offers paid internships with independent research!</i> Bowman, Reed, Stephanie Carrera, Logan Clark, Alberto Gonzalez, Meredith Heather, David L. Sherer, Young Ha Suh , Angela Tringali & Rebecca Windsor
P21		<i>Age-specific variation in House Sparrow (Passer domesticus) preen gland secretions and effect of semi-volatile components on attraction of the mosquito Culex pipiens</i> ; Boyer, Kevin^S , Cella Wright, Abbie McCrea, Madeleine Gefke, Yemko Pryor, Anah Soble, Mercedes Campos-Lopez, Tempe Shrenker, Max Butler, Ben Lovett, Amy Austin, Mary Garvin & Rebecca Whelan
P22		<i>Red-tailed Hawk eggshell characteristics change due to embryonic development</i> ; Brown, W.P.
P23		<i>Factors affecting the abundance and distribution of wintering waterfowl in Narragansett Bay, Rhode Island</i> ; Chace, Jameson F. , Erin O'Neill, Makayla Corimer & Ryan Senecal
P24		<i>Total plasma protein: Correlates and lack of species differences</i> ; Hatch, Margret I & Robert J. Smith
P25		<i>Time and environment influence incubation by Greater Prairie-Chickens in the Nebraska Sandhills</i> ; Hoppe, Ian R., Jocelyn Olney Harrison, Edward J. Raynor IV, Mary Bomberger Brown , Larkin A. Powell & Andrew J. Tyre
P26		<i>Scarlet-headed Blackbird (Amblyramphus holosericeus): a new effective host for the specialized Screaming Cowbird (Molothrus rufoaxillaris) that is not a cooperative breeder</i> ; Mermoz, Myriam E, Emilio M. Charnelli, Daniela M. Depalma & Cecilia Zilli
P27		<i>Responses of warblers to flight calls: does age influence the latency of response?</i> Johnston, Elliot & Sara R. Morris
P28		<i>Using eBird and other online resources in teaching ornithology</i> ; Kennedy, E. Dale & Douglas W. White
P29		<i>Predator cues used by Carolina Chickadees and Tufted Titmice in risk</i>

		<i>assessment in foraging conditions; Kyle, Steven^S</i>
P30		<i>Comparison of yolk carotenoid concentrations of three secondary-cavity nesting songbirds in west-central Georgia; Newbrey, Jennifer L., Quadasia Love & Michael G. Newbrey</i>
P31		<i>Bird feeder hygiene methods: recommendations versus reality; Underwood, Todd J & Makayla B. Boyd</i>
P32		<i>The effects of traffic noise on the alarm calls of Black-capped Chickadees; Veldhuizen, Kelsey, Jacqui Peterson & Jason Courter</i>
P33		<i>Nestling diet of Red-headed Woodpeckers in South Carolina; Vukovich, Mark & John C. Kilgo</i>
P34		<i>Ectoparasites of some wild bird species at some gallery forests along River Benue in Nigeria, West Africa; Adelusi, S.M & E.A. Omudu</i>
P35		<i>Avian responses to indigenous community forest management in western Amazonia; Arcilla, Nico, Madison O Sutton, Oscar Tsamajain Shiwig & Robert J Cooper</i>
P36		<i>Non-territorial sub-populations of Wilson's Warblers (<i>Cardellina pusilla</i>); William M. Gilbert</i>

FRIDAY June 8

Oral presentation schedule for Chattanooga 2018

Friday	Meeting Room 7	Meeting Room 8
8:00	Announcements	
8:15 AFO Plenary	<i>Variation in extra-pair paternity: lessons learned from studying birds in South America</i> Valentina Ferretti , Consejo Nacional de Investigaciones Científicas y Técnicas	
9:30	AFO Business Meeting	
10:00 Coffee Break		
FRIDAY Session 1	SYMPOSIUM: Ecology and conservation of high elevation birds in the southern Appalachian mountains	METHODOLOGY & TECHNIQUES: Fournier
10:30 S01, #35	<i>Diversity and conservation status of trailing-edge populations in the southern Appalachian Mountains;</i> Richard B. Chandler , Sam Merker ^S , Ryan Chitwood ^S , Will Lewis ^S & Robert J. Cooper; Warnell School of Forestry & Natural Resources, University of Georgia - Athens	<i>Assessing injury rates of Wilson's Warblers captured in two different mist net mesh sizes;</i> Meredith L. Heather ¹ & Renée Cormier ² ; ¹ Archbold Biological Station, ² Point Blue Conservation Science
10:45 S02, #36	<i>Demographic drivers of Black-throated Blue Warbler population dynamics at the trailing edge and core of the species' range;</i> Ryan W. Chitwood ^{1,S} , Richard B. Chandler ¹ , Mason H. Cline ² , Michael T. Hallworth ³ , Joanna L. Hatt ² , T. Scott Sillett ³ , Kirk W. Stodola ⁴ & Robert J. Cooper ¹ ; ¹ Warnell School of Forestry & Natural Resources, University of Georgia - Athens, ² New Mexico Dept. Game & Fish, ³ Smithsonian Migratory Bird Center, ⁴ Illinois Natural History Survey	<i>Complementing long-term bird monitoring observations with acoustic sensors and camera traps: best of both worlds;</i> Elizabeth Znidarsic ^{1,2} , Michael Towsey ³ , David M. Watson ¹ , Kelly W. Roy ² , Sarah E. Darling ⁴ , Anthony Truskinger ³ & Paul Roe ³ ; ¹ Institute for Land, Water & Society, Charles Sturt University, NSW, Australia, ² Oak Ridge National Laboratory, Environmental Sciences Division, ³ QUT Ecoacoustics Research Group, Science & Engineering Faculty, Queensland University of Technology, Australia, ⁴ Oak Ridge National Laboratory, Facilities & Operations Directorate
11:00 S03, #37	<i>Factors affecting the nestling provisioning rate of Black-throated Blue Warblers from a declining trailing-edge population;</i> William B. Lewis ^S , Ryan Chitwood ^S & Robert J. Cooper; Warnell School of Forestry & Natural Resources, University of Georgia - Athens	<i>Application of structured decision making in the development of a Gulf of Mexico-wide avian monitoring program;</i> Mark S. Woodrey ^{1,2} , Auriel Fournier ¹ , Randy Wilson ³ , Jeff Gleason ⁴ , Jim Lyons ⁵ , Robert J. Cooper ⁶ & John Tirpak ⁷ ; ¹ Coastal Research & Extension Center, Mississippi State University, Biloxi, MS 39532; ² Grand Bay National Estuarine Research Reserve, Moss Point, MS 39562; ³ USFWS - Jackson; ⁴ USFWS - Chiefland; ⁵ USGS Laurel, MD 20708; ⁶ Warnell School of Forestry & Natural Resources, University of Georgia - Athens, ⁷ USFWS - Lafayette
11:15 S04, #38	<i>Does competition determine warm-edge range limits in the southern Appalachian Mountains?</i> Samuel Merker ^S & Richard Chandler; Warnell School of Forestry &	<i>Do camera arrangement and settings improve individual identification of Golden Eagles?</i> Mark Vukovich & John C. Kilgo; USDA Forest Service, Southern Research Station - New Ellenton

	Natural Resources, University of Georgia - Athens	
FRIDAY 11:30 S05, #39	<i>A landscape level approach to understanding breeding habitat of a rapidly declining migratory songbird;</i> Elizabeth Schold ^{S,1} & Lesley Bulluck ¹ ; Virginia Commonwealth University	<i>Implications for using singed feathers in determining geographic origin with wildlife forensics approaches;</i> Abigail Reid ^{S,1} , Hannah B. Vander Zanden ^{2,3} , Todd Katzner ³ & David M. Nelson ⁴ ; ¹ Pawling High School - NY, ² Dept. Biology University of Florida - Gainesville, ³ USGS, Forest & Rangeland Ecosystem Science Center - Boise, ⁴ Appalachian Laboratory, University of Maryland Center for Environmental Science
11:45 S06, #40	<i>Relative abundance of forest songbirds on Cherokee National Forest, Tennessee related to forest management and climate change covariates;</i> Andrew Isenhower ^S & David Buehler; Forestry, Wildlife & Fisheries, University of Tennessee-Knoxville	<i>The relationship between urbanization and head trauma occurrences in raptors informed by rehabilitation data;</i> Taylor Eshmont ^{1,5} , Lori Blanc ² & Jennifer Smith ² ; ¹ Dept. Animal & Poultry Sciences, ² Dept. Biological Sciences, Virginia Tech
12:00 S07, #41	<i>Short-term response of breeding birds to oak regeneration treatments in southern Appalachian hardwood forest;</i> Cathryn H. Greenberg ¹ , Kathleen E. Franzreb ¹ , Tara L. Keyser ¹ , Stanley J. Zarnoch ² , Dean M. Simon ³ & Gordon S. Warburton ³ ; ¹ USDA Forest Service, Southern Research Station - Asheville, ² USDA Forest Service, Southern Research Station - Clemson, ³ North Carolina Wildlife Resources Commission (retired)	<i>Flight initiation distance changes, but not by much, before and after banding in Song Sparrows (<i>Melospiza melodia</i>);</i> Jeremy Hyman , Kate O'Hanlon & Kelsey Stover; Dept. Biology, Western Carolina University
12:15 S08	<i>Remotely sensed vegetation phenology monitoring can advance efforts to model habitat suitability and occupancy for birds associated with early-successional forest;</i> Lars Y. Pomara ¹ , Eric M. Wood ² , Danny C. Lee ¹ , Ronald W. Rohrbaugh ³ , Sara E. Barker ³ , Kenneth V. Rosenberg ³ & Amanda D. Rodewald ³ ; ¹ USDA Forest Service, Southern Research Station - Asheville, ² Dept. Biological Sciences, California State University - L.A., ³ Cornell Lab of Ornithology	
12:30 Lunch Break	*****	*****
FRIDAY Session 2	APPALACHIAN BIRD SYMPOSIUM, cont.	PHYSIOLOGY & PARASITOLOGY: Tringali
2:00 S09, #42	<i>Incorporating climate variables improves distribution models for trailing edge populations;</i> Heather Abernathy ¹ , John Maerz ² & Jeffrey Hepinstall-Cymerman ² ; ¹ Fish & Wildlife Conservation, Virginia Tech, ² Warnell School of Forestry &	<i>Three undergrads, three metabolites, in three years: a story about Baltimore Oriole physiology;</i> Luke J. Hamilton ^S , Emma C. Keele, Marika Van Brocklin & Letitia M. Reichart; Dept. Biology, University of Nebraska-Kearney

	Natural Resources, University of Georgia - Athens	
2:15 S10, #43	<i>Breeding season home-range estimates of Hermit Thrush in the southern Appalachian Mountains of North Carolina;</i> John A. Gerwin ¹ , Edward A. Landi ^{1,2} , Olivia F. Merritt ^{1,2,3} , Vanessa J. Merritt ^{1,2,3} & Emma J. Little ⁴ ; ¹ North Carolina State Museum of Natural Sciences,, ² North Carolina State University - Raleigh, ³ Millbrook Magnet High School & International Baccalaureate World School, ⁴ Enloe Magnet High School	<i>Investigating behavioral variation and stress in urban and rural populations of Eastern Bluebirds;</i> Barbara Ballentine ^{1,2} , Meghan Graham ² & Gabriel de la Iglesia ¹ ; ¹ Western Carolina University, ² University of West Georgia
2:30 S11, #44	<i>Avian dynamics along an elevation gradient in the Central Appalachians;</i> Christopher Rota , West Virginia University	<i>Fight or flight: why not both? The association of acute stress response with personality, dominance, and condition;</i> Rebecca L. Windsor ¹ , Angela Tringali ¹ , Sara Prussing ² & Reed Bowman ¹ ; ¹ Avian Ecology Lab, Archbold Biological Station, ² Dept. Biology, Central Michigan University
2:45 S12, #45	<i>Declines in high elevation populations of Southern Appalachian birds: confronting and reducing uncertainty;</i> Robert J. Cooper , Michael J. Conroy & Richard B. Chandler; Warnell School of Forestry & Natural Resources, University of Georgia - Athens	<i>Malarial parasites within a moving avian hybrid zone: mapping their occurrence and prevalence among hybridizing chickadee populations;</i> Ari A. Rice ^{S,1} , Robert L. Curry ¹ & Jason D. Weckstein ² ; ¹ Dept. Biology, Villanova University, ² The Academy of Natural Sciences at Drexel University
3:00 #46	Discussion	<i>Does stress response predict social network position in a cooperatively breeding bird?</i> Angela Tringali , Rebecca Windsor & Reed Bowman; Avian Ecology Program, Archbold Biological Station
3:15 #47		<i>Urbanization and avian ectoparasites interactions in Nigeria: emerging implications for zoonotic infestation;</i> Edward Omudu & Stephanie Adelus; Dept. Biological Sciences, Benue State University, Makurdi, Nigeria
3:30 Coffee Break	*****	*****
FRIDAY Session 3	Breeding Biology: Tarvin	
4:00 #48	<i>Indirect effects of a competitor on life history and reproductive traits in a cavity nesting bird;</i> Sarah Britton ^S & Barbara Ballentine; Western Carolina University	
4:15 #49	<i>Prediction and prevention of nest predation in passerine species in middle Georgia;</i> Tina R. Smith ^{1,S} & Katie Stumpf; Georgia College & State University	

4:30 #50	<i>American Kestrel (Falco sparverius) food habits and delivery rates during the brood rearing period in the southern plains; Clint Boal¹, Madeleine Thornley^{2,S} & Shea Mullican^{2,S}; ¹USGS, Texas Cooperative Fish & Wildlife Research Unit, Texas Tech University, ²Dept. Natural Resources, Texas Tech University</i>	
4:45 #51	<i>Plumage and Behavioral Development of Nestling Anhingas; Jerome A. Jackson¹ & Bette J. S. Jackson²; ¹Dept. Marine & Ecological Sciences, Florida Gulf Coast University, ²Dept. Biological Sciences, Florida Gulf Coast University</i>	
6:00 Closing Banquet		

ABSTRACTS

PLENARIES

MARGARET MORSE NICE LECTURE: Wilson Ornithological Society

Reed Bowman

Avian Ecology Program, Archbold Biological Station, Venus, FL 33960

The challenges of long-term research: getting the work done and keeping it relevant

Few begin a research project and imagine it lasting 50 years, yet long-term demographic research that spans multiple generations can address many important questions in ecology and evolutionary biology. Long-term studies of individually marked birds allows estimates of age or stage-based changes in life histories, the influence of one life stage on the next and the influence of social or kin structure on variation in lifetime reproductive success and subsequent patterns of selection. Via pedigrees, we can integrate heritability and quantitative genetics with environmental parameters into models of selection. However, long-term studies often persist beyond their originators, beyond multiple generations of data management, and of funding sources, all of which influence quality and consistency. Continuous funding requires new questions which arise through increased study depth and breadth, new technology and new theory. On the 50th breeding season of our long-term study of the demography of the Florida Scrub-Jay and in the context of these challenges, I will discuss the evolution of our project, our collaborative networks, and past milestones and the integration of new theory and technologies that is providing opportunities for synthesizing our previous understanding and generate new ecological and evolutionary models that also have conservation relevance.

PLENARY LECTURE: Association of Field Ornithologists

Valentina Ferretti

Consejo Nacional de Investigaciones Científicas y Técnicas

Variation in extra-pair paternity: lessons learned from studying birds in South America

Since 1987 when DNA molecular techniques were first applied to behavioral and ecological studies of mating systems in birds, the long-standing assumption that 90% of avian taxa are monogamous has steadily eroded. Now, it is difficult to speak of avian mating systems without distinguishing between social and genetic mating systems. Early research on this subject applied molecular techniques to the study of wild bird populations to evaluate the incidence of mixed reproductive strategies by males and females. More recently, there has been a shift in focus from *what* is the incidence of occurrence of extra-pair paternity (EPP) to *why* there is variation in the incidence of EPP, both within and between populations and species. However, despite all the attention received and some careful comparative analyses there is still no unified understanding of the causes of variation in EPP. I test here some of the hypotheses proposed to explain variation EPP in *Tachycineta* swallows, and show how sampling of EPP rates for taxa in the tropics and South temperate regions yielded results that do not follow the pattern found in the Northern Hemisphere. Mating strategies have to be considered as behavioral syndromes, and the

study of their variation needs to examine the different trade-offs between life-history parameters and environmental variables.

ORAL PRESENTATIONS

Presenting **authors** in boldface

S09 *SYMPOSIUM: Ecology and conservation of high elevation birds in Appalachians*
Abernathy¹ Heather, John Maerz², and Jeffrey Hepinstall-Cymerman²

¹ Fish and Wildlife Conservation, Virginia Tech, Blacksburg, VA

² Warnell School of Forestry & Natural Resources, University of Georgia, Athens, GA

Incorporating climate variables improves distribution models for trailing edge populations

Identifying areas of suitable habitat is a fundamental requirement in managing wildlife populations, but many species distribution models (SDMs) based on simple species-habitat associations are prone to overestimation errors. We compared occupancy models using only land cover and elevation to models that included additional climate-related measures to assess how estimates of habitat availability, distribution, and configuration for trailing-edge populations of the Black-throated Blue Warbler (*Setophaga caerulescens*, BTBW) in western North Carolina change. Models that included mean annual precipitation, integrated moisture index (IMI), and heat load index (HLI) fit observed data better and predicted only 42% of the areal extent of suitable habitat predicted by models using only land cover and elevation. In our top model, precipitation was twice as important as land cover which was slightly more important than IMI and HLI, and an interaction of HLI and mean precipitation in predicting BTBW occupancy. IMI was highly positively correlated with elevation. We explored the configuration and connectivity of potential populations and determined they are likely more patchy and isolated than what is currently predicted by SDMs such as GAP models. Specifically, areas with high predicted occurrence were at higher elevations, wetter sites, and tended to occur in linear patches. These findings indicate the additional peril these species may face with a changing climate. Since three climate-related variables were included in estimating occupancy, the importance of accounting for climate-environmental interactions in driving trailing-edge populations cannot be overemphasized.

43 *PHYSIOLOGY & PARASITOLOGY*

Ballentine^{1,2}, Barbara, Meghan Graham², and Gabriel de la Iglesia¹

¹Western Carolina University ²University of West Georgia

Investigating behavioral variation and stress in urban and rural populations of Eastern Bluebirds

Urbanization presents animals with unique challenges associated with the effects of human disturbances such as increased noise, light, pollution and proximity to humans. However, increased tolerance to human disturbance can allow individuals to take advantage of potential benefits of urban landscapes such as access to resources, less interspecific competition and lower predation. Clumped resources associated with human disturbances characterize urban landscapes and may favor more aggressive males that can defend high quality resources and bolder males that are tolerant of anthropogenic disturbance. However, costs to urban colonizers may persist because of chronic exposure to stress. In this study, we investigate how aggression and boldness differs in populations of Eastern Bluebirds, *Sialia sialis*, inhabiting both urban and rural

landscapes using playback experiments. To estimate the effects of stress on urban populations, we measuring telomere length in nestlings. Shortened telomeres are a result of increased stress in humans and some birds and can result in decreased lifespans. We found that urban males are more aggressive than rural males and that urban males approached humans and natural predators equally. But, rural birds were less willing to approach a human than to approach a natural predator suggesting that boldness in the presence of humans is not the result of habituation and that anthropogenic disturbance favors aggressive males that are tolerant of humans. However, we found that urban nestlings have shorter telomeres than rural nestlings suggesting that birds colonizing urban areas may experience more stress that may have long term consequences.

30 CONSERVATION

Beaubien^{1,S}, Gale B., Connor I.Olson^{2,S}, Scott A.Rush³, David McKinney⁴, and Ryan R.Otter^{1,2}

¹Molecular Biosciences Interdisciplinary Ph.D. Program, Middle Tennessee State University, Murfreesboro, TN 37130

²Department of Biology, Middle Tennessee State University, Murfreesboro, TN 37130

³Department of Wildlife, Fisheries and Aquaculture, Mississippi State University, Mississippi State, MS 39762

⁴Tennessee Wildlife Resources Agency, Nashville, TN 37220

Mercury contaminated riparian spiders: toxicological implications for passerine birds inhabiting Tennessee's Appalachian Mountains

Tennessee's Appalachian Mountains are historically a hotspot for the wet and dry deposition of atmospheric mercury. Once mercury reaches the aquatic environment, sulfate-reducing bacteria may convert mercury into its bioavailable and toxic form, methyl-mercury. Riparian spiders, specifically those that spin webs above the land-water interface and passively prey on emerging insects, can be exposed to methyl-mercury when they prey on benthic macroinvertebrates (i.e. mayflies, caddisflies, and midges) that recently emerged from the neighboring streams. These spiders extend the aquatic food-chain and serve as a vector for methyl-mercury when they are preyed upon by birds. The objective of this study was to assess the risk of riparian spider ingestion to arachnivoracious birds in Tennessee's Appalachian Mountains. To determine the viability of spiders as a mercury exposure pathway, two groups of spiders (Families: Tetragnathidae and Araneidae) were collected from four streams and one pond that span the latitudinal gradient of Tennessee's Appalachian Mountains. Whole-body homogenates were then analyzed for mercury (Tetragnathids: $220 \pm 28 \mu\text{g}/\text{kg}$; Araneids: $85 \pm 10 \mu\text{g}/\text{kg}$). The methyl-mercury concentrations were then calculated using literature based conversion ratios and then compared to calculated spider-based avian wildlife values (bird specific methyl-mercury risk thresholds). At all sites spiders exceeded methyl-mercury risk threshold concentrations calculated for chickadee (*Poecile* spp.) nestlings. These results suggest that mercury poses a risk to arachnivoracious passerine birds across the range of Tennessee's Appalachian Mountains.

STUDENT AWARD - DOCTORAL

34 HABITAT SELECTION

Bellman^S, Henrietta A., Samantha G. Robinson, Katie M. Walker, Shannon Ritter, James D. Fraser, Daniel H. Catlin, and Sarah M. Karpanty

Department of Fish and Wildlife Conservation, 134 Cheatham Hall, Virginia Tech, Blacksburg, VA 24060

Piping Plover (*Charadrius melodus*) habitat selection of human-created restoration habitat and storm-created overwash on Fire Island, New York

An increase in coastal habitat modification can impact coastal ecosystems and natural processes, affecting breeding shorebirds. The Atlantic Coast Piping Plover (*Charadrius melodus*; hereafter ‘plover’) is adapted to dynamic coastal systems where it nests on dry sandy substrates created when storms overwash barrier islands. Following Hurricane Sandy in 2012, the U.S. Army Corps of Engineers proposed a coastal risk reduction project on Fire Island, NY. To mitigate the impacts to threatened breeding plovers 45 hectares of restoration habitat were created (2014–2015). Additionally, some Sandy-created overwash was managed (beach widening, dune creation/stabilization; hereafter, ‘manipulated overwash’), while others were not managed (hereafter, ‘natural overwash’). Our objective was to compare plover habitat selection and reproductive success in these habitats. We monitored plovers on Fire Island from April to August (2015–2017) and used high-resolution aerial imagery to map habitat types. We compared the proportion of use (plover pairs) to the proportion of available nesting substrate (ha) across management types. Dry sand declined across all habitats from 2015–2017 as vegetation grew. Plover pairs varied in the restoration habitat, decreased in the manipulated overwash and increased in the natural overwash. We did not detect significant habitat selection for or against any habitat within years. Reproductive success increased in the restoration habitat (0%–100% from 2015 to 2017). We expect the current increase in pair numbers and density to stabilize as the habitats reach carrying capacity. We recommend continued monitoring of these habitats to determine any lasting impacts on plovers on Fire Island.

STUDENT AWARD - MASTERS

50 BREEDING BIOLOGY

Boal¹, Clint, Madeleine Thornley^{2,S}, and Shea Mullican^{2,S}

¹U.S. Geological Survey, Texas Cooperative Fish and Wildlife Research Unit, Texas Tech University, Lubbock, TX 79409.

²Department of Natural Resources, Texas Tech University, Lubbock, TX 79409

American Kestrel (*Falco sparverius*) food habits and delivery rates during the brood rearing period in the southern plains

American Kestrel (*Falco sparverius*) populations are generally declining across their North American distribution. However, they appear to be stable or increasing in the southern Great Plains region, an area that likely had very low natural presence of the species pre-European settlement. In 2011 we initiated a nest box program to study kestrel ecology in short/mixed grass prairies of Texas. One line of inquiry was assessing how population dynamics may be influenced by regional dietary habits. We recorded over 3,100 prey deliveries during four-week brood-rearing periods at nest boxes in 2017. Average prey delivery rates/hour increased from 0.84/hr and 0.96/nestling/hr during the first week to 2.65/hr and 0.57/nestlings/hr during the fourth week of brood rearing. The breeding season diet was dominated by reptiles (71.3%). Prairie racers and common spotted whiptails (*Aspidoscelis sexlineata viridis* and *A. gularis*) accounted for 38.3% and Texas horned lizards (*Phrynosoma cornutum*) accounted for 13.0% of prey deliveries. Mammalian (5.4%), avian (2.3%), and invertebrate (21.0%) prey were difficult to identify beyond genus, family, and order, respectively, but a minimum of 30 different prey species were identified. Prey as large as juvenile cottontails (*Sylvilagus floridanus*) and cotton rats (*Sigmodon hispidus*) were delivered to nest boxes. Biomass assessments are underway for

complete presentation of breeding season prey use of kestrels in our study, with comparison to data from other regions.

STUDENT AWARD - MASTERS

48 *BREEDING BIOLOGY*

Britton^S, Sarah and Barbara Ballentine

Western Carolina University

Indirect effects of a competitor on life history and reproductive traits in a cavity nesting bird

Research on life history evolution in birds has revealed both direct and indirect effects of predation. Increased levels of nest predation favor reproductive behaviors that reduce the threat of predators on offspring or allow parents to bet hedge for future reproductive attempts. In this study, we investigate whether the presence of a competitor, the House Wren (*Troglodytes aedon*), results in similar indirect effects on life history and reproductive behaviors of Carolina Chickadees (*Poecile carolinensis*). House Wrens compete for nesting cavities and will kill Carolina Chickadee eggs and nestlings. We monitored nest boxes in Western North Carolina where exposure to House Wrens varies. We surveyed House Wren presence at active Carolina Chickadee nests and measured clutch size and mass, incubation, provisioning rates, nestling growth rates, development, and fledging success of chickadees. House Wren takeover accounted for 35% of nesting failures, more than any other cause of failure in our study. We found smaller clutch sizes in areas where House Wrens were present. However, we did not detect any effects of House Wren presence on chickadee egg size, incubation, provisioning, growth, or development. These results suggest that House Wren presence affects a narrow range of life history traits early in the nesting period, possibly because this is when House Wrens are the biggest threat. Reducing clutch size may be a strategy used by Carolina Chickadees to decrease reproductive investment in an environment where early nest failure is probable, allowing adults to reserve energy for survival to the next breeding season.

STUDENT AWARD - MASTERS

10 *SPACE USE & OCCUPANCY*

Brunner^{1,S}, Alicia R., Peter P. Marra², and Chris M. Tonra¹

¹School of Environment and Natural Resources, The Ohio State University, Columbus, OH 43210

²Smithsonian Migratory Bird Center, Smithsonian National Zoo, Washington, D.C. 20008

Nonbreeding Swainson's Warblers modify their space-use strategy in response to seasonal environmental change

Migratory birds that overwinter in the Caribbean are experiencing fluctuations in food abundance caused by shifting seasonal rainfall regimes and an overall drying trend. Dry conditions have adverse effects on birds; however, individuals may be able to respond to drying conditions by demonstrating behavioral plasticity in their space use. By expanding or shifting home ranges, birds may avoid consequences of drought-induced declines in arthropod abundance.

Understanding if and how birds can respond to changing environmental conditions is crucial in predicting the future for bird populations as climate change persists. We quantified space use behaviors of nonbreeding Swainson's Warblers (SWWA) and examined the environmental drivers behind home range size and within-season changes in home range. We measured soil moisture, habitat characteristics, and arthropod abundance on the home ranges of radio-tracked

SWWA in Jamaica during the winter seasons of 2016/2017 to determine the drivers of seasonal variation in space use. We predicted that (1) home ranges would be smaller in areas with habitat characteristics that promote a greater abundance of food (2) home ranges would increase in size or shift spatially to compensate for the decline of food as precipitation decreases. As we predicted, birds have larger home ranges in more open habitats with less leaf litter and fewer arthropods. Individuals utilizing poorer quality habitats also shifted their home ranges spatially to compensate for food declines. This behavioral plasticity in habitat use suggests that migratory birds might have the ability to respond to seasonal fluctuations in prey and long-term environmental change.

STUDENT AWARD - MASTERS

06 SPACE USE & OCCUPANCY

Bryant^{1,S}, Lee C., Tiffany A. Beachy², and Than J. Boves¹

¹Department of Biological Sciences, Arkansas State University, State University, AR 72467

²Great Smoky Mountains Institute at Tremont, Townsend, TN, 37882

Evaluating relationships between eastern hemlock decline and Louisiana Waterthrush demographics and behavior in Great Smoky Mountains National Park

Eastern hemlock (*Tsuga canadensis*) is declining throughout the eastern United States due to the invasive hemlock woolly adelgid (*Adelges tsugae*), threatening riparian areas in the southern Appalachians. Avian research has focused on community diversity; few studies have evaluated the consequences for single species. The Louisiana Waterthrush (*Parkesia motacilla*), an obligate-riparian species, could be sensitive to hemlock condition, but how decline impacts the species is currently unknown. Our goals were to evaluate the relationship(s) between hemlock decline and waterthrush in the southern Appalachians and determine the possible driving mechanisms behind the relationship(s). Specifically, we 1) identified the habitat characteristics, including hemlock condition, associated with waterthrush foraging area and nest site selection and 2) evaluated if these same characteristics were associated with apparent adult and nest survival, territory length, and nestling provisioning and body condition. To do so, we visually tracked banded waterthrushes and monitored nests. Hemlock condition was unrelated to apparent adult survival, foraging habitat selection, and territory length, but was related (directly or indirectly) to nest site selection (when hemlock condition was poor waterthrushes selected for more exposed tree roots), nest survival (reduced in areas where deciduous, opposed to evergreen, species dominated the understory), nestling provisioning (higher when adults foraged in areas with more mid-story), and nestling body condition (higher when adults foraged among more hemlocks). Our results suggest short-term consequences of hemlock decline for waterthrushes appear minimal but, in the longer-term, hemlock decline could indirectly impact waterthrush fitness depending on riparian forest succession following hemlock mortality.

11 MIGRATION

Chan¹, Aung N., Eric C. Soehren², Mary Miller³, and Scott A. Rush⁴

¹ Dept. of Fish, Wildlife, and Conservation Biology, Colorado State University, Fort Collins, CO 80523

² Alabama Department of Conservation and Natural Resources, State Lands Division, Wehle Land Conservation Center, 4819 Pleasant Hill Road, Midway, AL 36053

³ U.S.D.A. Forest Service, Cherokee National Forest, 2800 North Ocoee St., Cleveland, TN 37312

⁴ Dept. of Wildlife, Fisheries, and Aquaculture, Mississippi State University, Mississippi State, MS 39759

Residence of Tennessee Warblers (*Oreothlypis peregrina*) at an inland stopover site during fall migration: comparing estimates derived using stable isotope and mark-recapture analyses

Inland stopover sites provide critical resources for Neotropical songbirds during migration. Included among these songbirds is the Tennessee Warbler (*Oreothlypis peregrina*), a species that migrates from breeding grounds in the boreal forests of Canada to overwinter in Central and South America. We investigated the residence time of Tennessee Warblers at one stopover site, Whigg Meadow, Tennessee. To do so, we applied mark-recapture models and stable isotope analysis ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$). We collected blood samples from Tennessee Warblers captured in mist nets over week periods in 2015–2017. Vegetation samples were collected from three dominant vegetation types (*Vaccinium*, *Crataegus*, and *Rubus* spp.). Both $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ were compared among Tennessee Warbler blood samples and dominant vegetation. Mark-recapture models applied to data collected from 2009–2014 indicated maximum stopover time of 14 days (mean = 5 days). When diet-tissue discrimination (trophic fractionation) and turnover rates were taken into consideration, we concluded that 60% of birds sampled in 2015 had been at the stopover site for 5–11 days by the time of capture, thus corroborating evidence from mark-recapture models. This study provides additional information that the conservation of inland stopover sites, such as Whigg Meadow, is a crucial conservation strategy for migrant songbirds.

S01 SYMPOSIUM: Ecology and conservation of high elevation birds in Appalachians

Chandler, Richard B., Sam Merker^S, Ryan Chitwood^S, Will Lewis^S, and Robert J. Cooper
Warnell School of Forestry and Natural Resources, University of Georgia

Diversity and conservation status of trailing-edge populations in the southern Appalachian Mountains

In the first presentation of the symposium "Ecology and Conservation of High Elevation Birds in the Southern Appalachian Mountains", we will highlight the diversity of species with breeding ranges characterized by an expansive region in the northeastern US and southern Canada and a narrow region that extends southward over the high elevations of Appalachia. Approximately 25 bird species have breeding ranges that follow this pattern, and most of them are restricted to elevations above 900 m in the southern portion of their range. Moreover, climate change models and long-term data, indicate that populations near southern range boundaries are shifting northward and upward in elevation, raising the possibility that many of these species could become extirpated from the region. Loss of these trailing-edge populations would reduce regional biodiversity and might negatively impact species-level genetic diversity and ecosystems processes. We will present information about the conservation status of each species with trailing-edge populations in the southern Appalachians, and we will discuss ideas for conserving these populations in the face of recent climate and land use change.

S02 SYMPOSIUM: Ecology and conservation of high elevation birds in Appalachians

Chitwood^{1,S}, Ryan W., Richard B. Chandler¹, Mason H. Cline², Michael T. Hallworth³, Joanna L. Hatt², T. Scott Sillett³, Kirk W. Stodola⁴, and Robert J. Cooper¹

¹ Warnell School of Forestry and Natural Resources, University of Georgia, Athens, GA 30602

² New Mexico Department of Game and Fish, Santa Fe, NM 87507

³ Smithsonian Migratory Bird Center, Washington, DC 20008

⁴ Illinois Natural History Survey, Champaign, IL 61820

Demographic drivers of Black-throated Blue Warbler population dynamics at the trailing edge and core of the species' range

Species' ranges are shifting poleward and to higher elevations in response to climate change. To investigate the demographic drivers of range shifts, we examined spatial and temporal patterns in black-throated blue warbler (*Setophaga caerulescens*) density at the core and trailing edge of the species' range to evaluate the initial hypothesis that this species' range is shifting. We used capture-recapture data from these two sites to evaluate the alternative hypotheses that the apparent range shift in this species is driven by climate change effects on recruitment, a primarily breeding ground factor, or that the range shift is driven by changes in survival, a primarily non-breeding factor. Our results demonstrated that population density declined at the trailing edge, but remained stable in the core of the range, supporting the hypothesis that the black-throated blue warblers range is shifting. Survival rates were higher but recruitment rates were lower at the trailing edge, supporting the hypothesis that low recruitment is driving trailing-edge population declines. Future work should seek to understand how climate influences recruitment at trailing-edge range margins via changes in either reproduction, juvenile survival, or dispersal because recruitment appears to drive population dynamics for this species.

STUDENT AWARD - DOCTORAL

17 CONSERVATION

Coffey^{1,S}, Julie, Eric Wood¹, Heather Mackey¹, and Lars Pomara²

¹Department of Biology, California State University of Los Angeles, 5151 State University Dr., Los Angeles, CA 90032

²Southern Research Station, US Forest Service, Asheville, NC 28805

Desert riparian bird and butterfly community response to removal of an invasive grass along the Rio Grande in Big Bend National Park, Texas

In riparian systems of the US desert southwest, the invasive plant Giant Cane (*Arundo donax*) has colonized large sections of river floodplain, altering hydrologic regimes, displacing native plants, and reducing wildlife habitat. In one of the largest *A. donax* removal efforts in the southwest, US and Mexican partners are using prescribed fire and herbicide applications to remove *A. donax* along a 118-mile, bi-national reach of the Rio Grande. We completed a 2-year field survey effort to examine the response of birds and butterflies to *A. donax* management efforts. We used a space-for-time sampling design whereby, in May-July, 2016-2017, we surveyed sites that were last burned three or fewer years prior to sampling ($n = 26$), four to eight years prior to sampling ($n = 21$), and unburned *A. donax* sites ($n = 11$). We found higher bird species diversity at older relative to recently burned sites; likely in response to more developed recovering woody vegetation structure. We found a higher proportion of aerial foraging birds and a lower proportion of foliage gleaning birds in recently burned than older and unburned sites. For butterflies, we also found the most diverse species assemblages at older burn sites. However, this pattern varied between the two study years, as high rainfall and robust herbaceous growth throughout the floodplain in 2017 appeared to influence butterfly distribution patterns. Our results showed high bird and butterfly diversity at managed sites following vegetation recovery, suggesting that removing *A. donax* promotes the recovery of floodplain biodiversity.

STUDENT AWARD - MASTERS

S12 SYMPOSIUM: Ecology and conservation of high elevation birds in Appalachians

Cooper, Robert J., Michael J. Conroy, and Richard B. Chandler

Warnell School of Forestry and Natural Resources, University of Georgia, Athens, GA 30602

Declines in high elevation populations of Southern Appalachian birds: confronting and reducing uncertainty

Many species of birds are showing declines in trailing-edge populations in the southern Appalachian Mountains; however, the cause of these declines is not well understood. As shown in the talks in this session, causes likely vary for different species and can act in concert. Species associated with early successional habitat depend on disturbances such as fire, severe weather and timber harvest to maintain those habitats. Declines in disturbance-dependent species often can be related to lack of habitat creation/maintenance in recent decades. Other species are not in decline in the region. Still other species appear to be slowly declining in abundance but only at lower elevations, suggesting a possible link to climate change. Uncovering the exact population mechanism(s) (e.g., productivity, survival, recruitment) causing this elevational response is proving to be a challenge. We propose an approach that uses the principles of adaptive management, in which decisions are guided by predictions under multiple, plausible hypotheses about climate impacts. Under this plan, monitoring is used to evaluate the response of the system to climate drivers, and management actions (and experiments) are used to confront testable predictions with data, in turn providing feedback for future decision making. Management actions include forest management alternatives that alter the structure and/or species composition of forest stands at multiple elevations and latitudes.

28 *CONSERVATION*

Cristol, Daniel A., Andrew J. Rapp, and Nicholas J. Lignore

Department of Biology College of William & Mary

Is mercury pollution a conservation concern for songbirds?

Mercury pollution is a well-known risk for piscivores, whether birds such as herons and loons or mammals such as mink and humans. Songbirds, although rarely piscivorous, can also be exposed to large amounts of mercury through their frequent consumption of invertebrates, especially spiders. Some other characteristics of songbirds, such as their migrations, preference for riparian habitats, and short lifespans, make them particularly vulnerable to the effects of mercury bioaccumulation. A review of the extensive literature on mercury in songbirds, most of which is recent, suggests that some populations of passerines may be at risk of declines as the result of mercury exposure. However, most songbirds live in terrestrial habitats and have levels of mercury that do not increase risk of mortality, and pose risks of sub-lethal effects such as reduced reproductive success to only a small fraction of the population. Mercury pollution is yet another contributor to the ongoing degradation of songbird habitat quality, but only in special cases is it likely to be a major conservation concern.

05 *MIGRATION*

Darrah¹, Abigail J., Timothy D. Meehan², and Nicole L. Michel³

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Importance of barrier and nearshore islands for migrant and wintering shorebirds in Mississippi

The northern Gulf of Mexico is an important stopover and wintering area for many shorebird species of conservation concern. After the Deepwater Horizon oil spill in 2010, a citizen science

project called the Audubon Coastal Bird Survey (ACBS) was launched to fill gaps in understanding of habitat needs, stronghold sites, and population trends of coastal birds. Here we report the results of four years of surveys from 26 1.6-km transect surveys in coastal Mississippi. Observers documented 33 shorebird species across all ACBS transects, with the greatest diversity (30) occurring on nearshore islands. Mean shorebird abundance was 170% and 190% greater at barrier and nearshore islands (respectively) than mainland sites. We used generalized linear mixed models to relate counts of seven priority shorebird species to habitat features extracted from GIS and to survey-level covariates. Four species were associated with wetlands, two were associated with urban areas, and five were associated with total shore area. Total shorebird counts decreased with increasing counts of humans or dogs during surveys. Barrier and nearshore islands likely provide quality stopover and wintering habitat because they experience less human disturbance and contain more wetland and shoreline area than mainland sites in Mississippi. Stronghold sites and habitat preferences identified in this study will be used to prioritize areas for winter stewardship and to guide restoration activities that use dredge material and plantings to enhance coastal bird habitat.

14 SPACE USE & OCCUPANCY

Depalma^{S,1,2}, Daniela M., Myriam E. Mermoz², Alejandra C. Valverde³ & Pablo Picca³

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Integrating survey and behavior data in the analysis of habitat use by birds in road borders of Argentine Pampas

Land transformation in the Pampas grasslands have led to habitat loss for birds. Roadside borders provide remnant habitats, although species may use them differently. Here, we determine which characteristics of these roadsides and the surrounding habitat matrix influence their use by birds and their behaviors. During the breeding season of 2016, we sampled birds, vegetation and food resources in 87 roadside borders. We also estimated the amount of grassland, wetland, woodland, and modified land in the habitat matrix surrounding those borders. For the most common species, we recorded their behavior and analyzed the associations between their abundance and border characteristics, habitat matrix characteristics and food. We detected 3819 individuals of 89 species using borders for feeding, roosting and nesting. According to behavioral observations, wetland birds were the most selective regarding habitat use, whereas grassland and woodland birds used a range of habitats such as grassland, woodland and wetland. Among 23 analyzed species (i.e., the most frequent), eight responded only to border variables, four responded to matrix variables, and five responded to both. The most relevant variables on species richness and species abundance were woodland and wetland cover of borders. Species were generally associated with their nesting sites. Species responded differently to the surrounding matrix according to their habitat requirements and probably also to their sensitivity to habitat modification. Since birds respond to the size of habitat patches, the degree of conservation in the Pampas do influence bird communities and characteristics of roadside borders should be considered in management strategies.

STUDENT AWARD - DOCTORAL

23 CONSERVATION

Durham, Brooke

Independent researcher

Naturalized citizen psittacines in southern California offer conservation opportunities for endangered Mexican species

Urban southern California has been home to a gradually increasing number of non-native, naturalized parrots since at least the 1960's. Common among the thirteen-documented species are two IUCN endangered species; the Red-crowned Amazon (*Amazona viridigenalis*) and the Lilac-crowned Amazon (*Amazona finschi*), both native to Mexico. State and federal biologists have determined that none of these species are invasive due to their occurrence in urbanized settings and dependence on non-native, ornamental plantings for suitable food and nesting sites. Wildlife rehabilitators have developed rehabilitation protocols, released over 100 endangered birds, and are currently collecting biometric data and tissue samples for researchers.

Rehabilitators are engaging other conservationists to help determine the role that these individual alien outcasts may play in future conservation efforts. Challenges include overcoming standardized eco xenophobia, a lack of legal protections in the US, a lack of structured species conservation in Mexico and a deficiency in background studies to determine what opportunities and responsibilities take precedence in this complicated subject. Disease testing, microchipping, population studies, urban ecology studies, and a recently initiated genomic study are currently underway. Anecdotal evidence seems to indicate an unusual resistance to disease, and the possibility of, at the very least, serving as a genetic reservoir should the natural populations in Mexico experience a sudden decline due to anthropogenic pressure or natural disasters on the scale of 2017's hurricane season. Ultimately, more research and resources are needed to explore the potential for an unprecedented conservation opportunity in a mounting global wild parrot population decline.

40 METHODOLOGY & TECHNIQUES

Eshmont^{1,S}, Taylor, Lori Blanc², and Jennifer Smith²¹Department of Animal and Poultry Sciences, Virginia Tech, Blacksburg, VA 24061²Department of Biological Sciences, Virginia Tech, Blacksburg, VA 24061**The relationship between urbanization and head trauma occurrences in raptors informed by rehabilitation data**

The majority of research on raptor injury and mortality has been conducted through observations of raptors in the wild. Although case studies on individual occurrences of head trauma in raptors have been published, little information has been documented regarding trends on injury and mortality in raptor rehabilitation. We analyzed 1005 total head trauma cases from three raptor rehabilitation centers in an effort to document factors associated with head trauma in raptors. Each center represented a different developed environment: Carolina Raptor Center represented an urban environment, Indiana Raptor Center represented a suburban environment, and Teton Raptor Center represented a rural environment. In this study, we (1) classified head trauma admissions by avian family, sex, age, and cause of injury, (2) documented the relationship between human population density and the number of head trauma cases admitted to rehabilitation centers, and (3) described how human population density within differing developed environments related to causes of injury. We found that adult owls (*Strigidae* spp.) had the highest risk of acquiring head trauma and that human population density was positively correlated with the number of raptor head trauma cases admitted to rehabilitation centers. We

also found that human population density positively correlated with the proportion of cases caused by car collisions in developed areas and with the proportion of cases caused by window collisions in undeveloped areas. Our results can be applied to the development of management strategies by identifying ways in which species, the developed environment, and mechanisms of impact interact.

STUDENT AWARD - UNDERGRADUATE

29 *HABITAT SELECTION*

Farley^{1,S}, Kathleen E., Nicholas J. Henshue², Derrick Ofori-Boateng¹, and Claus Holzapfel¹

¹Department of Biological Sciences, Rutgers University-Newark, Newark, NJ 07073

²Department of Earth Sciences, University at Buffalo, Buffalo, NY 14260

Courting risk: do consequences exist for American Woodcock selecting post-industrial habitat for courtship?

Habitat selection tenets (e.g., Ideal Free Distribution) assume animals are well-informed regarding habitat quality before establishing breeding territory. However, for migratory animals this assumption is unlikely to be upheld. In regions of urbanization and industrial sprawl, animals must identify quality territory where habitat is limited and former cues may no longer provide useful information. Post-industrial sites (old rail yards, landfills, etc.) visually appear similar to early successional habitat, but these altered habitats may contain pollutants, altered hydrological regimes, delayed succession, and modified floral and fauna communities. These landscapes can exist as significant sources of available habitat within a region and may lead to a shift in habitat usage where animals equally or preferentially select post-industrial sites over non-industrial sites. To test this, during spring 2016 I monitored American Woodcock (*Scolopax minor*) to determine how they use post-industrial habitat. We conducted crepuscular courtship surveys from March through May across 30 sites in New Jersey that were categorized as post-industrial or non-industrial. Work conducted in 2017 involved further investigation of three sites representative of woodcock courtship habitat across the degraded-urban gradient in New Jersey for crepuscular spring courtship displays and food availability from April-October. Collectively results suggest that habitat quality at fine and broad scales work in concert to influence courtship period length. Preliminary results indicate that while woodcock do not discern differences between post-industrial and non-industrial habitat for courtship displays, the sites differ in critical resources leading to changes in the length of courtship regionally.

STUDENT AWARD - DOCTORAL

24 *VOCALIZATION & COMMUNICATION*

Fetzner^S, William and Kenneth Schmidt

Department of Biological Sciences, Texas Tech University, Lubbock, Texas 79409

The effect of whisper calls on settlement decisions in female Veeries (*Catharus fuscescens*)

Emerging research has shown that many species of birds utilize low-amplitude vocalizations (LAVs) in a variety of social interactions, including male-male aggressive interactions. However, the function of these aggressive vocalizations in shaping the spatial dynamics of individuals within breeding populations remains unexplored. Since females may be attracted to settle near highly-aggressive males, LAVs may function to attract females to settle closer to males that use LAVs. Thus, to determine a putative role of LAVs in the context of territory establishment, I experimentally tested the function of LAVs in the settlement decisions of a migratory songbird (Veery; *Catharus fuscescens*) in a forest soundscape. Twenty sites were manipulated using

playbacks of previously recorded male songs. Half of these sites had a 6-minute track that played back LAVs (i.e., whisper calls) after approximately every five songs while the other half broadcasted only the male song as the control treatment. Thirty nests were found during the 4-week experiment (20 near whisper call sites, 10 near control). Although nesting in proximity (within ~150m) to whisper call sites was marginally significant ($P = 0.048$), females nested at whisper call sites more often and earlier in the breeding season, and whisper call sites had higher numbers of breeding females in near proximity. These findings support the increasing number of studies that have shown LAVs to be aggressive signals in songbirds. However, this is the first study to experimentally show how a low-amplitude, aggressive signal can affect female settlement decisions.

STUDENT AWARD - MASTERS

09 MIGRATION

Fraser, Kevin C., Saeedeh Bani Assadi, Amélie Roberto-Charron, and Alisha Ritchie

Department of Biological Sciences, University of Manitoba, Winnipeg, MB, R3T 2N2

First flights: investigating the spatio-temporal patterns of juvenile songbirds on their inaugural fall migration

The spatio-temporal movement patterns of juvenile songbirds embarking on their first long-distance migration are predicted to differ from those of adult birds. Juveniles are generally predicted to begin and end migration later, may take different routes, and have more frequent or longer stopovers. To test these predictions, we collected migration data from two types of tracking tags deployed on adult and juvenile Purple Martins (*Progne subis*). Our objective was to quantify the fall migration timing, speed, routes, and stopover frequency and duration of juvenile martins and compare these metrics with the migration of adults originating from the same breeding sites. We used an automated telemetry array (Motus Wildlife Tracking Network) to determine the post-breeding movements and timing of adults and nestlings equipped with radio-tags at three breeding colonies in Ontario, Canada. We also used data derived from light-level geolocators deployed at breeding sites in Manitoba and Alberta, Canada, to compare start-to-finish fall migration routes and timing. From the nest to overwintering sites, our results provide insight into the first-flights of juvenile songbirds, a little-studied period of the annual cycle that is expected to be particularly limiting for juvenile birds.

S10 SYMPOSIUM: Ecology and conservation of high elevation birds in Appalachians

Gerwin¹, John A., Edward A. Landi^{1,2}, Olivia F. Merritt^{1,2,3}, Vanessa J. Merritt^{1,2,3}, and Emma J. Little⁴

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Breeding season home-range estimates of Hermit Thrush in the southern Appalachian Mountains of North Carolina

The Hermit Thrush (*Catharus guttatus*) is a short-distance migrant that breeds in the western and northern United States and across Canada. In the eastern U.S., the species now breeds at high elevations in western North Carolina and eastern Tennessee (above 4500 feet). This is a relatively recent expansion, with observers first reporting breeding-season, singing males, in

1979. Since then, many additional reports have been published. Biologists have surveyed along Bald Knob Ridge in Yancey County and documented numerous singing males. We began a simplified study of home ranges of this species in 2016. The three junior authors were matriculating high school students, and this project is in part to introduce them to elements of wildlife biology – they have conducted most of the field work. We radio-tagged and tracked 3 males in 2016. In 2017 we tracked 8 additional males, and one female. 20-40 point locations/bird were recorded with handheld Garmin GPS units. We color-banded 12 males in 2016 and documented 10 returns in 2017 (9 to the same territories). We banded 13 new thrushes in 2017 and will assess site fidelity in May 2018. We derived a minimum convex polygon for the 3 home ranges from 2016 – which yield estimates of 12, 20, and 30 acres (5/9/13 ha). We are in the process of analyzing the additional data, and ultimately using GIS/kernel estimates. We will collect vegetation data in 2018. These higher-elevation spruce-fir sites are subject to various biotic and abiotic stresses and we provide baseline data for subsequent comparisons.

01 MIGRATION

Geurts^S, Ellyne and Kevin Fraser

Department of Biological Sciences, University of Manitoba, Winnipeg, MB R3T 2N2

Investigating molt and migration strategies in a long-distance migratory songbird by using stable-isotope analysis

The location of flight-feather molt may pose constraints to the timing of songbird migration and is important to consider in conservation planning, but has been little studied. Our objectives were to 1) identify important molt locations for a long-distance migratory songbird (Purple Martin *Progne subis*), 2) determine whether breeding latitude influenced molt timing and locations, and 3) determine whether molt influenced stopover duration. We deployed light-level geolocators and sampled feathers at 10 different breeding regions across North America. We combined Bayesian probability assignment analysis of stable-hydrogen isotope values for flight feathers with spatio-temporal data derived from geolocators to determine whether molt occurred at breeding locations, migratory stopovers, or at overwintering sites. We found that more northern breeding martins initiated flight molt after fall departure from the breeding grounds and had longer stopover duration, as compared to more southern breeding martins that often completed their molt at the breeding grounds before departure. Our study thus reveals how molt and migration may be influenced or constrained by breeding latitude in long-distance migratory songbirds.

STUDENT AWARD - UNDERGRADUATE

08 SPACE USE & OCCUPANCY

Gilbert^S, Neil A. and Paige F. B. Ferguson

Department of Biological Sciences, University of Alabama

Evening point counts produce similar occupancy estimates as morning point counts for some species

The point count is a methodological mainstay in avian research. Although numerous point count protocols can be customized according to the researcher's needs, the time of day during which point counts are conducted is seldom modified. Traditionally, ornithologists conduct point counts in the 3-4 hours following dawn. However, given the second peak of avian activity during the evening hours, we considered whether evening point counts can produce similar occupancy estimates as morning point counts. We hypothesized that the majority (i.e., >50%) of the study

species would not show a major difference between morning and evening estimates for occupancy probability. To address this hypothesis, we conducted morning (within 4 hours of sunrise) and evening (within 3 hours of sunset) point counts at 46 sites in Alabama and modeled occupancy for 20 species. We used Bayesian estimation to compare occupancy probabilities for the two periods and assessed whether the difference between the means fell within a predefined region of practical equivalence. Of the 20 species, 11 showed no difference between morning and evening occupancy probabilities, thereby supporting our hypothesis and suggesting that evening point counts can produce similar results as morning counts for many species. Given this finding, we suggest that evening point counts are an appropriate alternative to morning point counts for some species and recommend that researchers implementing evening point counts should (1) conduct pilot fieldwork to ascertain evening detectability of focal species and (2) limit evening point counts to optimal survey conditions.

STUDENT AWARD - MASTERS

20 VOCALIZATION & COMMUNICATION

Grabarczyk^{S,1,2}, Erin E., Monique Pipkin², Maarten J. Vonhof^{1,3}, and Sharon A. Gill¹

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When to change your tune? Unpaired and paired male House Wrens respond differently to anthropogenic noise

In response to anthropogenic noise, many bird species adjust their song frequency, presumably to optimize song transmission and overcome noise masking. But song adjustment costs may outweigh the benefits during different stages of breeding, depending on the locations of potential receivers. Selection might favor unpaired males to alter their songs because they sing to attract females that may be widely dispersed, whereas paired males might not if mates and neighbors are primary receivers of their song. We hypothesized male House Wrens (*Troglodytes aedon*) respond differently to noise depending on their pairing status. To test our hypothesis we synthesized pink noise, which mimics anthropogenic noise, and played it at three intensities in focal male territories. We recorded songs and analyzed whether song structure varied with pairing status and treatment. Consistent with our predictions, unpaired males sang differently than paired males, giving longer songs at higher rates. Contrary to predictions, paired males changed their songs, increasing peak frequency during high intensity noise playback, whereas unpaired males did not. If adjusting song frequency in noise is beneficial for long-distance communication we would have expected unpaired males to change their songs in response to noise. By adjusting song frequency, paired males reduce masking and produce a song that is easier to hear. However, if females prefer low frequency song, then unpaired males may be constrained by female preference. Alternatively, if noise adjustments are learned and vary with experience or quality, unpaired males in our study may be younger, less experienced, or lower quality males.

STUDENT AWARD - DOCTORAL

S07 SYMPOSIUM: Ecology and conservation of high elevation birds in Appalachians

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⁴North Carolina Wildlife Resources Commission (retired), NC, 28752

Short-term response of breeding birds to oak regeneration treatments in southern Appalachian hardwood forest

Population declines of several successional-scrub bird species are partly associated with decreased habitat availability as abandoned farmlands return to forest and recently harvested forests regrow. Restoration of mixed-oak forest is also a concern because of widespread oak regeneration failure, especially on moist, productive sites where competition from faster-growing tree species is fierce following stand-replacing disturbances. Several silvicultural methods are proposed to promote oak regeneration but many are not experimentally tested, especially on productive sites. We surveyed birds in 19 mid-elevation (940-1,280 m) stands to assess response to initial application of three proposed oak regeneration treatments on productive sites: prescribed burning (B); oak shelterwood by midstory herbicide (OSW); shelterwood harvests (SW); and controls (C), for one breeding season before and two breeding seasons after implementation. Relative density of successional-scrub species Indigo Buntings, Eastern Towhees, and Chestnut-sided Warblers increased while Ovenbirds decreased within 11-18 months after SW harvests; understory disturbance treatments B or OSW had no effect. Our results indicated that partial harvests created habitat for breeding birds associated with both young and mature forests whereas understory treatments had little effect. Additionally, we show that even small patches of young forest habitat are used by more individuals and more species of breeding birds than surrounding closed-canopy forest, and may benefit successional-scrub species by enabling their occurrence in an otherwise forested landscape. Absence of several lower-elevation successional-scrub bird species in our mid-elevation SW harvests suggests that comprehensive conservation in the southern Appalachians necessitate creating and maintaining young forest habitats across elevation gradients.

42 *PHYSIOLOGY & PARASITOLOGY*

Hamilton^S, Luke J., Emma C. Keele, Marika Van Brocklin, and Letitia M. Reichart

Department of Biology, University of Nebraska-Kearney, Kearney, NE 68849

Three undergrads, three metabolites, in three years: a story about Baltimore Oriole physiology

Migratory passerines catabolize lipids, primarily, to power their transcontinental flights. Accordingly, a bird's metabolic state with regard to lipids can be used to assess overall fitness for migration. Past research has demonstrated that blood plasma levels of triglycerides (TRIG) and β -OH-butyrate (BUTY) are especially reliable indicators of lipid metabolism in birds. In this study, blood was collected from Baltimore Orioles during their migration season at one study site for three years—2015, 2016, and 2017 (total n=125). Blood was analyzed to determine both TRIG concentration and BUTY concentration. Concurrent with the lipid metabolism project, blood was also analyzed to determine level of creatine kinase (CK) activity—an indicator of muscle damage. A spike in average CK activity was noticed in 2016 (2015=35 U/L; 2016=490 U/L; 2017=34 U/L), indicating a difficult migration that year. When TRIG and BUTY averages were compared across the three years, trends in the average values of both lipid metabolites supported the hypothesis that the orioles were at their worst energetic condition in 2016 (TRIG—2015= 0.14mM; 2016=0.10mM; 2017=0.22mM) (BUTY—2015=1.22mM; 2016=1.50mM; 2017=1.31mM). Poor condition of orioles during 2016 migration correlates with a strong El

Niño event on their wintering grounds that same year. Our results support conclusions of previous research that highlighted a trend toward poorer energetic condition among migratory passerines after strong El Niño years.

STUDENT AWARD - UNDERGRADUATE

35 *METHODOLOGY & TECHNIQUES*

Heather¹, Meredith L. and Renée Cormier²

¹Archbold Biological Station, Venus, FL 33960

²Point Blue Conservation Science, Bolinas, CA 94924

Assessing injury rates of Wilson's Warblers captured in two different mist net mesh sizes

Mist nets are useful tools, commonly used for studying avian populations and demography. While rates of injury and mortality (hereafter incidents) have been documented at rates of less than 1%, some species are more prone to incident than others. Determining which mesh size to use is an important criterion for any banding station and depends on the target species. To test the hypothesis that injuries were more common in larger mesh size for smaller species, we evaluated injury and mortality rates for Wilson's Warblers captured in mist nets at Point Blue Conservation Science's Palomarin Field Station from 1988-2016 with two different mesh sizes: 30 mm and 36 mm. Most causes of incident in Wilson's Warblers were unknown, or attributed to stress, as defined by banding protocols at the field station. Results indicate that incidents in Wilson's Warblers were significantly more likely when captured in 36mm nets compared to 30 mm. As a result of this study and other factors at Palomarin, all mist nets have been changed to 30 mm mesh size. Projects using mist nets should constantly monitor their performance and banding protocols to minimize incidents.

41 *METHODOLOGY & TECHNIQUES*

Hyman, Jeremy, Kate O'Hanlon, and Kelsey Stover

Department of Biology, Western Carolina University, Cullowhee, NC 28723

Flight initiation distance changes, but not by much, before and after banding in Song Sparrows (*Melospiza melodia*)

Animals in urban habitats face many unique stresses, such as dealing with pollution, road traffic, and human disturbance. Animals that are successful in urban habitats are likely to have a high tolerance of human disturbance. One measure of an animals' tolerance of human disturbance is flight initiation distance (FID), the distance at which an individual takes flight when approached by a threat. In many birds, urban individuals have shorter FID than rural members of the same species. The shorter FID of urban birds could arise either through selection favoring birds with lower FID, or through habituation if urban birds learn through repeated exposure that humans represent little threat. Some studies suggest that FID is a heritable trait and has evolved, and yet many bird species show high behavioral plasticity, and adjust quickly to human disturbance. In this study, we examined whether a bird in an urban environment, that would be expected to have numerous harmless encounters with humans, will change their FID in response to a single negative experience with a human. We found that after catching and banding, male Song Sparrows had a significantly higher FID. However, their FID scores were still significantly lower than those of rural birds. In addition, the pre- and post-banding FID scores were correlated. These results suggest that FID is flexible, but a single negative experience with humans does not cause Song Sparrows to adopt a shy personality, and that personality influences how much behavioral change will occur.

S06 *SYMPOSIUM: Ecology and conservation of high elevation birds in Appalachians*

Isenhower^S, Andrew and **David Buehler**

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Knoxville, TN 37996-4563

Relative abundance of forest songbirds on Cherokee National Forest, Tennessee related to forest management and climate change covariates

We used Poisson regression on a long-term (1992-2015) point-count database from the Cherokee National Forest (CNF), TN, and adjacent North American Breeding Bird Survey route data to assess avian population change over the time for 18 focal species that occupy a variety of forest types and age classes across an elevation gradient. We modeled each species' relative abundance with timber harvest and prescribed burning covariates to identify significant relationships. We also modeled relative abundance with climate covariates (temperature and precipitation) to examine potential relationships with climate change. Twelve of 18 focal species on the CNF and 3 of 18 species on adjacent BBS routes had significant relative abundance trends (7 decline, 5 increase- CNF; 3 decline- BBS) over the 24-year period. Declining species on the CNF were generally associated with young forest conditions. The amount of timber harvest on the CNF has declined significantly during the study period. Four species showed positive relationships with the decline in total timber harvested and 2 species showed negative relationships with increasing prescribed burning on the CNF. Eight focal species shifted elevation on the CNF, with 2 species moving upslope and 6 moving downslope, counter to expected elevational shifts associated with a warming climate. Most species abundances were related to a complex interaction of temperature and precipitation covariates. In conclusion, focal species abundances are changing on the CNF and on to a lesser degree on adjacent BBS routes. Forest management or lack thereof and climate covariates are related to those changes for many species.

51 *BREEDING BIOLOGY*

Jackson¹, Jerome A., and **Bette J. S. Jackson²**

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Plumage and Behavioral Development of Nestling Anhingas

Nestling Anhingas were monitored and photographed at approximately 2-day intervals to document changes in their plumage and behavior from hatching (beginning on 9 January 2018) to post-fledging (through 1 March 2018). Natal down included areas of longer white down and shorter, apparently more dense tan down. Emergence of juvenal feathers began with the scapular region shortly before young apparently were able to thermoregulate and were independent of brooding by their parents. Tertials and central rectrices lacked the transverse "corrugated" texture of adults, but showed slight indication of varied feather density in areas where such a pattern occurs in adults. The three chicks hatched at two-day intervals, the oldest on 9 January and the youngest on 13 January. Their staggered plumage development allowed individual chicks to be identified for more than a week post-fledging.

S03 *SYMPOSIUM: Ecology and conservation of high elevation birds in Appalachians*

Lewis^S, William B., **Ryan Chitwood^S,** and **Robert J. Cooper**

Warnell School of Forestry and Natural Resources, University of Georgia, Athens, GA 30605

Factors affecting the nestling provisioning rate of Black-throated Blue Warblers from a declining trailing-edge population

Many species of bird are showing declines in trailing-edge populations in the southern Appalachian Mountains however the cause of these declines is not well understood. It is possible that the population declines could be attributable to changes in the ability of adults to feed their young, as parental provisioning can have a large impact on nestling growth and hence first-year survival. From 2003-2017 we videoed the nests of Black-throated Blue Warblers (*Setophaga caerulescens*) breeding in North Carolina to determine 1) if the population declines observed in this region could be attributed to changes in nestling provisioning rate, and 2) what factors influenced nestling provisioning rate. While provisioning rate was variable by year it did not show a decrease from 2003 to 2017, therefore provisioning rate is unlikely to be the cause of the local population declines observed in this species. Instead provisioning rate was dependent on the sex of the adult and the time during the season, with females increasing their provisioning rate to nests later in the season while males exhibited largely constant rates throughout the season. Annual productivity in this species is tied to the occurrence of double-brooding, so females early in the season may reduce parental investment in order to save energy for a potential second brood. These results show that provisioning rate, while unlikely to be directly explaining population declines may still influence annual productivity if females conserve energy early in the season for the possibility of raising a second brood.

STUDENT AWARD - DOCTORAL

S04 *SYMPOSIUM: Ecology and conservation of high elevation birds in Appalachians*

Merker^S, Samuel and Richard Chandler

Warnell School of Forestry and Natural Resources

Does competition determine warm-edge range limits in the southern Appalachian Mountains?

Many species ranges are shifting poleward and toward higher elevations in response to climate change. A large number of species have trailing-edge populations restricted to high elevations in the southern Appalachian Mountains. These trailing-edge populations are expected to go extinct if they cannot track climate change via dispersal. Conserving these populations will require information about the factors limiting their distributions. MacArthur (1972) hypothesized that biotic interactions should limit species' distributions near low-latitudes due to high species diversity and the potential for interspecific interactions. We evaluated this hypothesis using both observational and experimental data to determine if competition with Hooded Warblers (*Setophaga citrina*) influenced the spatial and temporal dynamics of a trailing-edge population of Canada Warblers (*Cardellina canadensis*) near the species' southern breeding range limit in North Carolina. Using four years (2014-2017) of point count data from 71 sites distributed across a climate gradient spanning the species' range boundary, we constructed co-occurrence models for Canada Warblers and Hooded Warblers. These models were supported by simulated territory intrusion experiments designed to test for aggression between the two species. Although our point count data and co-occurrence models demonstrate that the two species strongly segregate over the climate gradient, we found no evidence that competition was responsible for the spatial segregation. Niche partitioning appears to be a better explanation of the distinct distributions, indicating that conservation efforts do not need to account for competitive interactions when attempting to maintain the viability of Canada Warbler populations near their southern range limit.

STUDENT AWARD - DOCTORAL

26 *VOCALIZATION & COMMUNICATION*

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Responses to song playback by male chickadees in a rapidly moving hybrid zone

The dynamics of hybridization in passerines may be influenced by birds misimprinting on heterospecific signals including song: accordingly, hybrid-zone males may produce heterospecific song and thereby attract female mates that are not conspecifics, but also respond to heterospecific males as rivals because of their own song learning. We investigated the latter hypothesis using playback experiments in populations in ‘early’ (Hawk Mountain, HM) and ‘late’ (Nolde Forest, NF) stages of hybridization relative to the northward-moving Black-capped/Carolina chickadee (BCCH/CACH) hybrid zone. Most HM males had hybrid genotypes, assessed using species-diagnostic SNPs (0 = BCCH, 1 = CACH; mean 0.60, range 0 – 0.94, N = 17). However, half of HM males produced exclusively BCCH songs (mean %BCCH songs = 73%), while the likelihood of also singing CACH (‘bilingual’; song type A only) increased with genotype score. HM males sang at higher rates in response to BCCH songs, irrespective of their genotype or repertoire. NF males had mostly CACH genotypes (mean 0.95, range 0.5 – 1.0, N = 26). All but one NF male sang CACH (song type A only, 85%; types A and B, 12%), with 50% additionally singing BCCH, independent of genotype. These results suggest that the persistence of Black-capped song culture long after Carolina genes have introgressed could affect hybrid-zone territorial interactions among males that involve song. Production of song independent of male genotype could also confound mate choice and impede northward hybrid-zone movement that otherwise favors Carolina Chickadees in conjunction with climate warming.

33 *HABITAT SELECTION*

Nickley^S, Benjamin and Lesley P. Bulluck

Department of Biology, Virginia Commonwealth University

Winter roost-site selection by Red-headed Woodpeckers in a burned forest stand

In temperate regions, winter is characterized by high thermoregulatory demands and low food availability. For many cavity nesters, winter survival depends on selecting habitat that provides both suitable roost trees and adequate food. The Red-headed Woodpecker (*Melanerpes erythrocephalus*) has experienced precipitous declines across much of its range in the past fifty years, yet causes of declines remain elusive. Although previous studies have focused primarily on the breeding season, understanding winter roost-site requirements is crucial for the maintenance of Red-headed Woodpecker populations across the full annual cycle. Our study investigated winter roost-site characteristics at three spatial scales (roost patch, tree and cavity) in a 41 ha fire-affected forest stand located in Northern Virginia. From February to April of 2016 we tracked Red-headed Woodpeckers to 43 roost sites during evening surveys. In order to determine the features driving roost-site selection, we compared vegetation surrounding the roost to random sites within the same forest stand, and occupied roost snags were compared to the closest available snag. Cavity height and orientation were also examined. We modeled roost-site selection at both the patch and tree scales using logistic regression and identified important variables and their influence by estimating regression coefficients and their model-averaged parameter weights. Habitat within the patch surrounding roost trees had higher basal area of snags and mast-producing trees compared with random sites. Woodpeckers selected roost snags

with signs of decay and showed preferences based on snag taxon. Our findings indicate that managing land that produces and retains both snag and mature mast-producing trees will benefit overwintering populations of Red-headed Woodpeckers. This study provides the first detailed analysis of winter roost-site selection in this declining species.

STUDENT AWARD - MASTERS

47 *PHYSIOLOGY & PARASITOLOGY*

Omudu, Edward and Stephanie Adelusi

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Urbanization and avian ectoparasites interactions in Nigeria: emerging implications for zoonotic infestation

Transmission of disease-causing pathogens can increase in urban adapted wildlife. Considering the dynamics of foraging and interaction between free-ranging domestic and wild birds, this study investigated influence of urbanization on wild bird population and consequences of their ectoparasites interaction. Wild birds were trapped using mist nets; trapped birds were visually examined after which the dust-ruffling technique was used to further dislodge parasites. Domestic birds were also physically examined for ectoparasites. Dislodged parasites were microscopically examined. A total of 254 wild birds were captured out of which, 174 (68.5%) were infested with 1294 ectoparasites. Dominant bird families were Columbidae (13.8%), Macrosphenidae (11.0%) and Alcedinidae (9.1%) respectively. Five hundred domestic birds (chicken, ducks, turkeys, and pigeons) were also randomly sampled from thirty (30) households. A total of 394 (78.8%) of the 500 domestic birds were infested with 689 ectoparasites. Lice had the highest infestation rate of 84.6%, while ticks, mites, and fleas had prevalence of 3.3%, 7.7% and 4.4 % respectively. In the wild bird population, lice also had the highest rate of 66.0%, while ticks, mites, and fleas had prevalence of 4.2%, 13.1%, and 16.8% respectively. Out of the 17 ectoparasites species encountered, six (6) were found in both wild and domestic birds. Predominant species of ectoparasites infesting both domestic and wild birds are lice (*Columbicola* spp), mites (*Dermanyssus gallinea*), fleas (*Echinophaga* spp), and ticks (*Argas persicus*). Declining habitat of wild birds in urban areas are continuously bringing them into contact with domestic birds, this may set the stage for inter- and intra-species transmission of disease-causing pathogens and establish avian reservoirs for zoonotic pathogens.

04 *SPACE USE & OCCUPANCY*

Pearson¹, Scott M. and Christine A. Kelly²

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Eastern Whip-poor-wills in North Carolina: temporal trends and site-level predictors of site occupancy

Eastern Whip-poor-wills (*Antrostomus vociferous*, EWPW) have declined in abundance over the past 50 years and have become scarce or absent in some parts of their historical range. Therefore, a better understanding of their current distribution and habitat needs is needed. Roadside surveys of nightjars were conducted over a decade (2007-2016) for 333 sites in western North Carolina by professional biologists and volunteers. Occupancy models were developed to examine temporal trends in EWPW as well as covariates for detection and site-level occupancy. Important detection covariates included cloud cover, moon visibility, wind, and date. Site-level occupancy covariates included elevation, topographic shape, and several measures of forest and non-forest

land covers. Sampling effort varied among sites and years, which limited the options available for multi-season occupancy models. The goal of this analysis was to develop a species distribution model identifying areas where EWPW is experiencing range contractions and expansions.

25 CONSERVATION

Perkins^{1,S}, Rebecca and Clint Boal²

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Captive rear and release: conservation tool or high trophic level bird feeder?

Captive rear and release of birds in the order galliformes remains a popular management tactic despite low survival rates. We investigated avian predator selection of captive-reared Northern Bobwhites (*Colinus virginianus*) as a potential driver of their high mortality. We simulated avian predator hunts on flushing pairs of bobwhites. In 8 of 10 flight trials ($P \leq 0.055$), a Harris's Hawk (*Parabuteo unicinctus*) pursued a captive-reared bobwhite over a wild bobwhite. This selective rate, combined with capture success rates of wild and captive reared quail in associated research, suggest 1) captive-reared quail are behaviorally and/or physiologically disadvantaged compared to their wild counterparts and 2) avian predators are able to rapidly assess flushing quail and quickly identify compromised individuals. The success of captive rear and release programs for population enhancement or reestablishment efforts may benefit from a better understanding of how to more adequately prepare captive-reared birds for release. Other researchers have suggested captive-reared galliformes are physiologically inferior to wild birds. Our results compliment previous research in providing evidence that avian predators are able to rapidly differentiate flushing quail on basis of capture success potential, and that avian predation may be a greater risk for captive reared birds than wild birds.

S08 SYMPOSIUM: Ecology and conservation of high elevation birds in Appalachians

Pomara¹, Lars Y., Eric M. Wood², Danny C. Lee¹, Ronald W. Rohrbaugh³, Sara E. Barker³, Kenneth V. Rosenberg³, and Amanda D. Rodewald³

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Remotely sensed vegetation phenology monitoring can advance efforts to model habitat suitability and occupancy for birds associated with early-successional forest

Conservation concern has risen for birds associated with early-successional forest in the eastern United States, coincident with population declines and loss of forest with strong disturbance components. The ability to map and monitor disturbance-driven forest conditions therefore has value in planning and management contexts, but it also poses technical challenges. Remote sensing of vegetation phenology (regular seasonal change) is a promising solution, because phenology and phenological variation over time and space are associated with a large number of ecosystem properties and dynamics. We paired a novel vegetation phenology monitoring approach with early-successional forest songbird survey data collected annually from 2009 to 2013 at nearly 300 forest disturbance sites throughout the Appalachian Mountains. The Landscape Dynamics Assessment Tool (LanDAT) uses a vegetation greenness index generated from MODIS satellite data at 8-day intervals to characterize phenology at landscape scales and

track variations within and across years. LanDAT is well suited to examining subtle vegetation conditions and changes in response to drivers such as natural disturbances, land use, climate variability, fire, and others. Measures of interest for characterizing forests with disturbance components were annual phenology descriptors, their departures from long-term conditions, and descriptors of multi-annual landscape change based in information theory. Preliminary results from Golden-winged Warbler (*Vermivora chrysoptera*) occupancy models suggest that remotely-sensed vegetation phenology can link drivers of landscape properties and dynamics to wildlife habitat suitability in a spatially explicit monitoring and assessment framework.

18 VOCALIZATION & COMMUNICATION

Pudlo^S, Allison, Laura Kloepper, and Joel Ralston

Department of Biology, Saint Mary's College, Notre Dame, IN 46556

The effect of environmental conditions on the detection frequency of owl calls

Bioacoustics can be used to survey a variety of organisms, especially those that are difficult to find in the wild. Since owls are evasive and difficult birds to study, passive acoustics can be used to study how the environment influences their calling behavior. For this observational study, an acoustic recorder was left in three study sites in the winter of 2016 and recorded daily from sunset to sunrise. The audio files were examined, and every owl call was counted and identified as one of the three species: Great Horned Owl (*Bubo virginianus*), Barred Owl (*Strix varia*), and Eastern Screech-Owl (*Megascops asio*). Weather data were extracted from Wunderground.com every night. We used multiple regression models and mixed effects models to investigate the effect of weather on vocal activity. We found that colder temperatures and increased cloud coverage increased Great Horned Owl and Eastern Screech-Owl call number frequency and duration. There also is a possible positive correlation between precipitation and Great Horned Owl call duration. No environmental conditions affected Barred Owl calls. These results could be due to the behavior of the different owl species and includes time of breeding season and predation of the Great Horned Owl on the other species.

STUDENT AWARD - UNDERGRADUATE

31 HABITAT SELECTION

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White-headed Woodpecker (*Picoides albolarvatus*) nesting habitat selection at multiple scales

White-headed Woodpeckers (*Picoides albolarvatus*) are considered a species at risk by federal and state agencies, with declines attributed to forestry practices. We examined nest site selection of White-headed Woodpeckers with the goal of identifying abiotic and habitat variables important to habitat selection. From 1995 through 2002, we located nests of white-headed woodpeckers over an elevational gradient in the Sierra Nevada, California. We analyzed abiotic data and habitat data derived from field plots and Landsat ETM+imagery at three scales: nest site (0.04 ha), local (1 ha), and home range (125 ha) for nests and random sites using an information theoretic framework. Habitat selection models at the nest site and home range scales best predicted White-headed Woodpecker nest occurrence. Results of abiotic models suggested that nests were found at higher elevations than random sites. At the nest site scale, nests were found in areas with open canopy, more snags, few large trees, and in decayed substrates. The model

was highly supported (AUC = 0.94). At the local scale, White-headed Woodpeckers nested in areas with high basal area of conifers and low density of snags but the model was weak (AUC = 0.65). At the home range scale, nests were found in areas with high conifer canopy cover and edge density, and the model had better than moderate support (AUC = 0.81). Our results suggest that White-headed Woodpeckers nest in decayed snags in openings adjacent to conifer forest. These complex habitat requirements complicate the identification of suitable habitat and recommendations for forest management.

07 MIGRATION

Ralston, Joel, Lydia Lorenc, and Melissa Montes

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Geographic variation in two candidate genes related to migratory behavior in Blackpoll Warbler (*Setophaga striata*)

Migratory behaviors in birds are known to be genetically controlled and heritable, yet what specific genes are responsible for the timing, distance, and duration of migration is unknown. Several candidate genes have been identified, including Clock and Adycap1, for which length polymorphisms appear to be associated with migratory behaviors in some species. Here, we explore the role of these two candidate genes in migratory behaviors in Blackpoll Warbler (*Setophaga striata*), a Neotropical-Boreal migrant. Due to its large breeding distribution and unique transoceanic migratory pathway, Blackpoll Warblers show large variation across populations in the distance and duration of migration, making them an ideal study species for the role of candidate genes. We genotyped 69 Blackpoll Warblers originating from four putative populations across the breeding distribution (Alaska, Yukon, Manitoba, Northeast) at both Clock and Adycap1 loci. We used linear regressions to test for an effect of both longitude and latitude on allele length at each locus. We found no effect of either latitude or longitude on Adycap1 allele length, and no effect of latitude on Clock allele length. However, we did find a significant effect of longitude on Clock allele length with western populations tending to have shorter alleles (typically associated with earlier migration), and eastern populations tending to have longer alleles (typically associated with later migration). These results suggest a possible role of Clock in controlling migratory behaviors that vary across populations in this species.

39 METHODOLOGY & TECHNIQUES

Reid^{S,1}, Abigail, Hannah B. Vander Zanden^{2,3}, Todd Katzner³, and David M. Nelson⁴

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Implications for using singed feathers in determining geographic origin with wildlife forensics approaches

Despite the increasing popularity of renewable energy, utility-scale renewable energy facilities can adversely affect wildlife. Stable hydrogen isotope data ($\delta^2\text{H}$) can be used as a conservation forensics technique to infer the geographic origin of migratory animals and thus help assess the impact of such facilities on bird populations. At concentrating solar power plants, avian mortality often results from solar-flux effects, causing feather samples to be singed. Thus, it is essential to understand how heat and singeing may affect the $\delta^2\text{H}$ values in feathers and subsequent

geographic assignments. We heated feathers from two passerine species (*Sturnella neglecta* and *Eremophila alpestris*) in a muffle furnace in the lab at 200°C, 250°C, and 300°C for 60 seconds, and we also obtained field-singed and unsigned feathers from three different passerine species (*Haemorrhous mexicanus*, *Setophaga petechia*, and *Setophaga coronata*) that were found dead at a concentrating solar-energy facility. The heating trials in the lab indicated significant changes in $\delta^{2}\text{H}$ values and feather morphology at 300°C for both species. There was no consistent difference between the $\delta^{2}\text{H}$ values of the field-singed and unsigned samples. Therefore, these preliminary results suggest that highly singed feathers should be avoided as the singeing process may alter $\delta^{2}\text{H}$ values. However, exposure to moderate heat and singeing does not appear to dramatically alter $\delta^{2}\text{H}$ values of feathers from passerines.

STUDENT AWARD - UNDERGRADUATE

45 *PHYSIOLOGY & PARASITOLOGY*

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¹ Department of Biology, Villanova University, Villanova, PA 19085

² The Academy of Natural Sciences at Drexel University, Philadelphia, PA 19103

Malarial parasites within a moving avian hybrid zone: mapping their occurrence and prevalence among hybridizing chickadee populations

Avian haemosporidians are single-celled parasites that cause malaria and malaria-like disease in a wide range of bird taxa throughout the world. However, not all birds are equally susceptible to infection, and these differences in parasite resistance may play major roles in shaping birds' evolutionary processes, limiting their geographic distributions, and giving some species a competitive edge over others. For this project, we are investigating several phenomena that may occur among haemosporidians in chickadee populations from Southeastern Pennsylvania. Here, Black-Capped Chickadees (*Poecile atricapillus*) and Carolina Chickadees (*P. carolinensis*) interbreed across a narrow hybrid zone that is moving ~1 km north per year as the latter gradually displaces the former. If certain haemosporidian strains are unique to one chickadee but not the other, we expect that these parasites' distributions and prevalence vary across the hybrid zone. Additionally, some of these parasites may help drive hybrid zone movement by transferring from Carolina Chickadees to less resistant Black-caps where both birds occur. We are using molecular methods to screen chickadee blood samples for haemosporidians and identify specific haemosporidian strains. In preliminary screenings that involved chickadees from four sites within or near the hybrid zone, we found that overall infection rates varied between 21-49% of birds tested at each site. Interestingly, the site with "pure" Black-capped populations had the lowest parasite prevalence and almost completely lacked birds infected with a certain haemosporidian genus. Whether this pattern is influenced by chickadee species composition or other local factors will be the subject of upcoming studies.

STUDENT AWARD - MASTERS

02 *SPACE USE & OCCUPANCY*

Ross^S, Caryn D. and David Aborn

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The effects of urban extent on avian diversity: a citizen science and GIS study

As the human population continuously increases, habitat transformation due to urban expansion is inevitable, affecting many wildlife species (Silva 2015, Miller and Hobbs 2002, Gagne and

Fahrig 2011, Ikin et al. 2013). Birds have become a frequently used model species for studying the effects of urbanization on wildlife populations due to their environmental sensitivity and ease of observation (Mills et al. 1989, Blair 1996, Gagne and Fahrig 2011, Ormond et al. 2014). The analysis of these relationships has become considerably more practical with extensive bird census data available and, in more recent years, high-resolution digitized land-use data (Gardner 2017, Sauer 2011). While previous studies have investigated changes in species richness and abundance related to urbanization, there is a need for more broad-scale studies geographically associating changes in species diversity and urban expansion. Results of this study will facilitate implementation of more developed avian and environmental management strategies in relation to urban environments.

STUDENT AWARD - MASTERS

S11 SYMPOSIUM: Ecology and conservation of high elevation birds in Appalachians

Rota, Christopher

West Virginia University

Avian dynamics along an elevation gradient in the Central Appalachians

The physiognomy of the Central Appalachians creates unique patterns of avian biodiversity. Elevation ranges from 4,861 feet at Spruce Knob, West Virginia to 167 feet in neighboring Maryland. This elevation gradient leads to changes in vegetation and wildlife communities that reflects a latitudinal gradient, and many high elevation areas resemble northern boreal ecosystems. By substituting elevation for latitude, we can potentially address questions regarding the effects of climate change on spatial distributions of species. Furthermore, for many species, these high elevation areas within the Central Appalachians represent the southern-most portion of their range. One such species is the Canada Warbler (*Cardelina canadensis*), which is a species of conservation concern throughout its range in the United States and Canada. Partnering with scientists at the Monongahela National Forest and the U.S. Geological Society, I have begun an investigation of avian community dynamics along this elevation gradient. We are currently addressing two questions: are species exhibiting directional turnover along an elevation gradient; and how do environmental variables and interspecific interactions influence space use of Canada Warblers in the Monongahela National Forest? By evaluating turnover along an elevation gradient, we are seeking to determine if ranges of high elevation species are potentially contracting as a consequence of climate change. Additionally, by evaluating space use of Canada Warblers, we seek to inform conservation efforts for this species in West Virginia and the Central Appalachians. For this talk, I will discuss motivation for this newly established research program and present preliminary results.

27 CONSERVATION

Sargent¹, Sarah, Christopher H. Lundberg², and Anne Balogh³

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Effects of invasive plant control efforts on marsh breeding birds at a wetland complex along southern Lake Erie

Invasive wetland plant species, especially *Phragmites australis*, have spread throughout the Great Lakes basin, forming dense monotypic stands, displacing more diverse native plant communities in emergent marshes. Presque Isle State Park (Erie, PA) is a 3200-acre sand spit

with a complex of coastal ecological communities including approximately 1250 acres of wetlands. Using a standard point-based playback protocol, we completed an initial survey of marsh breeding birds at 28 points in 2011 (three visits per point), prior to an intensive effort to control invasive vegetation that began in 2012. In 2017, we conducted a second survey, revisiting the same points plus adding 7 new ones, with two visits per point. Pied-billed Grebe (*Podilymbus podiceps*), Common Gallinule (*Gallinula galeata*), American Coot (*Fulica americana*), Virginia Rail (*Rallus limicola*), Sora (*Porzana carolina*), and Least Bittern (*Ixobrychus exilis*), were documented in 2011, with 42 total detections of target species, whereas only four species were detected in 2017, with 61 total detections. American Coot and Virginia Rail were absent in 2017. Least Bittern was the most abundant species in both years, with an estimated 12 unique individuals in 2011 and 31 in 2017. Least Bittern and Common Gallinule were more widespread in 2017 and were denser in several areas where vegetation control efforts had successfully reduced the dominance of invasive plants since 2011. Unusually high lake water levels in 2017 may have reduced habitat suitability for some marsh breeding birds.

S05 *SYMPOSIUM: Ecology and conservation of high elevation birds in Appalachians*
Schold^{S,1}, Elizabeth and Lesley Bulluck¹

Virginia Commonwealth University

A landscape level approach to understanding breeding habitat of a rapidly declining migratory songbird

Conservation of declining species requires an understanding of how landscape composition and complexity influence the probability of occurrence. The golden-winged warbler, a rapidly declining migratory songbird, has complex habitat needs during the breeding season, requiring both early successional, shrubby habitats and mature forest habitat. Despite significant research effort in recent years on this species, very few studies have assessed landscape level habitat patterns. This gap in knowledge is due to the fact that accurate maps representing shrub cover do not exist in regions where this species breeds. Using supervised random forest classification, we have developed an accurate (92.4% overall accuracy) 1-m resolution land cover classification map of Highland County, VA, where golden-winged warblers are most frequently found on abandoned or actively grazed private agricultural lands. Using this map in conjunction with three years of golden-winged warbler survey data, we have developed dynamic occupancy models to better understand the importance of land cover composition and heterogeneity at multiple spatial scales. The results of these models suggest that different landscape characteristics are indeed important in predicting the presence of birds at different spatial scales. This valuable new information may better guide the conservation and management of this near threatened species; specifically, it may lead to better population estimates and prioritization of areas for habitat creation and maintenance.

STUDENT AWARD - MASTERS

49 *BREEDING BIOLOGY*

Smith^{1,S}, Tina R. and Katie Stumpf

Georgia College and State University

Prediction and prevention of nest predation in passerine species in middle Georgia

Nest predation is the most common cause of nest failure for the majority of passerine species in the southeastern United States. Direct observations of predation are challenging, and using motion-triggered camera use is expensive, time-consuming, with limited nest availability.

Alternatively, using these cameras on artificial nests can be a faster method to identify predators who rely on visual cues to find nests. Ultimately, artificial nests may be used to identify predators, if photographic evidence corroborates the egg markings left on clay eggs. In summer 2017, we baited 59 artificial nests with three clay eggs, and placed cameras on 39 of them in a middle Georgia mixed forest lake habitat. Twenty-five percent (15/59) were depredated, varying from egg markings to complete nest destruction. We captured ten predators on camera, and were able to match three with egg markings as evidence of predator activity. This summer, research will expand to include an additional site, and will also incorporate quantification of the habitat's vegetation type. Identifying predators based on egg markings will enable us to more readily identify predators and predator communities in a more cost-effective manner. Definitive predator identification will positively impact the reproductive success of both migratory and resident bird species in the southeastern United States by the development of protective measures that will serve to enhance passerine survivorship.

STUDENT AWARD - MASTERS

22 *VOCALIZATION & COMMUNICATION*

Snyder^S, Kate T. and Nicole Creanza

Department of Biological Sciences, Vanderbilt University

Complex evolutionary interactions between mating system and learned song in passerine birds

Bird song is involved in sexual selection and differs dramatically between species, evolving under both genetic and cultural pressures. In several species, studies have shown that females preferentially choose mates with more complex songs. Sexual selection theory suggests that competition for mates should be more extreme for males in polygynous species, predicting, by extension, that the evolution of polygyny should drive the evolution of increasingly complex songs. However, over the past several decades, multiple studies investigating whether there are evolutionary correlations between mating system and song have yielded mixed results. Thus, the question remains: does the evolution of polygyny lead to expected changes in song complexity? To address this, we compiled the most comprehensive dataset on this topic to date, including mating system data on 777 songbird species and song data on 363 species. We combined this dataset with new computational tools and large-scale avian phylogenies to provide novel insights into this unsettled question. We show that there is no universal correlation between mating system and song traits across Passeriformes: polygynous species do not have more complex songs overall. However, mating system does influence the rate of evolution of several song traits; the syllable repertoires of polygynous species tend to change more quickly. From these results, we can conclude that mating system is implicated in song evolution, but its influence is more complex than predicted by theory.

STUDENT AWARD - DOCTORAL

16 *SPACE USE & OCCUPANCY*

Stanton^S, Jr, Richard A., Robert J. Fletcher, Jr², Muzi Sibiya³, Ara Monadjem^{3,4}, and Robert A. McCleery²

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⁴Mammal Research Institute, Department of Zoology & Entomology, University of Pretoria, Private Bag 20, Hatfield 0028, Pretoria, South Africa

Traits explaining shrub encroachment and land use effects on bird occupancy in an African savanna

Land-cover and land-use change are among the most important drivers of vertebrate biodiversity loss, yet the synergistic effects of these drivers remain poorly understood. Species traits are increasingly used in ecology and conservation to understand the effects of land-cover and land-use change. Savannas are experiencing shrub encroachment and land-use conversions that have affected the composition of animal communities yet the ability of species traits to explain these effects is largely unexamined. We sampled bird occurrence across gradients of shrub encroachment and land use in an African savanna to determine whether nest substrate, diet, body size, and maneuverability explained species' responses to shrub encroachment and land-use change, pooling posterior distributions of responses to shrub encroachment and land-use change (i.e., β coefficients) from single-species occupancy models. We found no evidence of interactions between land-use type and shrub encroachment. Rather, sugar cane plantation had negative effects on the occurrence of birds with several nesting and foraging traits whilst homesteads had negative effects on tree nesters and insectivores. Shrub encroachment effects were positive for insectivores and all nest substrates. Neither land use nor shrub cover exhibited a trend with body size or maneuverability. The effects of shrub encroachment on bird communities were consistent across land uses, suggesting there are common mechanisms underpinning community dynamics in encroached savanna. Further, trait-mediated differences in the effects of shrub encroachment and land-use change may provide opportunities to manage biodiversity in mosaic landscapes by manipulating shrub cover.

STUDENT AWARD - DOCTORAL

19 CONSERVATION

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Interactive impacts of by-catch take and elite consumption of illegal wildlife

Harvesting, consumption and trade of forest meat are key causes of biodiversity loss. Successful mitigation programs are proving difficult to design, in part because anthropogenic pressures are treated as internationally uniform. Despite illegal hunting being a key conservation issue in the Pacific Islands, there is little research. We examined the dynamics of bird hunting and determine how these contribute to biodiversity loss on the islands of Samoa. We focus on the interactive effects of hunting on two key seed dispersing bird species: the Pacific Pigeon and the critically

endangered Manumea or Tooth-billed Pigeon. We use unique data sets to investigate the impact of wealth on consumption. Results raise serious conservation concerns, as pigeon hunting is likely to be a key factor contributing to the decline of the Manumea and critical forest seed dispersers in general. Our results show that wild meat consumption can lead to non-targeted pressure on bycatch species. Wild meat harvesting and consumption is a key issue leading to species declines and extinctions in the tropics. It is critical that this issue receives the appropriate attention and is addressed in the Pacific if species and forests are to be maintained.

32 CONSERVATION

Stoleson¹, Scott and Christopher Lituma²

¹USDA Forest Service, Northern Research Station, Irvine, PA

²West Virginia University, Morgantown, WV

Infestation by the exotic fruit fly, *Drosophila suzukii*, reduces local abundance of frugivorous birds in an Appalachian forest

The spotted-winged drosophila (SWD, *Drosophila suzukii*), an invasive pest of berry and stone fruit, has spread rapidly across the continent since it first appeared on the West Coast in 2008. Unlike native fruit flies, which oviposit on overripe or decaying fruit, SWD has a saw-like ovipositor that enables it to lay its eggs in unripe fruit and thus prevent full ripening. Although the devastating effects of SWD on commercial fruit production have been well-studied globally, its prevalence and impacts on native forest ecosystems remain unknown. Since 2006 we have used constant-effort mist-netting to monitor post-breeding bird abundance in recent timber harvests on the Allegheny National Forest of Pennsylvania. In 2016, we discovered an infestation of SWD in two recent harvests dominated by blackberry (*Rubus allegheniensis*). As the berries ripened, large numbers of fruit flies appeared and destroyed the entire fruit crop within 2 weeks. Compared to pre-SWD averages, capture rates of non-frugivorous birds remained high in 2016-2017, but numbers of primarily frugivorous species were drastically lower. It remains unknown whether frugivorous birds turned to alternate food resources, relocated to areas without SWD, or if local populations were actually reduced. Because frugivorous birds function as key seed dispersers in forests, their reduction, mediated through the loss of soft mast to SWD, may have serious long-term negative ecological consequences, such as changes in forest composition and regeneration.

03 MIGRATION

Sutton, Madison O., J.A. Holzschuh, B.J. Cosentino, and M.E. Deutschlander

Dept. of Biology, Hobart and William Smith Colleges, Geneva, NY USA

Energetic condition and mass gain in six species of parulid warbler during stopover along the southern shore of Lake Ontario

Passerines use stopover sites to refuel during migration. However, some studies have shown that refueling rates during stopover can vary with sex, time of arrival, density of conspecifics, or season. Using AIC model sets, we addressed two main questions: (1) Which factors – season, sex, arrival date, or time of day - best explain variability in energetic condition and (2) do season, sex, and arrival date influence mass-gain rate? Data were collected for six species of migratory warbler from 1999-2016 at the Braddock Bay Bird Observatory, a stopover site near Rochester, New York. While there was significant species variation, arrival date, sex, and season explained more variation in condition than time of day. For all species, birds arriving later in the season were in better condition than earlier migrants, females were in better condition than males, and

spring birds were in better condition than fall. Likewise, all birds gained mass over the course of the day. There was no difference in mass gain between the sexes in any species. Mass gain was consistent across season and arrival date for the *Geothlypis trichas* and *Setophaga caerulescens*, fall birds gained mass at a greater rate than spring birds in *S. ruticilla* and *S. magnolia*, and arrival date influenced mass gain of *Cardellina pusilla* and *S. coronata*. This suggests that the factors that most influence energetic condition and mass gain may be species specific. Further studies need to be conducted in order to determine the causes of these variations.

STUDENT AWARD - UNDERGRADUATE

12 SPACE USE & OCCUPANCY

Touhami^S, Feirouz, Abdelaziz Benhoussa, Hocein Bazairi, and Bouabid Badaoui
Laboratory 'Biodiversity, Ecology and Genome' and Research Center 'Plant and Microbial Biotechnology, Biodiversity and Environment', Faculty of Sciences, University Mohammed V, Rabat, Morocco

Experimental investigation of the impact of wader predation on benthic macrofauna in Merja Zerga lagoon, Morocco

To experimentally evaluate the predation effects of migratory waders on macrofauna community structure and organization, an enclosure field experiment was undertaken on the intertidal mudflats of Merja Zerga lagoon, Morocco, between September 2014 and March 2015. Three sampling stations on the mudflats most frequently used by waders in winter were selected. Four replicate sampling areas were laid out per station, each replicate consisting of an exclusion plot (a caged area of 2×2 m) and a control plot; five samples were taken in each in September and March. We did not find significant differences in either density or biomass of benthic macrofauna between exclusion and control plots, even though four of the five most abundant prey species in our plots (*Peringia ulvae*, *Hediste diversicolor*, *Heteromastus filiformis*, and *Cyathura carinata*) were potentially suitable prey species for the most common wader species present, the small calidrids. The density of the polychaete *Hediste diversicolor* and the biomass of *Heteromastus filiformis* significantly increased in both exclusion and control zones, likely because of the seasonal biological cycle of these species. Our results suggest that the density and biomass of the benthic macroinvertebrates assemblages at Merja Zerga lagoon are not impacted by wader predation.

STUDENT AWARD - DOCTORAL

46 PHYSIOLOGY & PARASITOLOGY

Tringali, Angela, Rebecca Windsor, and Reed Bowman

Avian Ecology Program, Archbold Biological Station, Venus, FL. 33960

Does stress response predict social network position in a cooperatively breeding bird?

Hormones influence behavior, and may help to explain how suites of correlated behaviors, or behavioral syndromes, are maintained. As part of a study of this phenomenon, we examined how baseline and acute stress response influences an individual's pattern of social behavior. We conducted this study on an individually marked population of Florida Scrub-Jays (*Aphelocoma coerulescens*) at Archbold Biological Station. In 2016, we collected blood samples to measure acute stress response from juveniles in this cohort. Social network data were inferred from observations collected the following year, from February through April of 2017. We used R packages *asnipe* and *igraph* to create a social network and calculate metrics to describe individuals' position in the network. We found that individuals with higher baseline

corticosterone also had more and stronger connections in the network. There was no relationship between an individual's baseline corticosterone and the size of its family-group, indicating that individuals with higher baseline levels of corticosterone form more and stronger relationships with individuals from other family-groups than those with lower baseline corticosterone. This suggests that birds with higher baseline corticosterone may be making more off-territory forays than those with lower corticosterone. We will explore the relationship between corticosterone and foray distance in subsequent analyses. These results provide insight into how stress physiology can influence an individual's life history strategy.

38 *METHODOLOGY & TECHNIQUES*

Vukovich, Mark and John C. Kilgo

USDA Forest Service-Southern Research Station

Do camera arrangement and settings improve individual identification of Golden Eagles?

Trail cameras have rapidly become important tools in monitoring and detecting wildlife. Individual identification of animals from photographs is noninvasive and can provide data for robust statistical analyses of population parameters. Golden Eagles (*Aquila chrysaetos*) are rare among birds in that their size, plumage and morphology permit individual identification from photographs. However, images of eagles often are not of sufficient quality to permit individual identification. Refining camera trap deployment could improve image quality and hence individual identification. Our objective was to assess whether various camera arrangements and settings increased likelihood of identifying individual eagles. We conducted our study on the Savannah River Site in South Carolina, USA, from 8 December 2016 to 9 March 2017. We deployed six cameras concurrently at each of three sites, with paired cameras at different settings (1 min delay vs. 30 sec burst of 5 photographs), positions relative to bait (dorsally and ventrally), and heights (1 m and 3 m). We established qualitative scores based on the dorsal views of eagle tail rectrices visible in photographs and compared scores among factors using a randomized complete block ANOVA. We detected significant differences in scores among the three sites ($P < 0.001$) but elevated cameras consistently had the highest mean scores for all three sites ($P < 0.05$). Researchers interested in identifying individual Golden Eagles should consider elevating cameras to improve views of eagle tail rectrices, which in turn should increase the number of distinguishable individual eagles at bait sites.

21 *CONSERVATION*

Ward¹, Simon, Auriel M.V. Fournier², and Alexander L. Bond^{3,4}

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Rodent eradications on islands and their effect on rails (Rallidae) as non-target species

Eradicating invasive species is a key part of island restoration, and can reverse the devastating impacts on native biota. Rodents are one of the most widespread invasive species, found on 80% of oceanic island systems, but have been removed from hundreds of islands through the application of anticoagulant-treated cereal bait. While such eradication operations are often net

positive events for island ecosystems over the long-term, some native biota are also susceptible, resulting in short-term non-target mortality. One of the most widely distributed groups of birds, rails and allies (Rallidae) are highly adaptable, often endemic, and are known often to suffer mortality during rodent eradication operations, to varying degrees. Our goal was to examine the ecological and operational factors associated with non-target mortality of rails during rodent eradications to better inform conservation practitioners so that mitigation measures can be planned and implemented during island restoration operations. We examined 122 eradication operations on 81 islands with rails present from 1983-2015, and found 78% with no reported information on non-target mortality using our search criteria. Operations with aerial application were more likely to report rail mortality (29%) than operation using bait stations (14%) or hand broadcasting methods (0%). Rail species' predominant diet or flight ability were unrelated to their likelihood of mortality, but smaller species were significantly more susceptible than large-bodied species. Post-operational monitoring of eradication operations should thoroughly record non-target mortality to improve our understanding of factors affecting non-target mortality, and the efficacy of mitigation measures.

44 *PHYSIOLOGY & PARASITOLOGY*

Windsor¹, Rebecca L., Angela Tringali¹, Sara Prussing², and Reed Bowman¹

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Fight or flight: why not both? The association of acute stress response with personality, dominance, and condition

As individuals encounter threatening or challenging environmental situations, they experience stress and react through the release of glucocorticoids (CORT). CORT acts on multiple types of tissue and physiological systems, thus creating correlations among phenotypic traits and behaviors through pleiotropic effects. The present study aims to explore the relationships between the CORT-mediated stress response, personality, dominance, and condition in a free-living bird, the Florida Scrub-Jay (*Aphelocoma coerulescens*). Research was conducted on the juvenile cohort at Archbold Biological Station, Venus, FL in summer 2016. We measured stress response, neophobia of a novel object, hierarchical dominance within natal brood, body size, and ornamentation (UV feather color) in 73 first-year jays to assess their association with acute stress response. Neither a bird's condition nor personality predicted any measure of CORT response. We observed a significant logarithmic regression between integrated stress response and the total number of aggressive actions performed, our measure of hierarchical dominance. Aggressive dominant birds had high stress responses while subordinate jays exhibited a wide range of integrated stress responses. We also observed a significant polynomial trend between neophobia and aggressive actions. Bold birds performed intermediate amounts of aggressive actions, while shy birds were bimodal: some shy birds performed very few aggressive actions while others performed the most. Bolder birds were more highly ornamented than shy birds, and dominant birds tended to be larger than subordinates. Our results illustrate a potential link between acute stress response, dominance, and personality, and shed light on the complex relationships between physiology and behavior.

37 *METHODOLOGY & TECHNIQUES*

Woodrey^{1,2}, Mark S., Auriel Fournier¹, Randy Wilson³, Jeff Gleason⁴, Jim Lyons⁵, Robert J. Cooper⁶, and John Tirpak⁷

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Application of structured decision making in the development of a Gulf of Mexico-wide avian monitoring program

Despite the importance of the Gulf of Mexico to North American avifauna, no comprehensive, Gulf-wide, bird monitoring program exists for any avian taxonomic group. This deficiency was highlighted during and after the Deepwater Horizon oil spill, when little was learned about the effects of the spill on bird populations. To address the diverse monitoring challenges and complexities across species, habitats, and the region, the Gulf of Mexico Avian Monitoring Network (GoMAMN) was formed. Comprised of a diversity of conservation partners including state and federal agencies, NGOs, and academic institutions, GoMAMN's broad goal is to define a vision and process for developing the role of bird monitoring in achieving integrated, efficient, and effective Gulf of Mexico management and recovery of impacted avian species. Utilizing a Structured Decision Making process, the team developed a set of fundamental objectives along with an explicit objectives hierarchy that reflects the goals, objectives, values, and information needs for an integrated Gulf avian monitoring strategy. Fundamental objectives reflect the need for scientific rigor, relevancy, and integration with other monitoring efforts. Relevant emphases of monitoring efforts focus on maximizing ability to (1) assess status and trends, (2) reduce uncertainty associated with management, and (3) understand ecological processes and their respective impacts on avian populations. Collectively, this framework provides a means to establish baselines for assessing future perturbations, evaluate restoration activities, and fill critical information gaps related to how ecological processes drive bird populations, as well as a means to establish priorities among many options for monitoring.

13 MIGRATION

Zenzal Jr.^{1,2}, Theodore J., Frank R. Moore¹, Jeffrey J. Buler³ and Jaclyn Smolinsky³

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³Department of Entomology and Wildlife Ecology University of Delaware 246 Townsend Hall Newark, DE, USA 19716

The response of songbirds to hurricanes during autumn migration

Hurricanes are natural events that can cause disturbance to stopover habitats and influence birds on migration as they approach the Gulf of Mexico in autumn. These migrants must obtain fuel sufficient for a trans-Gulf flight, which typically occurs within the forested habitats leading to the Gulf – areas at odds with hurricanes. Hurricanes can also influence migrant flight paths, altering migrant distributions at a broad scale. Therefore, we examined the influence of hurricanes during autumn migration within the eastern Gulf of Mexico. We used a multi-scale approach to determine how migrants respond to hurricanes using long-term (20+ years) banding data from coastal Alabama and remotely sensed data from the Mobile, AL and Slidell, LA

weather surveillance radars (WSR). WSR illustrates changes at a regional scale, while banding data provides a case study of species-specific changes in the stopover biology and habitat use of migrants. Results at the regional scale suggest that migrants avoid hurricane-impacted areas mostly within the same season, possibly due to habitat degradation or conditions aloft from these severe weather systems. At the local scale, 4 of 29 species were impacted during each hurricane year compared to pre- or post-storm means, with increased capture rates for most species during hurricane years. However, the majority of species had reduced post-storm capture rates compared to pre-storm rates. Our results suggest that hurricanes affect species in different ways at multiple scales; conservation plans should consider these results as the frequency and severity of hurricanes may increase with climate change.

36 *METHODOLOGY & TECHNIQUES*

Znidarsic^{1,2}, Elizabeth, Michael Towsey³, David M. Watson¹, Kelly W. Roy², Sarah E. Darling⁴, Anthony Truskinger³, and Paul Roe³

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²Oak Ridge National Laboratory. Environmental Sciences Division, Oak Ridge. Tennessee 37831, USA

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Complementing long-term bird monitoring observations with acoustic sensors and camera traps: best of both worlds

In this era of dynamic environmental change, monitoring is becoming even more critical as species experience escalating pressures associated with reduced habitat availability, climate disruptions and invasive species. Although long-term monitoring is central to the assessment of spatial and temporal movements in species richness and abundance, this labor intensive approach is being increasingly challenged to maximize efficiency and cost effectiveness. We investigated the application of two recently developed technological approaches to biodiversity monitoring and compared them with long-term occurrence data for marsh bird species at the Oak Ridge Reservation, Tennessee. Oak Ridge National Laboratory staff have collected bird data for over 67 years (1950–2017), yielding observational records of 232 species. During May–June 2017, we deployed remote camera traps and autonomous acoustic sensors for a period of 35 days. The resultant accumulation of acoustic data necessitated an automated method to assist in the analysis and interpretation. We used a novel ‘soundscape’ technique, long-duration false-color spectrograms to detect specific species. The acoustic sensors confirmed the presence of the Least Bittern (*Ixobrychus exilis*), a species previously only detected on 3 occasions at the Oak Ridge Reservation. In addition, a Purple Gallinule (*Porphyrio martinicus*) was ‘captured’ in a series of camera trap images, the first Roane County and Oak Ridge Reservation record of this species. Rather than replacing conventional monitoring approaches, these recently developed methods are a useful complement, especially for furtive species and inhospitable habitats. As well as generating independently verifiable records, acoustic sensors and camera-traps provide novel means to interact with a wide range of stakeholders, generating engaging sounds and images to personalize a data-driven narrative.

POSTER PRESENTATIONS

List of Poster Abstracts in numbered order

P01 STUDENT AWARD - UNDERGRADUATE

Weber, Ryan^{S,1}, Jason Courter¹, and Mike Watson²

¹ Department of Natural Sciences, Malone University, Canton, Ohio 44709

² Holden Arboretum, Willoughby, Ohio 44094

Changes in nesting phenology and delayed incubation of Tree Swallows in Ohio from 1966-2016

To optimize nesting success birds must time reproduction to raise young during periods of high food abundance. In many places food resources are becoming available earlier in the spring and birds may advance their hatching dates, or delay incubation, to stay in sync. Cavity nesting birds provide an excellent opportunity to monitor the timing of nesting and hatching. Our study assesses temporal changes in the nesting behavior of Tree Swallows (*Tachycineta bicolor*), single-brooded, aerial insectivores. We assessed 1780 successful Tree Swallow nesting attempts reported from 1966-2016 at the Holden Arboretum in Kirtland, OH. We matched nesting dates with weather variables and used linear regression to assess the impact of winter and spring temperature and precipitation on first egg dates and incubation intervals. Birds advanced first egg dates over time and now nest at higher degree-day accumulations. In addition, intervals between first egg and hatching dates (i.e., the degree of delayed incubation) increased over time. Our results suggest that Tree Swallows are advancing their first egg and hatching dates in response to climate change, but perhaps not enough to stay in sync with peak food resources. This may partially explain the notable declines in Tree Swallow populations reported by the Breeding Bird Survey during the past 50 years in the eastern United States. Increasing incubation intervals over time could be an evolutionary strategy that Tree Swallows are using to attempt to optimize reproduction efforts during springs that are warmer, on average, but with more erratic weather events.

P02 STUDENT AWARD - UNDERGRADUATE

Dunn, Lex^{S,1}, J. Lindley McKay², Lucy M. Avina¹, and Olga Milenkaya¹

¹ Young Harris College, 1 College Street, Young Harris GA 30582 USA

² 5875 Brasstown Creed Road, Young Harris GA 30582 USA

Carolina Chickadees (*Poecile carolinensis*) increase nest visitation rate in response to a novel predator, the House Wren (*Troglodytes aedon*)

House Wrens (*Troglodytes aedon*) usurp other birds' cavities and may kill their eggs and young. They are relatively new predators and competitors in northern Georgia, and it is therefore unknown whether local cavity-nesting birds use anti-predatory behaviors against house wrens to defend their nests. We hypothesized that Carolina Chickadees (*Poecile carolinensis*) have already evolved anti-predatory behaviors against House Wrens because they exert a strong selective pressure. We monitored the nesting of wild chickadees and presented one of three predatory models near each nest when the nestlings were 8 days old: the novel predator (house wren), a positive control of a well-established predator (eastern gray squirrel, *Sciurus carolinensis*), and a negative control of a non-predatory species (Mourning Dove, *Zenaida macroura*). We compared nest visitation rates of parent chickadees during a 1-hour period before (pre-model) and after (post-model) the presentation of the model. Visitation rate was not statistically different between the paired pre and post-model trials when doves and squirrels were

presented, but the latter had a wide variation in individual responses. For the house wren treatment, visitation rate was statistically higher in the post-model trials compared to their paired pre-model trials. Our hypothesis was supported, but not in the manner that we had initially anticipated. We expected a decrease in visitation rate, but the opposite occurred. Chickadees may be visiting their nests more in response to house wrens to check on the safety of their young, or they may be feeding their young more to accelerate their development.

P03 STUDENT AWARD - UNDERGRADUATE

Koch, Samuel^S and Lindsey Walters

Department of Biological Sciences, Northern Kentucky University, Highland Heights, KY 41099

Sex differences in fecal sac removal from Carolina Chickadee (*Poecile carolinensis*) nests

Parent songbirds keep their nests clean by removing nestling waste in the form of fecal sacs. In species with biparental care, both parents typically remove fecal sacs. However, this behavior has not been well studied in Carolina Chickadees. The purpose of our research was to determine whether there were differences in fecal sac removal rates between male and female Carolina Chickadees (*Poecile carolinensis*). We collected data for this project at St. Anne Woods and Wetlands in Melbourne, Kentucky. We observed 30 nests over seven years, from 2011-2017, with a total of 430 one-hour observations. For each observation, we used a viewing scope to watch the entrance of the nest box to note arrivals and departures of banded parents. For each sex, we calculated both the number of fecal sac removals and the number of removals divided by the total number of nest visits per hour. Our results showed that males removed more fecal sacs per hour than females. However, this was only because they visited the nest more frequently, not because they were more predisposed toward providing nest sanitation, as the rate of fecal sac removals per nest visit was the same between the two sexes. Studies on fecal sac disposal are significant because the behavior is rarely studied and yet is an important part of passerine nesting behavior. Future studies should determine whether the pattern we observed in Carolina Chickadees is consistent among different species.

P04 STUDENT AWARD - UNDERGRADUATE

Nash, Cody^{1,S}, Rob Holbrook², and Philip Darby¹

¹Department of Biology, University of West Florida, Pensacola, FL 32514

² East Gulf Coastal Plain Joint Venture, USFWS, Daphne, AL 36526

A survey of wintering waterfowl on the bays and estuaries of the Florida/Alabama Gulf Coast

University of West Florida and USFWS biologists have recently established a long-term waterfowl monitoring program around Santa Rosa Island and Perdido Key on the Florida/Alabama Gulf Coast. This region provides wintering habitat and feeding grounds for many species of waterfowl, including redhead, merganser, scaup, and bufflehead. Seagrass beds in the bays and estuaries provide a reliable feeding ground, but heavy boat traffic in these areas may restrict the range occupied by waterfowl. This relatively new survey currently consists of point counts at a total of 30 waterfront survey sites, and almost four years of data have been collected to date. At each survey site, species abundance and activity are recorded, as well as boat traffic and hunting disturbances. Preliminary results show that the highest abundance of waterfowl occurs in January and February, and the largest single-species rafts are seen at sites with the least human disturbance. Upon the completion of the fourth year of data collection (May 2018), formal analysis and mapping of waterfowl abundance and distribution will be performed.

Data will be related to the most recently available seagrass coverage maps of the region of interest, and year-to-year changes in species type and abundance will be analyzed. Waterfowl are subject to numerous laws and protections, and thus are of interest to many researchers and stakeholders. Studying their use of wintering habitat will serve to inform conservation and management decision-makers.

P05 STUDENT AWARD - UNDERGRADUATE

Roberts, Kelly^{S,1}, Veronica Schabert¹, Kristen Covino², and Andrea Patterson³

¹ Department of Animal Behavior, Ecology, and Conservation, Canisius College, Buffalo, NY 14208

² Department of Biology, Canisius College, Buffalo, NY 14208

³ Braddock Bay Bird Observatory, Rochester, NY 14612

Migratory patterns in male and female Common Yellowthroats (*Geothlypis trichas*) at different spring migratory sites

In order to study movements of migratory species across different geographic locations, the implementation of reliable tools and tracking technologies is needed. One such method, stable hydrogen isotopes ecology have been shown to be accurate measures at determining approximate origin of migrants. This study analyzes stable hydrogen isotopes ratios in the rectrices of both sexes of the Common Yellowthroat (*Geothlypis trichas*), in order to better understand their migratory patterns. Feathers were collected from two stopover sites, Braddock Bay Bird Observatory in Greece, NY and Appledore Island Migration Station, ME, during the spring migratory seasons of 2016 and 2017. After birds were banded and sex was determined, the left and right rectrix number five were pulled from 106 birds (67 from Appledore, 39 from Braddock Bay). Feathers were cleaned and dried; the vanes were cut and packed into silver capsules in preparation for isotope analysis. All packed samples were shipped to collaborators where mass spectrometry is underway. We will present our results investigating differences in the hydrogen isotope ratios between the stopover sites in Maine and New York and between males and females. We will use the methods established by this study to continue similar investigations with additional migratory species and at other migratory stopover sites.

P06 STUDENT AWARD - UNDERGRADUATE

Schabert, Veronica^{S,1}, Kelly Roberts¹, Kristen Covino², and Andrea Patterson³

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² Department of Biology, Canisius College, Buffalo, NY 14208

³ Braddock Bay Bird Observatory, Rochester, NY 14612

Age-specific variation between migration patterns of the Common Yellowthroat (*Geothlypis trichas*)

Migratory patterns can be investigated through studies of stable isotope ratios of hydrogen atoms found in the feathers of birds. We are studying age-specific differences in migration of Common Yellowthroats (*Geothlypis trichas*) through analyses of feather hydrogen isotopes. We predicted that within each migratory season, variation in feather isotopes will be greater in young birds compared to adults. We did not expect differences in the feather hydrogen ratios of adults between the spring and fall migratory seasons. However, due to the greater number of young migrants during fall, we expected that variation will be greater in fall compared to spring for

young birds. Feather samples were collected at Braddock Bay Bird Observatory in Greece, New York during spring and fall migration, 2016 and 2017. The right and left fifth rectrices were pulled from 61 birds (22 in fall, 39 in spring). Samples were cleaned and dried before feather vanes were cut, weighed, and packed into 3.5 mm x 5 mm silver capsules. Samples were then sent out for isotope testing via mass spectrometry. We will present our results investigating differences in the hydrogen isotope ratios between age groups and migratory seasons. The framework established by this study will be applied to investigations of migratory movement of other species in future studies.

P07 STUDENT AWARD - UNDERGRADUATE

Schall, Amanda, Christina Shonk, Sebastian Moreno, Madelyn Dolinsky^S, Emily Russavage, Ana Rahman, Zoya Rahman, Emily Kamieniecki, Keri Skvarla, Michael A. Steele, and Jeffrey Stratford

Wilkes University

Predation rates on model caterpillars are higher in suburbs than in the city or country

Avian insectivores are reduced in abundance and species richness as habitats become more urbanized. How these altered communities affect ecosystem services is less well understood. For three years, we placed plasticine model caterpillars across urban-rural gradients in northeastern Pennsylvania (USA) to give insights into predation rates with decreasing avian species richness. We hypothesized that predation rates would decrease with fewer species of insectivores and predicted fewer bitten caterpillar models as urbanization increased. However, predation rates were consistently highest in suburban sites. Daily predation rates on individual models in suburban sites were up to three times the daily predation rates than found in rural and urban sites, which were nearly identical (daily predation probability ~0.025). Game cameras identified predation events by Rose-breasted Grosbeak, Northern Cardinal, and a Blue Jay though the identity of most predation events were unknown. Our ad hoc hypothesis is that predation rates are a combination of species richness, abundance of insectivores, and intensity of areas searched.

P08 STUDENT AWARD - UNDERGRADUATE

Thammarat, Chayata^S and Julie Jedlicka

Missouri Western State University

Avian nest site selection and reproductive success

Many native bird species require cavities for building nests and raising young, and conservation programs in urban landscapes are increasingly using nest boxes to potentially increase native bird communities. In Northwest Missouri, native cavity-nesting birds include House Wrens (*Troglodytes aedon*), Black-capped Chickadee (*Poecile atricapillus*), Eastern Bluebirds (*Sialia sialis*), and Carolina Wren (*Thryothorus ludovicianus*). We hypothesized bird species differ in their preference for nest site substrate (cedar or concrete mix). Our experimental design established one wood and one concrete mix box erected in pairs across the Missouri Western State University campus. From March through July in 2016 and 2017 boxes were monitored every 3-4 days for breeding activity. Campus nest boxes produced 82 fledglings from 35 nests of three native species in 2016. In 2017, number of fledglings increased to 208 individuals from 59 nests of four native species. In both 2016 and 2017 Eastern Bluebirds significantly preferred concrete nest boxes ($X^2=26$, $p<0.001$), with no attempts made in wood boxes. In 2016, Black-capped Chickadees significantly preferred concrete nest boxes ($X^2=4$, $p<0.05$). This research

indicates that with management, nest box programs can be effective at fledging native bird species and increasing local populations, even within urban areas.

P09 STUDENT AWARD - UNDERGRADUATE

Martel^S, Grace, Bradley Cosentino, and Mark E. Deutschlander

Dept. of Biology, Hobart and William Smith Colleges, Geneva, NY 14456

Energetic condition and differential migration during fall and spring migration in Ruby-crowned Kinglets: a test of the insurance and breeding hypotheses

Energetic condition during spring stopover is critical to migration and in preparation for breeding. Birds may deposit excess fat reserves as insurance against potentially poor environmental conditions during early spring or they may utilize excess fat for breeding; for either reason, birds may be in better condition in spring than fall. Moreover, rates of refueling during stopover can vary with season, date of arrival, or sex. We used path analyses on Ruby-crowned Kinglets (RCKI) to determine whether sex, season, arrival date or time of capture (as an estimate of refueling rate) influence energetic condition. Data for over 6000 females and males were collected from 1999-2016 from the Braddock Bay Bird Observatory, a northern stopover site on the south shore of Lake Ontario. Typical of RCKI differential migration, males arrived earlier in the spring than females, and later in the fall. Spring birds were slightly, but significantly, heavier than fall birds. In fall, there were no effects of sex, time of capture, or arrival date on condition. In the spring, however, there was an effect of arrival date on energetic condition in both sexes, with later arriving birds in better condition for each sex, contradicting the insurance hypothesis. In addition, regressions of condition with time of capture, suggest that males may lose mass during spring stopover, while females may gain mass, irrespective of date of capture, which suggest females are better able to prepare for breeding during stopover.

P10 STUDENT AWARD - MASTERS

Bentz, Alexandra B.^{2,S}, Victoria A. Andreassen³, and Kristen J. Navara¹

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² Indiana University- Bloomington, Indiana

³ Auburn University- Auburn, Alabama

An experimental test of the relationship between yolk testosterone and the social environment in a colonial passerine

Maternal hormones can be transferred to offspring during prenatal development in response to the maternal social environment, and may adaptively alter offspring phenotype. For example, numerous avian studies show that aggressive competition with conspecifics tends to result in females allocating more testosterone to their egg yolks, and this may cause offspring to have more competitive phenotypes. However, deviations from this pattern of maternal testosterone allocation are found, largely in studies of colonial species, and have yet to be explained. Colonial species may have different life-history constraints causing different yolk testosterone allocation strategies in response to conspecific competition, but few studies have experimentally tested whether colonial species do indeed differ from that of solitary species. To test this, we collected eggs from Zebra Finches (*Taeniopygia guttata*), a colonial species, in the presence and absence of conspecific intrusions. Females did not alter the concentration of testosterone deposited in eggs laid during intrusions despite becoming more aggressive. These results suggest that maternal effects are not characterized by a uniform response to the social environment, but rather need to be contextualized with life-history traits.

P11 STUDENT AWARD - MASTERS

Feely, Mary^S and David Aborn

Department of Biology, University of Tennessee, Chattanooga, Chattanooga, TN 37403

Passerine occurrence and seed dispersal post-wildfire within the Flipper Bend Woods of Signal Mountain, Tennessee

In Tennessee, the Flipper Bend region on Signal Mountain presents a unique opportunity to analyze forest regrowth one-year after a major wildfire. Though the avian diversity of pre-fire conditions is unknown, we are able to observe the post-fire effects on passerine usage and whether it assisted disturbance-dependent species. One way to examine the aftermath of the fire is to observe the diversity of passerines post-fire and their impact on plant recolonization.

Invasive plants are thought to have significantly intensified the fire at Flippers Bend by allowing the fire to easily spread and to create fire “ladders” into the crowns of trees. The objectives of my thesis project are to (1) examine the overall passerine species evenness and richness within the post-burned site and (2) examine whether invasive plant species recolonization of the forest could be assisted by birds. Birds will be caught in mist-nets and any droppings will be collected to determine if viable seeds of invasive plants are being spread by ornithochory. The preliminary results will be presented after analysis.

P12 STUDENT AWARD - MASTERS

Streker, Rochelle^{S,1}, Patrick Jodice², and Juliet Lamb³

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Daily survival rates of Brown Pelican (*Pelecanus occidentalis carolinensis*) nests and chicks and their relationships with nest habitat

Brown Pelicans nest throughout the northern Gulf of Mexico and are a high priority species for restoration and monitoring. Prior research on the species here has focused strongly on migration, spatial and foraging ecology, but detailed data on reproductive parameters and their association with habitat are still incomplete. As part of a larger project aimed at informing restoration and monitoring, we studied reproductive ecology of Brown Pelicans at the largest colony (ca. 4500 pairs) on Gaillard Island in Mobile Bay, AL. Our objective was to assess the relationship between nest macro- and micro-habitat variables and the survival rates of nests and chicks. We monitored 69 nests on Gaillard Island during the 2017 breeding season, recording survival of the nests and chicks. 54 nests successfully fledged at least one chick (78.3%), while 15 nests failed to produce any fledged chicks (21.7%). Of the 54 successful nests, 9 nests successfully fledged chicks from all eggs laid (16.7%), 34 nests successfully fledged at least one chick despite losing at least one egg (62.9%), and 11 nests successfully fledged at least one chick despite at least one chick dying during maturation (20.4%). We also measured habitat features at approximately 3-week intervals to account for natural changes in the variables over the length of the breeding season and to identify whether effects from habitat variables change overtime. We are creating generalized linear mixed models with environmental covariates as fixed effects and individual nests as random factors for both apparent success and daily survival rates.

P13 STUDENT AWARD - MASTERS

Youngman, Holland^{S,1}, Rick Huffines², and David Aborn¹

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Post-fledging habitat use and movements of Worm-eating Warblers (*Helmitheros vermivorum*) in the Tennessee River Gorge

Declines in Neotropical migratory birds have been observed throughout the Americas over the past several decades. Avian species with particular habitat needs, termed ‘specialists’, are especially at risk given continual habitat loss. These downward trends have prompted researchers to gather information on species’ life histories and associated habitats to better understand the necessary components for successful life stages. The post-fledging period is an under-studied and important life stage. The Worm-eating Warbler (*Helmitheros vermivorum*; WEWA) is an interior specialist with little known regarding its post-fledging habitat needs. I used harness-attached radio transmitters to track fledgling WEWAs on lands in the Tennessee River Gorge to study habitat components and daily movements. Analyzed results between fledgling location and random points indicate that degrees slope (measured gradient of a hillside) and leaf litter depth are significant characteristics of juvenile habitat; and that shrub density and herbaceous cover may also be determining factors of juvenile habitat. Daily movements averaged 49 linear meters, and tended to move down slope. Additional studies will augment the understanding of post-fledging needs, and will help land managers to make informed decisions on conservation actions.

P14 STUDENT AWARD - DOCTORAL

Dossman, Bryant C. ^{S,1,2}, Amanda D. Rodewald^{1,2}, and Peter P. Marra³

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Seasonal rainfall influences intra- and inter-seasonal variation in territoriality of a wintering migratory songbird

The role of territoriality and space use in regulating animal populations is arguably one of the most important concepts in population ecology. For migratory birds, territoriality during the non-breeding season is primarily driven by competition over food. However, despite profound consequences for population dynamics, temporal variation in territorial behavior has yet to be examined. Given the importance of rainfall on insect (food) abundance and redstart ecology, we hypothesize that variation in territorial behavior will be influenced by annual and seasonal variation in rainfall. To test this hypothesis, we utilize the long-term model system of American Redstarts *Setophaga ruticilla* wintering in Southwest Jamaica. Using a dynamic occupancy approach, we directly estimate territory-fidelity (site occupancy) within and between seasons. Rainfall has been previously shown to influence redstart ecology and will be used in this analysis to determine its effect on modifying the strength of territoriality. Preliminary analyses have shown that there is an inverse relationship between winter rainfall and territory fidelity at the seasonal level. We suspect that these movements coincide with ephemeral resource pulses that individuals opportunistically take advantage of during periods following increased rainfall. This study is the first to investigate the extent of intra-seasonal variation in territorial behavior

brought upon by variation in seasonal rainfall. With ongoing declines in rainfall predicted to continue throughout the Caribbean, future efforts will seek to build upon the potential implications that variation in territorial behavior will have on population dynamics of migrants wintering in the Caribbean.

P15 STUDENT AWARD - DOCTORAL

Gutierrez Ramirez, Mariamar^{1,S}, Joely DeSimone^{1,2}, Michael S. Griego¹, Cory R. Elowe¹, and Alexander R. Gerson¹

¹Biology Department, University of Massachusetts Amherst, Amherst, MA 01003

²Current address: Division of Biological Sciences, University of Montana, Missoula, MT 59812

Evaluating the impact of overnight en route weather over the Gulf of Mexico on lean mass of spring migrants

During long migratory flights, birds use fat deposits for energy, but they also burn lean tissue resulting in significant reductions in muscle and organ masses which can impose physiological limitations that prolong stopover. In wind-tunnel experiments, hotter or drier conditions lead to greater depletion of lean mass in flying birds. Therefore, warming temperatures experienced en route may directly impact body condition, migration rate, and ultimately breeding success of migratory songbirds. Here we test the hypothesis that higher temperatures and/or drier conditions experienced en route by spring trans-Gulf of Mexico migrants will result in reduced lean mass upon arrival in the Northern Gulf coast. In spring 2016-2017 we banded songbirds on a barrier island in Apalachicola Bay, Florida. We used plasma metabolite profiling and Quantitative Magnetic Resonance body composition analysis to accurately and non-invasively measure body condition of spring migrants on arrival. Select species were tracked using automated radio-telemetry to determine stopover duration and migratory behavior. For six focal species, body fat averages were all under 9%, indicating birds had recently arrived from trans-Gulf flight. We found no inter-annual difference in fat mass or refueling rate. Northern Waterthrush (*Parkesia noveboracensis*) had significantly lower lean mass in 2016 than in 2017, but we did not find inter-annual lean mass differences for the other species. Overnight temperature and humidity data prior to capture will be correlated against size-corrected lean and fat masses to determine how climate impacts fuel use in flight and arrival condition in passerine Neotropical migrants.

P16 STUDENT AWARD - DOCTORAL

Millican^S, David and Jeff Walters

Virginia Polytechnic Institute and State University

Resource use and interspecific interactions in a Namibian cavity-nesting community

Cavity-nesting guilds are diverse communities of vertebrates and invertebrates found in forest ecosystems worldwide. Due to their dependence on tree holes for nesting, species in these communities are limited by an availability of suitable nest cavities. This dependence therefore leaves these species susceptible to forms of disturbance that diminish cavity availability, such as anthropogenic forest management, stochastic events, and climatic shifts. Namibia is the driest country in sub-Saharan Africa, with a landscape largely depauperate of large trees, the most common harborers of cavities. Despite this, Namibia's cavity-nesting community is large and diverse. Among the birds, there is in particular a higher diversity of medium- and large-bodied secondary nesting species than in over cavity-nesting guilds. This community is threatened by numerous anthropogenic disturbances, including charcoal production, altered grazing and fire

regimes, and increasingly frequent and severe droughts caused by climate change. To aid the conservation of this threatened community, we have embarked on a multi-year nest-web analysis to quantify community structure. Through this analysis, we will seek to describe the type and structure of available nest cavities, species-specific resource use preferences, and direct and indirect interactions between community members. This research will provide critical information on how to protect an important ecological community, including the tree species most utilized by cavity-nesters and the most important processes for cavity formation. Our research will provide important information to help land managers mitigate impacts to this community from anthropogenic management, and our long term data set may provide preliminary insights into how more frequent and severe droughts due to climate change will impact community dynamics and long-term persistence of species.

P17 STUDENT AWARD - DOCTORAL

Searfoss, Abigail M.^{S.1,2}, Desmond Fugar³, Wan-chun Liu⁴, and Nicole Creanza²

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The evolution of Chipping Sparrow song: a geographic comparison of genetic and cultural variation

After migration and during their first breeding season, male Chipping Sparrows (*Spizella passerina*) often experience a plastic phase in which they produce several syllable types before settling on one syllable for their permanent repertoire; that syllable may resemble the songs of neighboring conspecifics. Thus, although the Chipping Sparrow has a simple repertoire, this matching phenomenon may allow complex geographic distributions of song types to exist. Thus, syllable types of successful birds with large or long-held territories could gain prominence in one region; this pattern of song transfer or random drift of song types could in turn lead to both regional and chronological differences in syllable types. The Chipping Sparrow ranges across North and Central America and has been recorded extensively for over six decades. Taking advantage of citizen science data, we conducted a large-scale analysis of approximately 900 Chipping Sparrow songs to determine whether certain song features show geographically-dependent differences. By examining the syllables of Chipping Sparrows with respect to the time and location of the recordings, we will search for cultural evolution of song within this species. Furthermore, using genetic data, including barcodes and mitochondrial control region sequences, we can determine whether geographically-dependent song differences are also correlated with genetic variation. Our preliminary results suggest that North American populations differ genetically from Central American ones. However, there is limited genetic differentiation within North America. Interestingly, even though this population is genetically well mixed, our preliminary song analysis hints there are cultural niches across the continent.

P18 STUDENT AWARD - DOCTORAL

Straley, Katherine^{S.1}, Paige Warren², and David King³

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² Department of Environmental Conservation, The University of Massachusetts in Amherst, Amherst, MA 01003

³ USDA Forest Service Northern Research Station, Amherst, MA 01003

Suburban forests buffer effects of bird blow fly ectoparasitism on nestling Wood Thrushes (*Hylocichla mustelina*)

Humans are shifting wildlife community dynamics with ecosystem alteration through urbanization. Urbanization influences species interactions, including host-parasite interactions. In birds, ectoparasites can decrease nestling health by reducing mass and/or inducing immune responses, and they may even influence health and reproduction in subsequent years. Ectoparasites such as hematophagous blow flies are introduced to nests via adult flies laying eggs into nest materials. Higher densities of bird territories, which have been documented in patchy habitats, may lead to increased incidents of ectoparasitism by providing blow flies with more clustered nesting resources. The Wood Thrush, a declining species, nests in both suburban and contiguous forests in Massachusetts. We compared ectoparasite loads on Wood Thrush nestlings from suburban forest fragments and a larger more contiguous forest to determine a) whether suburban birds experience more ectoparasitism and b) if ectoparasite loads are affecting nestling health. We predicted that suburban nestlings would experience higher loads than their rural counterparts, and that more parasitized nestlings in both habitats would be smaller in body size. Preliminary analyses indicate that suburban nestling body condition was not affected by the presence of blow flies, while rural nestlings experienced a decrease in body condition when parasitized. This indicates that suburban habitats may provide more abundant or higher quality resources that buffer parasitized nestlings against the effects of bird blow flies. Further study that examines the availability of food resources and provisioning by adults in suburban forests could clarify mechanisms through which parasitized nestlings are able to maintain body condition.

P19

Berkunsky, Igor with 101 international co-authors (please see poster for names and addresses)

Instituto Multidisciplinario sobre Ecosistemas y Desarrollo Sustentable, CONICET, Universidad Nacional del Centro de la Provincia de Buenos Aires, Tandil, Argentina

Current threats faced by Neotropical parrot populations

Psittaciformes (parrots, cockatoos) are among the most endangered birds, particularly in the Neotropics. The drivers of this situation appear to be manifold and mainly of anthropogenic origin. However, this assessment is based on the last extensive consultation about the conservation situation of parrots carried out in the 1990s. Given the rapid development of anthropogenic threats, updated data are needed to strategize conservation actions. The present study evaluates current threats faced by Neotropical parrots following a population-based approach. We gathered updated information through a wide-ranging consultation involving biologists, wildlife managers, government agencies and non-governmental conservation organizations. We obtained up-to-date information on threats affecting 192 populations of 96 Neotropical parrot species across 21 countries. Moreover, we investigated associations among current threats and population trends. Many populations were affected by multiple threats. Agriculture, capture for the pet trade, logging, each of them affected >55% of the populations, suggesting a higher degree of risk than previously thought. In contrast to previous studies at the species level, our study showed that the threat most closely associated with decreasing population trends is now the capture of wild parrots for the domestic local pet trade. Other threats associated with decreasing populations include small-holder farming, rural population

pressure, nest destruction by poachers, agro-industry grazing, small-holder grazing, and capture for the international pet trade. Our results highlight the importance of a population-level approach in revealing the extent of threats to wild populations. It is critical to increase the scope of conservation actions to reduce the capture of wild parrots for pets.

P20

Bowman, Reed, Stephanie Carrera, Logan Clark, Alberto Gonzalez, Meredith Heather, David L. Sherer, Young Ha Suh, Angela Tringali, and Rebecca Windsor

Avian Ecology Program, Archbold Biological Station, Venus, FL 33960

Want an internship after graduation? The Avian Ecology Program at Archbold Biological Stations offers paid internships with independent research!

We expose interns to a variety of methods used to study avian demography and to quantify local ecological characteristics and larger-scale landscape characteristics. Our goal is to prepare potential graduate students in avian ecology for the rigors of independent research. In addition to research methods, we train interns about experimental design and the development of hypotheses and predictions, data management and quality control, and data analysis and presentation. Each intern develops their own independent project, typically are of their own design, both intellectually and logistically, but often fitting into the broader conceptual framework of our long-term research program. Our program enables prospective graduate students to refine their areas of intellectual interest, learn to articulate and then incorporate their original ideas into viable research plans, conduct that research, and then present the findings of that research. Interns devote 50% of their time to assigned duties as part of our long-term research on Florida Scrub-Jays, the rest is devoted to their independent project. Nearly 25% of intern projects lead to publications and >75% of post-baccalaureate interns go on to graduate school. Seminars are held biweekly with speakers from around the world. The Avian Ecology Lab holds regular lab meetings and a monthly journal club where we read and critique scientific papers. Internships, offered for 6-8 months, include a stipend, and room and board. This is an amazing chance to live and work in a vibrant, interdisciplinary scientific community. Talk to several of our current interns about their experiences and projects.

P21

Boyer, Kevin^{1,S}, Cella Wright¹, Abbie McCrea¹, Madeleine Gefke¹, Yemko Pryor¹, Anah Soble¹, Mercedes Campos-Lopez¹, Tempe Shrenker¹, Max Butler¹, Ben Lovett¹, Amy Austin¹, Mary Garvin¹, and Rebecca Whelan²

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Age-specific variation in House Sparrow (*Passer domesticus*) preen gland secretions and effect of semi-volatile components on attraction of the mosquito *Culex pipiens*

House sparrows (*Passer domesticus*) serve as reservoir hosts of West Nile virus (WNV), vectored in eastern North America by the mosquito *Culex pipiens*. Scott et al. (1990) demonstrated that *C. pipiens* prefers to take blood meals from adult House Sparrows over nestlings, though the reasons for this preference are unknown. Avian preen gland secretions include dozens of compounds; heavier components are believed to waterproof and condition feathers, while lighter components are hypothesized to serve in intra- and inter-specific communication. Using gas chromatography and mass spectrophotometry we found age-specific differences in the semi-volatile chemical compound profiles of House Sparrow preen gland

secretions. We then hypothesized that the observed preference of *C. pipiens* for adult House Sparrows is in response to the abundance of these compounds. To test the prediction that *C. pipiens* will more frequently be attracted to the preen gland secretions of adult over nestling House Sparrows, we conducted mosquito choice trials in an olfactometer. We found no significant difference in mosquito feeding preference between the secretions of nestlings and adults. We suggest that other chemical cues influence the feeding preference of *C. pipiens*, either independently of preen gland secretions, or synergistically in combination with them.

P22

Brown, W.P.

Division of Natural Sciences and Mathematics

Red-tailed Hawk eggshell characteristics change due to embryonic development

Eggshell thinning may be caused by embryonic demands for calcium. Changes in eggshell thickness, mass, and a thickness index that accounted for missing blowhole mass were examined from 66 Red-tailed Hawk (*Buteo jamaicensis*) eggs with varying degrees of embryonic development. Measurements from eggs collected in central New York in the late 1800s and early 1900s were examined with mixed model analyses with year of collection and clutch size specified as random variables. Eggs with advanced embryos were 13% thinner than eggs that were freshly laid ($P < 0.05$). This degree of thinning is much greater than reported values from eggs of captive hawks or other raptors. The thickness index was also influenced by degree of embryonic development ($P < 0.05$) but mass was not. Few other studies have examined the effect of embryonic development on characteristics of wild raptor eggs.

P23

Chace, Jameson F. Erin O'Neill, Makayla Corimer, and Ryan Senecal

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Factors affecting the abundance and distribution of wintering waterfowl in Narragansett Bay, Rhode Island

Narragansett Bay has a diverse assemblage of nonbreeding waterfowl during the winter months, yet little is known of the key factors that shape species-specific abundance and distribution. Actively foraging waterfowl were surveyed at 30 locations along the edge of the open ocean along Newport Neck and 33 sites along a 24 km transect of the west passage of the bay at low tide between January and March of 2015-2018 ($n=481$). Twenty species were detected, of which four species were only found in the more sheltered bays and coves of the west passage and six only in the more exposed areas of Newport Neck. American Black Duck (*Anas rubripes*), Common Loon (*Gavia immer*), and Bufflehead (*Bucephala albeola*) were equally common across the gradient. Structural components of coastal topography were a stronger predictor of black duck and loon occupancy, while prey base sampling was not a good predictor for these waterfowl species.

P24

Hatch, Margret I.¹ and Robert J. Smith²

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Total plasma protein: Correlates and lack of species differences

Total plasma protein (TPP) is a diagnostic tool used in avian medicine and to a lesser extent avian ecology. Proteins found in bird plasma include albumin, globulins, fibrinogen, glycoproteins, and lipoproteins. Functions of some of these proteins include osmoregulation, acid-base balance, immune defense, and blood clotting. Elevated values of total proteins may be associated with dehydration while lower than normal values may be related to kidney or liver disease or internal parasites. The purpose of our study was to examine whether TPP is correlated with other indices of health such as a body condition index, hematocrit, and total white blood cell count. We were also interested in seasonal (spring vs. fall) and species differences. We captured migratory songbirds from 2015-2017 at a shrub-dominated site in northeastern Pennsylvania. Preliminary analyses for Gray Catbird (*Dumetella carolinensis*) showed no significant differences in TPP between birds captured during spring or fall migration, or any correlation between a body condition index and TPP. However, TPP and hematocrit were significantly correlated. There was also no difference in average TPP between catbirds, White-throated Sparrows (*Zonotrichia albicollis*), Ovenbirds (*Seiurus aurocapillus*), Red-eyed Vireos (*Vireo olivaceus*), and Veerys (*Catharus fuscescens*). Our initial results suggest that TPP may not be a useful tool for comparing health in these species.

P25

Hoppe, Ian R., Jocelyn Olney Harrison, Edward J. Raynor IV, Mary Bomberger Brown, Larkin A. Powell, and Andrew J. Tyre

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Time and environment influence incubation by Greater Prairie-Chickens in the Nebraska Sandhills

Incubation involves behavioral decisions that highlight trade-offs between current and future reproductive success. To gain further insight into decisions made by female birds during incubation, we evaluated variation in off-bout duration and frequency of greater prairie-chickens (*Tympanuchus cupido pinnatus* Brewster, 1885). We selected prairie-chickens because their life history favors incubation behaviors that prioritize the success of the current breeding attempt over adult survival. Further, observations of incubation behavior suggest substantial commitments on the part of incubating females, who face decisions that are influenced by ambient conditions, body condition, and predation risk. We monitored nest attendance behavior by females at 30 greater prairie-chicken nests in the Nebraska Sandhills, USA to identify proximate cues used to make behavioral decisions regarding incubation. We recorded 930 total incubation off-bouts. Females took 1.9 ± 0.7 (SD) off-bouts/day of 43.3 ± 24.1 min. Off-bouts were shorter in duration at higher wind speeds, at lower ambient temperatures, at nests with less cover, and at those closer to roads. Females were most likely to leave the nest during the mid-morning and evening time periods, and off-bouts became less frequent later in the season. We did not observe any differences in incubation behavior between nests that failed and those that successfully hatched one or more chicks. Our results suggest that attendance decisions during incubation change with time and environmental factors, which emphasizes the complexity and risks associated with these decisions.

P26

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Scarlet-headed Blackbird (*Amblyramphus holosericeus*): a new effective host for the specialized Screaming Cowbird (*Molothrus rufoaxillaris*) that is not a cooperative breeder

Hudson (1920) described that Screaming Cowbird (hereafter ScC) was a brood parasite, supposing that they only parasitize the Greyish Baywing (*Agelaiodes badius* GB) since their eggs, nestlings, and fledglings are almost indistinguishable. However, in the last twenty years it was found that two other effective hosts are regularly parasitized: Brown-and-yellow Marshbird (*Pseudoleistes virescens* BYM), and Chopi Blackbird (*Gnorimopsar chopi*). As the three hosts of ScC are cooperative breeders, it has been suggested that competition with the more aggressive and highly generalist Shiny Cowbird (*M. bonariensis*) preclude that other hosts that do not have helpers-at-the-nests could rear ScC successfully. During November 2017, we studied nesting success of birds using roadside borders in Argentine Pampas. We found 123 nests belonging to 17 species. Fifty-seven nests were of BYM; 28 of them were parasitized by Shiny Cowbirds, and 4 by both Cowbirds. We also found 4 nests of Scarlet-headed Blackbird (SHB); one was parasitized with one egg of ScC that was successfully reared alongside with two of the host. Eleven nests were of Furnarids that are used as nest-sites by GB, but they do not start nesting until late December. Having helpers-at-the-nests is not a condition that a host must fulfill to rear ScC successfully, as all SHB nests (parasitized or not) were attended by two adults. When alternative hosts are sympatric with GB, all of them are available for parasitism by ScC before the main host. Therefore, by starting breeding earlier, those ScC individuals parasitizing them should increase their fitness

P27

Johnston, Elliot¹ and Sara R. Morris²

¹ University of Maine Orono

² Canisius College

Responses of warblers to flight calls: does age influence the latency of response?

Flight calling is a regular nocturnal migratory behavior that is inherently difficult to study based on timing. Because of age-related differences in other migratory behaviors, we examined whether age influences the latency of warblers' response to hearing flight calls because it reflects differences in migratory experience. After target species were banded at our field sites in New York, Maine, and Pennsylvania, they were transferred to an avian recording studio where we played conspecific flight calls and recorded vocal responses. For birds that responded, latency was calculated as the time between initial playback and initiation of response. We collected data on 474 warblers, 362 in spring and 112 in fall. There was no significant difference between young (hatch-year) and adult (after-hatch-year) birds' latency of response in fall or young (second-year) and adult (after-second-year) birds' latency of response in spring. These findings did not support the idea that younger birds initially respond to flight calls quicker than older birds either in their first migration in the fall or when they are slightly more experienced during their return in the spring. Although our data show that experience does not influence this behavior, the behavior is clearly important, as the warblers involved in the study initiated

responses rapidly (median time of 2.6 seconds). However, the variation we observed in the latency of this behavior (0.12 to >60 seconds) indicates a need to study factors influencing individual responses.

P28

Kennedy, E. Dale and Douglas W. White

Biology Department, Albion College, Albion MI 49224

Using eBird and other online resources in teaching ornithology

Online sites have changed how we retrieve information and keep data about birds and birding. eBird, a real-time, online checklist site, allows birders to contribute to a large database administered by Cornell Lab of Ornithology. We have incorporated use of eBird, the Great Backyard Bird Count, and All About Birds website (all run by the Cornell Laboratory of Ornithology) into assignments and research projects with students. This approach is especially valuable because, in addition to learning about birds, students are contributing to international Citizen Science projects. We have had success in some assignments and are working to modify others. We will share our assignments and hope to learn more about how others use online sites in their work with students.

P29

Kyle, Steven^S

Department of Psychology, University of Tennessee, Knoxville, TN 37996

Predator cues used by Carolina Chickadees and Tufted Titmice in risk assessment in foraging conditions

Carolina Chickadees (*Poecile carolinensis*) and Tufted Titmice (*Baeolophus bicolor*) must balance avoiding predators and foraging for food. Predators are not always hunting or aware of prey presence, so individuals of prey species have the opportunity to forage for food in the presence of predators that pose less of a risk. I have earlier shown that titmice and chickadees use the head orientation of hawk and owl models to judge the risk of a predator. A predator's attention to an area can be a cue. If a predator is not paying attention to an area in the environment then that area is safer than if it was actively examining hunting and looking in the area. In order to examine this I manipulated several different features of predator models that could indicate a predator's attention, and presented the models to flocks of chickadees and titmice near feeders. I displayed an owl model with its eyes either covered or uncovered, a cat robot with a moving head or still head, and a cat model with either a clear or opaque barrier between the cat and the food. The birds seem to pay attention to the presence of eyes, presence of the barrier and are hesitant to take seed when a cat is moving its head and facing the feeder. These studies indicate that chickadees and titmice attend to cues that can indicate where a predator is most likely looking to limit their risk when they go to forage.

P30

Newbrey, Jennifer L, Quadasia Love, and Michael G. Newbrey

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Comparison of yolk carotenoid concentrations of three secondary-cavity nesting songbirds in west-central Georgia

Carotenoids are biologically-active pigments that act as powerful antioxidants and immunostimulants for both developing embryos and adult birds. Female birds allocate high

concentrations of carotenoids to their egg yolks, where the pigments protect developing embryos against metabolic free radicals, which can damage lipids, proteins, and DNA. Despite this critical role that yolk carotenoids play in avian reproduction, surprisingly little research has focused on the yolk carotenoids of North American songbirds. Therefore, we identified and compared yolk carotenoids from the eggs of three species of secondary-cavity-nesting songbirds in west-central Georgia, the Tufted Titmouse (*Baeolophus bicolor*), Brown-headed Nuthatch (*Sitta pusilla*), and Carolina Wren (*Thryothorus ludovicianus*). The third-laid egg was collected fresh from nine nuthatch nests, seven titmouse nests, and 18 wren nests, for a total of 34 eggs. Yolk carotenoids were extracted and quantified using high performance liquid chromatography. We identified three dietary carotenoids in the eggs of the species we studied, β -carotene, lutein, and zeaxanthin. Yolk concentrations of β -carotene did not vary across the species, but wrens had the highest concentrations of lutein and total carotenoids, and nuthatches had the lowest concentrations of zeaxanthin. The differences we found in yolk carotenoid concentrations in the three study species are likely linked to differences in diet. Brown-headed Nuthatches consume more seeds than the other two species during egg formation, whereas Tufted Titmice and Carolina Wrens consume more invertebrates. However, further research on dietary sources of carotenoids for these three species is needed to better understand the yolk carotenoid concentration differences we observed.

P31

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Bird feeder hygiene methods: recommendations versus reality

Because bird feeders can be a site of disease transmission, feeders should be cleaned regularly. However, little is known about compliance with any cleaning recommendations. Here we summarize feeder cleaning recommendations available in the literature and compare these to methods people actually use to clean feeders. We determined how often people actually clean their feeders and with what products by surveying members of birding listservs from Pennsylvania, New Jersey, and New York. The recommended time intervals for cleaning from the literature varied considerably with 72 % recommending that feeders be cleaned one to four times per month. The most commonly recommended intervals were once a month (28 %) and once every two weeks (22 %). Six products were recommended for use in cleaning with bleach (39 %) and soap and water (33 %) the most commonly recommended products. Of birders surveyed ($n = 170$), 17 % never cleaned their feeders. Of those who cleaned their feeders, 71 % cleaned them only one to four times a year. Most respondents used bleach (44 %) or soap and water (34 %) to clean feeders. Despite being active birders, most people did not follow the recommended cleaning intervals, although most used the recommended products. Overall, feeder cleaning recommendations vary too widely and most are not based on any data. Research is needed to identify the most effective cleaning method to generate a common recommendation for the public to use. In addition, feeder owners must be persuaded to clean their feeders more often.

P32

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The Effects of Traffic Noise on the Alarm Calls of Black-capped Chickadees

The impact of urbanization on wildlife habitat has been well-documented, but less attention has been given to the way that urban noise impacts the soundscape in which birds communicate. Recent studies have indicated that chickadees raise the frequencies of their songs in the presence of traffic noise, but the impacts of urban noise on chickadee alarm calls has been largely overlooked; even though alarm calling in predator defense contexts is closely related to reproductive fitness. Therefore, the objective of our study was to assess the impacts of traffic noise on the alarm calls of Black-capped Chickadees. We studied birds at eight feeder locations in Stark County, Ohio, from 15 January to 7 March 2016, and used a taxidermic mount of an Eastern Screech-Owl to elicit alarm calls. In half of the trials, we broadcasted a recording of high frequency traffic noise from a speaker at 50 decibels. No differences were noted in the number of calls given or in the duration of alarm call elements between treatments, however in trials conducted with traffic noise, alarm call introductory notes and D-notes had lower peak frequencies ($P = 0.013$ and $P = 0.031$, respectively). Our results suggest that chickadees are also able to modify properties of their alarm calls to overcome potential interference from traffic noise. We recommend that future studies be conducted to assess the impacts of prolonged noise exposure on chickadee alarm calls and to assess the impacts of traffic noise on vocal communication in other parid species.

P33

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Nestling diet of Red-headed Woodpeckers in South Carolina

Red-headed Woodpeckers (*Melanerpes erythrocephalus*) have experienced sharp declines in portions of their range. Although many factors may be involved in declines, knowledge of Red-headed Woodpecker nestling diets may identify specific habitat relationships that are important and, thus, could be targeted in conservation and management efforts. Our objective was to identify diets of nestling Red-headed Woodpeckers and to quantify variability in food types within and between years and sexes of parents. We conducted observations of nests on the Savannah River Site, South Carolina from June to September 2006-2007. We recorded 791 food items fed to nestlings, representing 7 taxa of plants and 15 taxa of animals (13 invertebrate, 2 vertebrate). We then assigned food items as either animal matter or soft mast and used a binomial mixed model approach to assess differences in proportion of food types fed to nestlings between years, months, and by the sex of the parents. Three models received 67% of the cumulative AIC model weight and all included year and month, indicating annual and monthly variation in foods fed to nestlings. Animal matter comprised the majority of Red-headed Woodpecker nestling foods (71.5%) but notably soft mast was an important component (28.5%). We found only weak evidence for differences between sexes in the types of food fed to nestlings. We suggest that future work on Red-headed Woodpeckers consider how the availability of soft mast, which is often overlooked by managers, may or may not limit productivity of this species, particularly in northern latitudes with shorter growing seasons.

P34

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Ectoparasites of some wild bird species at some gallery forests along River Benue in Nigeria, West Africa

Ectoparasites negatively impact avifauna e.g. reduces quality of feathers and consequently affects flight efficiency. A good knowledge of avian-ectoparasite interactions and the effect on other aspects of avian ecology are therefore important and could be useful to inform conservation action. As this information is currently scarce from Afro tropical environments, we trapped and collected ectoparasites species infesting wild birds at two gallery forests along River Benue at Makurdi in Nigeria to provide baseline information on the diversity of ectoparasites in the region. Birds were trapped with mist nets from September 2015 to August 2016; a combination of visual examination and dust ruffling technique was used to remove ectoparasites from live birds. Specimens were preserved in labeled vials containing 70% alcohol and identified using standard taxonomic keys when viewed under a light microscope. A total of 254 birds were captured out of which, 174 (68.5%) were infested with 1294 ectoparasites (1208 lice, 25 ticks, 50 mites and 11 flies). The birds had high single infestation 107 (42.1%) and mean ectoparasitic infestation varied significantly between capture months and between bird species. Lice were more predominant (93.4%) than all other ectoparasites with the genus *Columbicola* being the most prevalent species (20.8%) while the fly *Pseudolynchia* sp was the lowest (1.18%). The genus *Strigiphilus* had the highest mean intensity of 6.88 followed by genus *Coloceras*. Considering the proximity of these habitats with human settlements and the possible interaction between wild and free-ranging domestic birds, these gallery forests and wild birds may act as possible reservoir for ectoparasites for domestic birds. The study recommends further studies to determine the effects of parasites on the health of wild birds and possible transmission of parasites from wild to domestic birds.

P35

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Avian responses to indigenous community forest management in western Amazonia

Tropical forests are singularly critical to maintaining the Earth's biodiversity. Birds play a major part in maintaining tropical forests, where up to 90% of plant species are dependent on animal pollination and dispersal, and in turn approximately 30% of the world's bird species are dependent on tropical forest for survival. Half of the world's remaining tropical forest are in Latin America, especially Amazonia. Indigenous territories comprise about a third of the land area in Amazonia, where they form a major barrier to deforestation, but the effects of indigenous forest management on birds have not been quantified until now. We documented forest management practices in indigenous territories in north Peruvian Amazon and investigated their impact on understory bird communities. We sampled birds in forest stands with different logging histories and used quantitative models to estimate and compare bird community responses. Indigenous logging practices did not result in significant decreases in bird abundance or species richness. However, a third of unlogged forest understory bird species were absent from logged forest between 1 and 5 years post-logging, a loss that was offset by influxes of nearly equal numbers of others avian species that may be better adapted to forest with more open canopy. While indigenous logging practices influenced bird community dynamics, they appeared to be far less detrimental for birds than either conventional or reduced-impact

logging. Our results suggest that indigenous territories may approximate sustainable forest and wildlife management to a greater extent than any other logging practices documented in tropical forests.

P36

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Non-territorial sub-populations of Wilson's Warblers (*Cardellina pusilla*)

Individuals in a territorial passerine population that do not establish breeding territories have been referred to as "floaters." This term is poorly defined, but most often has referred to males that would establish breeding territories if not excluded from doing so by males presumably better adapted to obtain and defend a breeding territory. Decades of field observations on a Wilson's Warbler breeding population have shown that that population annually contains a non-territorial subpopulation whose social system is complex, fluid, presumably adaptive, and includes both males and females. Depending on the circumstances of a given individual, including its age, participating in territorial breeding may not be the most adaptive reproductive strategy. Non-territorial Wilson's Warblers can be placed in several groups, each group designated by an added term of "allo," meaning that members of that group are "other" than members of the territorial breeding subpopulation. A non-territorial bird can be categorized as belonging to more than one allo group as a breeding season progresses. For example, a silent transient allo male may become a late-season allo singing male, occupying and singing in part of a breeding territory when defense behavior by the resident male appears to have become reduced.