Program and Abstracts
2008 WOS-AFO Meeting

Thursday, 17 April

8:00 am – 7:00 pm Registration Open

8:00 am – 3:00 pm Field Trips

9:00 am – 5:00 pm AFO Council Meeting – Room105A

1:00 – 6:00 pm WOS Council Meeting – Room105B

6:00 – 8:00 pm Evening Social – Prefunction Area/Outdoor Terrace

Friday, 18 April

8:00 am – 6:00 pm Registration Open

8:00 – 8:20 am Welcome 201 BCD
USM – Frank Moore
WOS – Jim Rising
AFO – Cecilia Riley

8:30 – 9:30 am Margaret Nice Lecture – 201BCD – Dr. J. A. Jackson
THINKING LIKE A MOUNTAIN, SEEING LIKE A WOODPECKER:
BEHAVIORAL ECOLOGY AND CONSERVATION OF WOODPECKERS

9:30 – 10:00 am Break – Prefunction Area/Outdoor Terrace

10:00 – 11:00 am Concurrent Paper Sessions

11:00 – 11:30 pm Meet the Editors – 106B:
Clait Braun, Editor, *Wilson Journal of Ornithology*
Gary Ritchison, Editor, *Journal of Field Ornithology*

11:30 am – 1:00 pm Lunch

1:00 – 3:00 pm Concurrent Paper Sessions

3:00 – 3:15 pm Break – Prefunction Area/Outdoor Terrace

3:15 – 5:00 pm Concurrent Paper Sessions

5:00 – 6:00 pm Joint WOS/AFO Business Meeting – 106B

7:00 – 9:00 pm Poster Session and Social – Prefunction Area/Outdoor Terrace

Saturday, 19 April

8:00 – 10:00 am Registration Open

8:30 – 9:30 am AFO Plenary Lecture – 201 BCD – Dr. J. V. Remsen
HOW PHYLOGENIES CAN GUIDE RESEARCH IN OTHER FIELDS: EXAMPLES FROM HUMMINGBIRDS

9:30 – 10:00 Break – Prefunction Area/Outdoor Terrace

10:00 – 11:30 am Concurrent Paper Sessions

11:30 – 1:00 pm Lunch

1:00 – 3:15 pm Migration and Coastal Ecology Symposium

3:15 – 3:30 pm Break – Prefunction Area/Outdoor Terrace

3:30 – 5:00 pm Migration and Coastal Ecology Symposium

6:00 pm Cocktail Reception and Social – Prefunction Area/Outdoor Terrace

7:00 pm Banquet – 201ABCD

Sunday, 20 April

8:00 am – 3:00 pm Field Trips

Ornithological Art Display –

Vendors –

SCIENTIFIC PAPER SESSIONS

Friday 18 April

8:00	Welcome and Introductions – 201BCD Frank Moore, Univ. Southern Mississippi, Jim Rising, Wilson Ornithological Soc., Cecilia Riley, Assoc. of Field Ornithologists
8:30	Margaret Morse Nice Lecture – 201BCD Dr. J. A. Jackson, THINKING LIKE A MOUNTAIN, SEEING LIKE A WOODPECKER: BEHAVIORAL ECOLOGY AND CONSERVATION OF WOODPECKERS
9:30	COFFEE BREAK

	Paper Session A –106B Systematics/Morphology/Physiology – Stephen Hager	Paper Session B – 107B Song – James Tucker
10:00	[A]PHYLOGEOGRAPHY OF THE YELLOW-THROATED WARBLER (*DENDROICA DOMINICA*), Bailey D. McKay, University of Minnesota	TEMPORAL PATTERN OF VOCALIZATION TYPE USAGE IN SINGING SESSIONS OF MALE TYRANT FLYCATCHERS, Austin L. Hughes, University of South Carolina
10:15	[A]COMPARATIVE PHYLOGEOGRAPHY OF NEOTROPICAL BIRDS: ECOLOGY PREDICTS LEVELS OF GENETIC DIFFERENTIATION, Curtis W. Burney* and Robb T. Brumfield, Louisiana State University	[A]FOOD SUPPLEMENTATION, TERRITORY ESTABLISHMENT, AND SONG IN THE PROTHONOTARY WARBLER. Charles Clarkson, University of Virginia
10:30	[A]MORPHOLOGICAL DIFFERENCES IN GRAY CATBIRDS ACROSS AGE CLASSES, Maura F. Hanna*, Canisius College, Richard Keith and Brenda Keith, Kalamazoo Nature Center, and Sara R. Morris, Canisius College	[A]IS SONG LENGTH AN IMPORTANT SIGNAL OF AGGRESSION FOR BLUE GROSBEAKS?: A PLAYBACK EXPERIMENT, Christine Lattin, Eastern Kentucky University
10:45	[A]CHANGES IN IMMUNOCOMPETENCE OF THE GRAY CATBIRD DURING AN EXPERIMENTAL WEST NILE VIRUS INFECTION, Amanda Jo Williams*, Jennifer C. Owen, and Frank R. Moore, University of Southern Mississippi, and Mary Garvin, Oberlin College	[A]THE RESPONSE OF MALE DICKCISSELS TO GEOGRAPHIC SONG VARIATION, Anthony C. Dalisio*, Sterling College, William E. Jensen, Emporia State University, and Timothy H. Parker, Whitman College

11:00	MEET THE EDITORS *Journal of Field Ornithology* – Gary Richtison *Wilson Journal of Ornithology* – Clait Braun	[A]SONGS OF THE CRITICALLY ENDANGERED COZUMEL THRASHER: WHAT WOULD A NEEDLE IN A HAYSTACK SOUND LIKE? Andrew J. McGann* and Robert L. Curry, Villanova University
11:15		
11:30 – 1:00	LUNCH	

	Paper Session A – 106B Migration/Navigation – Jean-Pierre Savard	Paper Session B – 107B Conservation/Ecology – Austin Hughes
1:00	FUEL RESERVES AFFECT MIGRATORY ORIENTATION OF THRUSHES AND SPARROWS BOTH BEFORE AND AFTER CROSSING AN ECOLOGICAL BARRIER NEAR THEIR BREEDING GROUNDS, Mark Deutschlander*, Hobart and William Smith Colleges, and Rachel Muheim, Virginia Polytechnic Institute	[A]RESPONSES OF FOUR SONGBIRD SPECIES TO EXPERIMENTAL COWBIRD PARASITISM IN A RECENTLY INVADED AREA, Matthew J. Reetz* and Kathryn E. Sieving, University of Florida, and Scott K. Robinson, University of Florida
1:15	STOPOVER BEHAVIOR OF MIGRANT LANDBIRDS IN TWO FRAGMENTED LANDSCAPES: LAKESHORE AND INLAND REGIONS OF OHIO, Paul G. Rodewald*, Ashley A. Buchanan, and Stephen N. Matthews, Ohio State University	[A]FORAGING ECOLOGY OF PILEATED WOODPECKERS IN DUKE'S EXPERIMENTAL FOREST IN THE UPPER PENINSULA OF MICHIGAN, Michael Wierda*, Clemson University, and Jacqueline Bird, Alen Rebertus, and Alec Linsay, Northern Michigan University
1:30	[A]MIGRATION AND STOPOVER ECOLOGY OF THE TENNESSEE WARBLER AT AN INLAND STOPOVER SITE NEAR KALAMAZOO, MICHIGAN, Amanda B. Stockwell* and Ryanne Sullivan, Canisius College, Richard Keith and Brenda Keith, Kalamazoo Nature Center, and Sara R. Morris, Canisius College	[A]WINTER WATERFOWL DYNAMICS IN MANAGED MOIST-SOIL WETLANDS IN THE MISSISSIPPI ALLUVIAL VALLEY, Heath M. Hagy*, Richard M. Kaminski, Samuel K. Riffell, and Francisco J. Vilella, Mississippi State University, and Kenneth J. Reinecke, USGS Patuxent Wildlife Research Center
1:45	[A]SPRING STOPOVER OF FOREST-DWELLING AND SHRUB-DWELLING MIGRANTS AT A GREAT LAKES COASTAL WETLAND: THE ROLES OF HABITAT, ARTHROPODS, AND PHENOLOGY, Ryan M. Dziedzic* and Michael J. Hamas, Central Michigan University	[A]EFFECTS OF SITE PREPARATION ON BREEDING BIRDS IN EARLY SUCCESSIONAL LOUISIANA PINE PLANTATIONS, Antoinette Taylor*, Philip C Stouffer, and Michael J. Chamberlain, Louisiana State University

2:00	[A]A COMPARISON OF MIGRANT SPECIES COMPOSITION AT TWO WESTERN NEW YORK TELEVISION TOWERS, Peggy E. Buckley*, Arthur R. Clark, and Sara R. Morris, Canisius College	HOME RANGE SIZE AND HABITAT USE OF TWO SONGBIRD SPECIES IN FOREST STANDS TREATED WITH PRESCRIBED FIRE AND THINNING, Jill Wick and Yong Wang, Alabama A&M University
2:15	[A]TERRESTRIAL HABITAT USE AND CHRONOLOGY OF MIGRATING BIRDS THROUGH SOUTHERN TEXAS, Arlene Arnold*, Bart Ballard, and Thomas Langsheid, Texas A&M University	NEST BOXES AND CONSERVATION OF PROTHONOTARY WARBLERS: A 21-YEAR STUDY, Charles R. Blem, Flathead Lake Biological Station
2:30	[A]TEMPORAL AND SPATIAL VARIATIONS OF HABITAT ASSOCIATIONS OF FALL MIGRATING SONGBIRDS AT AN INLAND SITE IN NORTHERN ALABAMA USA, Lisa Gardner Barillas* and Yong Wang, Alabama A&M University	CHARACTERISTICS AND ENERGETICS OF GREAT EGRET AND SNOWY EGRET FORAGING FLIGHTS, Alan D. Maccarone*, Friends University, John N. Brzorad, Lenoir-Rhyne College, and Heather M. Stone, Friends University
2:45	[A]A COMPARISON OF FALL MIGRATION AND STOPOVER BY NORTHERN SAW-WHET OWLS DURING IRRUPTIVE AND NONIRRUPTIVE YEARS IN COASTAL MARYLAND, Katie A. Chmielowiec*, Canisius College, David Brinker, Maryland Department of Natural Resources, and H. David Sheets and Sara R. Morris, Canisius College	INVESTIGATING THE USE OF PARTNERS IN FLIGHT SCORES FOR ECOLOGICAL ASSESSMENT, Timothy J. O'Connell, Oklahoma State University
3:00 – 3:15	COFFEE BREAK	COFFEE BREAK
	Paper Session A – 106B Human Interactions – Mark Deutschlander	Paper Session B – 107B Distribution/Habitat Use – Karl Miller
3:15	BIRD DENSITY AND MORTALITY AT WINDOWS, Stephen B. Hager*, Augustana College, Heidi Trudell, Principia College, Kelly J. McKay, BioEco Research and Monitoring Center, Stephanie M. Crandall, University of Illinois Extension, and Lance Mayer, Iowa City, IA	[A]WINTERING BIRDS AND HABITAT PREFERENCES IN THE OKLAHOMA CROSSTIMBERS, Paul van Els* and Timothy J. O'Connell, Oklahoma State University
3:30	PREVENTING BIRD-GLASS COLLISIONS, Daniel Klem, Jr. Muhlenberg College	[A]DO AVIAN ABUNDANCES DIFFER BETWEEN HABITAT TYPES? IMPLICATIONS FOR ASSESSMENT OF HABITAT QUALITY, Alan "Bruce" Hitch* and J. B. Grand, Auburn University

3:45	[A]DECLINES OF SOUND SENSITIVE SPECIES IN RESPONSE TO INCREASED TRAFFIC VOLUME, Sarah E. Goodwin* and W. Gregory Shriver, University of Delaware	HABITAT USE BY MARSH BIRDS ALONG THE NORTHERN GULF OF MEXICO, WITH FOCUS ON CLAPPER RAILS, Scott A. Rush*, University of Georgia, E. C. Soehren, Alabama Department of Conservation and Natural Resources, A. T. Fisk, University of Windsor, M.S. Woodrey, Mississippi State University, and R. J. Cooper, University of Georgia
4:00	[A]LIFETIME FITNESS OF TREE SWALLOWS EXPOSED TO AQUATIC MERCURY, Kelly K. Hallinger*, Rebecka L. Brasso, and Daniel A. Cristol, College of William and Mary	CONTRIBUTIONS OF GEORGE F. GAUMER TO ORNITHOLOGY OF THE YUCATÁN AND COZUMEL: THROWING THE BABY OUT WITH THE BATHWATER? Robert L. Curry, Villanova University
4:15	[A]THE INFILTRATION OF AQUATIC MERCURY INTO A TERRESTRIAL ECOSYSTEM, Mikaela G. Howie* and Dan A. Cristol, College of William and Mary	EVIDENCE OF WIDESPREAD NORTHWARD RANGE EXTENSIONS ALONG A 1000 KM GRADIENT FROM TROPICAL TO WARM-TEMPERATE CLIMATES IN NORTHEASTERN MEXICO AND SOUTHERN TEXAS, John C. Arvin, Gulf Coast Bird Observatory
4:30	[A]TIDAL MARSH BREEDING BIRDS AS BIO-INDICATORS OF MERCURY CONTAMINATION ALONG THE DELAWARE BAY, Sarah E. Warner*, W. Gregory Shriver, and Marnie A. Pepper, University of Delaware	[A]SCALE EFFECTS ON OCCURRENCE AND RELATIVE ABUNDANCE OF FOREST SONGBIRDS IN EASTERN OKLAHOMA, Vincent S. Cavalieri*, Timothy J. O'Connell, and David M. Leslie, Oklahoma State University
4:45	[A]AVIAN PESTICIDE EXPOSURE AND FOOD INTAKE ON GOLF COURSES, Ryan B. Burdge* and Daniel A. Cristol, The College of William and Mary	[A]ASSESSMENT OF HENSLOW'S SPARROW ABUNDANCE AND HABITAT SELECTION ACROSS LOUISIANA, Laura M. Palasz* and Philip C. Stouffer, Louisiana State University
5:00	JOINT BUSINESS MEETING OF THE ASSOCIATION OF FIELD ORNITHOLOGISTS AND THE WILSON ORNITHOLOGICAL SOCIETY – 106B	

7:00 – 9:00	POSTER SESSION and EVENING SOCIAL Prefunction Area and Outdoor Terrace of the Convention Center

P1 [A]RESEARCH ON THE HALF SHELL: DIET COMPOSITION OF AMERICAN OYSTERCATCHERS DURING THE NON-BREEDING SEASON. Christy Hand* and Patrick Jodice, Clemson University, and Felicia Sanders, Santee Coastal Reserve

P2 [A]HETEROPHIL TO LYMPHOCYTE RATIOS AS INDICATORS OF STRESS IN BUDGERIGARS (*MELOPSITTACUS UNDULATES*) UNDER DIFFERENT HOUSING ARRANGEMENTS. Kelly Kussmaul* and Doris Watt, Saint Mary's College

P3 [A]RELATIONSHIPS BETWEEN DOMINANCE MEASURES AND PHYSICAL CHARACTERISTICS OF THE BUDGERIGAR (*MELOPSITTACUS UNDULATES*). Kimberly Martinczak* and Doris Watt, Saint Mary's College

P4 [A]AN EXAMINATION OF THE ROLE OF WEIGHT, PLUMAGE COLOR, CERE COLOR AND TOTAL AREA OF UV REFLECTANT PLUMAGE ON MATE SELECTION IN BUDGERIGARS (*MELOPSITTICUS UNDULATES*). Bethany Belock* and Doris Watt, Saint Mary's College

P5 [A]USING FACTOR ANALYSIS AS A TOOL FOR THE IMPROVEMENT OF FIELD SAMPLING STRATEGIES, Katherine Leith*, Michael Wierda, and William Bowerman, Clemson University, James Sikarskie, Michigan State University, Dave Best, U.S. Fish & Wildlife Service, and Teryl Grubb, U.S. Forest Service

P6 [A]MICHIGAN BALD EAGLE BIOSENTINEL PROGRAM, MONITORING TRENDS OF PERSISTENT ORGANIC POLLUTANTS IN GREAT LAKES ECOSYSTEMS, Michael Wierda, William Bowerman, Amy Roe, Kathryn Parmentier, William Bridges, Katherine Leith, Clemson University; James Sikarskie, Michigan State University; David Best, U.S. Fish & Wildlife Service; Teryl Grubb, U.S. Forest Service; Dennis Bush, Michigan DEQ

P7 [A] SEASONAL VARIATIONS IN RECOVERIES OF SOUTH CAROLINA-BANDED BROWN PELICANS AND ROYAL TERNS: A COMPARISON OF TWO SEABIRD SPECIES EXPERIENCING A DECLINE IN LOCAL NESTING NUMBERS. S.J. Stefan*, F.J. Sanders, B.C. Doyle, M. Hughes, and P.G.R. Jodice, College of Charleston

P8 [A]MID-CONTRACT MANAGEMENT EFFECTS ON BREEDING GRASSLAND SONGBIRDS IN CP33 HABITAT BUFFERS IN EASTERN MISSISSIPPI. Heidi L. Puckett*, L. Wes Burger, Jr., and Samuel K. Riffell, Mississippi State University

P9 THE BIRDS OF GREEN WING ENVIRONMENTAL LABORATORY IN NORTHCENTRAL ILLINOIS. Kelly J. McKay, BioEco Research and Monitoring Center, and Stephen B. Hager*, Augustana College

P10 BREEDING BIRDS AND NEST PRODUCTIVITY AT GREEN WING ENVIRONMENTAL LABORATORY, NORTHCENTRAL, ILLINOIS. Stephen B. Hager*, Christopher R. Bertram, and Katie R. Derner Augustana College

P11 [A]A COMPARATIVE STUDY OF FEEDING HABITS AND HELMINTH DIVERSITY IN SOUTH TEXAS DOVES. Timothy Ludwick*, Autumn Smith, and Alan Fedynich, Caesar Kleberg Wildlife Research Institute

P12 AVIAN SPECIES AS INDICATORS OF RIPARIAN FUNCTION IN CHIAPAS, MEXICO. John M. Waud,* Rochester Institute of Technology, Omar Gordillo, Comisión Nacional de Áreas Naturales Protegidas, Tuxtla Gutierrez, Mexico, David Mathiason, Rochester Institute of Technology, and Mark Deutschlander, Hobart and William Smith Colleges

P13 WHITE-THROATED SPARROWS USE POLARIZATION CUES ON THE HORIZON TO CALIBRATE THEIR MAGNETIC COMPASS AT SUNRISE AND SUNSET. Mark Deutschlander*, Hobart and William Smith Colleges, Rachel Muheim, and John Phillips, Virginia Polytechnic Institute

P14 [A]ANALYSIS OF THE VOCALIZATIONS OF THE NORTHERN CARDINAL (*CARDINALIS CARDINALIS*). William B. Lewis*, E. Dale Kennedy, and Douglas W. White, Albion College

P15 [A]ANNUAL VARIATION IN THE STOPOVER ECOLOGY OF THE TENNESSEE WARBLER IN MICHIGAN. Ryanne Sullivan* and Amanda B. Stockwell, Canisius College, Richard Keith and Brenda Keith, Kalamazoo Nature Center, and Sara R. Morris, Canisius College

P16 [A]SEASONAL DIFFERENCES IN ENERGETIC CONDITION OF BLACKPOLL WARBLERS ON APPLEDORE ISLAND. Jason D. Jacobs*, Canisius College, Kristen M. Covino, University of Maine, and Sara R. Morris, Canisius College

P17 [A]COMPARISON OF AVIFAUNA IN THREE RIPARIAN ENVIRONMENTS IN WESTERN NEW YORK: THE IMPACT OF ANTHROPOGENIC HABITAT ALTERATION. Bethany K. Stephan*, Anna Marie Parise, Canisius College, Michael Hamilton and Robert L. DeLeon, Buffalo Ornithological Society, and H. David Sheets and Sara R. Morris, Canisius College

P18 [A]SEASONAL USE OF DYNAMIC LAKE HURON COASTAL HABITATS BY MIGRATING SHOREBIRDS. Ryan M. Dziedzic* and Michael J. Hamas, Central Michigan University

P19 OCCUPANCY MODELING TO EXAMINE DETECTION PROBABILITIES AND POPULATION TRENDS OF THE ENDANGERED FLORIDA GRASSHOPPER SPARROW. James W. Tucker, Jr.*, Gregory R. Schrott, and Reed Bowman, Archbold Biological Station

P20 [A]ECTOPARASITES AFFECT BIRD CONDITION IN NEOTROPICAL FOREST FRAGMENTS. Erik I. Johnson* and Philip C. Stouffer, Louisiana State University

P21 [A]FAT STORES AND ENERGETIC CONDITION OF *CATHARUS* THRUSHES DURING SPRING AND AUTUMN MIGRATION AT A GREAT LAKES STOPOVER SITE. Emily Runnells*, Hobart and William Smith Colleges, David Bonter, Cornell Laboratory of Ornithology, and Mark Deutschlander, Hobart and William Smith Colleges

P22 POST KATRINA MONITORING OF NESTING BIRDS IN COASTAL ALABAMA. Orin Robinson, John Dindo, and Lauren Showalter*, Dauphin Island Sea Lab

P23 [A]AVIAN RESPONSE TO OLD WORLD BLUESTEM *BOTHRIOCHLOA ISCHAEMUM* MONOCULTURES IN MIXED GRASS PRAIRIE. Andrew D. George*, Timothy J. O'Connell, Karen R. Hickman, and David M. Leslie Jr., Oklahoma State University

P24 CAROLINA CHICKADEE CALLS ENCODE INFORMATION ABOUT PREDATOR THREAT. Chad Soard and Gary Ritchison, Eastern Kentucky University

P25 HABITAT SELECTION IN THE ENDANGERED FLORIDA GRASSHOPPER SPARROW (*AMMODRAMUS SAVANNARUM FLORIDANUS*). James W. Tucker, Jr., Gregory R. Schrott*, and Reed Bowman, Archbold Biological Station

P26 MOVEMENTS, HABITAT SELECTION, AND STOPOVER DURATION OF MIGRANT SONGBIRDS IN THE WESTERN LAKE ERIE BASIN OF OHIO. Ashley A. Buchanan and Paul G. Rodewald*, The Ohio State University

P27 OKLAHOMA MARSHBIRD MONITORING PROJECT. Eric Beck*, Michael Husak, and Michael A. Patten, Cameron University and University of Oklahoma

P28 [A]MAKING THE CONNECTION BETWEEN SHOREBIRDS AND OFF-ROAD VEHICLES. Katherina Forgues*, Trent University, Canada

P29 MIGRATION STOPOVER OF THE CERULEAN WARBLER (*DENDROICA CERULEA*) IN NORTHERN MIDDLE AMERICA. Melinda J. Welton, Gulf Coast Bird Observatory, David L. Anderson*, Louisiana State University, Gabriel J. Colorado, Universidad Nacional de Colombia, Colombia, and Tiffany A. Beachy, University of Tennessee

P30 [A]DYNAMICS OF *STAPHYLOCOCCUS AUREUS* ON BIRD FEATHERS. Meredith P. Wilson* and Edward H. Burtt, Jr. Ohio Wesleyan University

P31 [A]BACTERIAL DEGRADATION OF FLIGHT AND BODY CONTOUR FEATHERS BY *B. LICHENIFORMIS*. Kristen M. Lear* and Edward H. Burtt Jr., Ohio Wesleyan University

P32 [A]RESISTANCE OF TURACO FEATHERS TO BACTERIAL DEGRADATION. Meredith Palmer* and Edward H. Burtt, Jr., Ohio Wesleyan University

P33 [A]THE BACTERIAL DEGRADATION OF PHAEOMELANIC AND EUMELANIC FEATHERS. Jack M. Stenger* and Edward H. Burtt Jr., Ohio Wesleyan University

P34 [A]STRUCTURE OF ALBINO FEATHERS: WHY SO WEAK? Sean M. Williams*, Edward H. Burtt Jr., Ohio Wesleyan University, and Ralph W. Schreiber and Elizabeth A. Schreiber, Smithsonian Institution

P35 FEEDING PREFERENCE OF *CULEX PIPIENS* BETWEEN TWO POTENTIAL WEST NILE VIRUS RESERVOIR HOST SPECIES. Ilana Garcia-Grossman, Lydia Moore, Harden Wisebram, Alice Manos, and Mary Garvin, Oberlin College

P36 DETECTION OF VOLATILES IN THE UROPYGIAL GLAND SECRETIONS OF GRAY CATBIRDS (*DUMETELLA CAROLINENSIS*) THROUGH SOLID-PHASE MICROEXTRACTION HEAD SPACE SAMPLING AND GAS-CHROMATOGRAPH-MASS SPECTROMETRY. Rebecca Whelan, Tera Levin, and Mary Garvin, Oberlin College

P37 [A]DNA SEQUENCE-BASED IDENTIFICATION OF ROOTLETS USED IN GRAY CATBIRD (*DUMETELLA CAROLINENSIS*) NEST LININGS. Kathryn Dirks, Molly Grove, Angela Roles, and Mary Garvin, Oberlin College

P38 [A]PHENOTYPIC ORGAN FLEXIBILITY AROUND THE ANNUAL CYCLE IN TWO NEARCTIC-NEOTROPICAL MIGRATORY THRUSH SPECIES. Zoltán Németh*, Michael J. Sellers, Jennifer C. Owen, and Frank R. Moore, University of Southern Mississippi

P39 [A]RESPONSES OF FLOCKS OF TUFTED TITMICE TO DIFFERENT-SIZED RAPTORS. Jason Courter* and Gary Ritchison, Eastern Kentucky University

P40 [A]EASTERN PHOEBES USE DIFFERENT STRATEGIES TO PROVISION YOUNG. R. Ian Horn* and Gary K. Ritchison, Eastern Kentucky University

P41 [A]REPRODUCTIVE ECOLOGY OF THE EURASIAN TREE SPARROW IN TWO SUBURBAN ENVIRONMENTS IN ST. LOUIS. Lyndell M. Bade*, University of Missouri-St Louis, Colleen Crank, Missouri Botanical Garden & Litzsinger Road Ecology Center, Kathleen Beilsmith, Parkway North High School, St Louis, MO, and Patricia G. Parker, University of Missouri-St Louis

P42 THE TERN AND PLOVER CONSERVATION PARTNERSHIP: A MODEL FOR INTERIOR LEAST TERN AND PIPING PLOVER CONSERVATION. Mary Bomberger Brown, University of Nebraska

P43 AUTOMATIC DETECTION OF RECORDED NOCTURNAL FLIGHT CALLS: A COMPARISON OF METHODS. Lewis Grove, Emma DeLeon, Ben Coulter, Michael Lanzone, and Andrew L. Mack*, Carnegie Museum of Natural History

P44 CERULEAN WARBLER HOME RANGE ESTIMATES AND ROOST SITE SELECTION IN NORTHEAST ALABAMA, John P. Carpenter*, Yong Wang, and Hugh Metcalfe, Alabama A&M University

P45 [A]SPLEEN SIZE AND ACTIVITY AS IT RELATES TO MIGRATORY DISPOSITION IN THE GRAY CATBIRD (*DUMETELLA CAROLINENSIS*). Marks McWhorter*, Mary Brown*, and Jennifer C. Owen, Department of Biological Sciences, University of Southern Mississippi

P46 [A]PASSERINE MIGRATORY MOVEMENTS ALOFT IN THE SOUTHWESTERN UNITED STATES. Rodney K. Felix Jr.* and Robb Diehl, University of Southern Mississippi and Janet M. Ruth, U.S. Geological Survey

Saturday 19 April

8:30 Association of Field Ornithologists Plenary Lecture – 201BCD
Dr. J. V. Remsen, HOW PHYLOGENIES CAN GUIDE RESEARCH IN OTHER FIELDS: EXAMPLES FROM HUMMINGBIRDS

9:30 COFFEE BREAK

	Paper Session A – 106B Breeding/Nesting – Scott Rush	Paper Session B – 107B Population Dynamics/Hurricanes – Mikaela Howie
10:00	[A]THE EFFECTS OF THERMAL ENVIRONMENT ON INCUBATION BEHAVIOR IN HOUSE WRENS (*TROGLODYTES AEDON*), Megan J. Fitzpatrick*, Douglas W. White, and E. Dale Kennedy, Albion College	EVIDENCE OF A FIVE-YEAR POPULATION CYCLE IN RUSTY BLACKBIRDS (*EUPHAGUS CAROLINUS*), Jean-Pierre L. Savard*, Environment Canada, and Bruno Drolet and Mélanie L. Cousineau, Canadian Wildlife Service
10:15	[A]NESTING ECOLOGY OF URBAN COLUMBIDS IN SOUTH TEXAS, Timothy J. Ludwick* and Alan M. Fedynich, Caesar Kleberg Wildlife Research Institute and Glenn H. Perrigo, Texas A&M University-Kingsville, and T. Wayne Swertner, Texas Parks and Wildlife Department	EURASIAN COLLARED-DOVES IN NORTH AMERICA: COLONIZATION DYNAMICS AND IMPLICATIONS FOR NATIVE DOVES, David Bonter, Cornell Lab of Ornithology
10:30	NESTING HABITAT OF THE GREAT HORNBILL (BUCEROS BOCORNIS) IN THE ANAIMALAI HILLS OF SOUTHERN INDIA, Douglas A. James* and Ragupathy Kannan, University of Arkansas	WHY ARE AMERICAN KESTREL (*FALCO SPARVERIUS*) POPULATIONS DECLINING IN NORTH AMERICA? EVIDENCE FROM NEST BOX PROGRAMS, John A. Smallwood*, Montclair State University, Mark F. Causey, Damascus, MD, David Mossop, Yukon College, James R. Klucsarits, Alvernia College, Bob and Sue Robertson, Kempton, PA, Richard J. Melvin, American Kestrel Foundation, Joey Mason, Middleboro, MA, Michael J. Maurer, Marion, MA, John W. Parrish, JR., and Timothy F. Breen, Georgia Southern University, Kenneth Boyd, Fort Gordon, GA, Russell D. Dawson, University of Northern British Columbia, and Gary R. Bortolotti, University of Saskatchewan
10:45	DO EXTRA-MARITAL AFFAIRS MAKE MOUNTAIN BLUEBIRDS BLUE? L. Scott Johnson*, Susan L. Balenger, and Brian S. Masters, Towson University	HURRICANE KATRINA: DID IT AFFECT PURPLE MARTINS AND PURPLE MARTIN ROOSTS? Emily Pifer*, Purple Martin Conservation Association, John R. Sauer and Jane Fallon, USGS Patuxent Wildlife Research Center, and John Tautin, Purple Martin Conservation Association

11:00	TERRITORY FIDELITY AND AGE STRUCTURE IN A TROPICAL UNDERSTORY BIRD, CHESTNUT-BACKED ANTBIRD (*MYRMECIZA EXSUL*), Stefan Woltmann* and Thomas W. Sherry, Tulane University	IMPACTS OF HURRICANE CHARLEY ON A FLORIDA SCRUB-JAY POPULATION, Karl E. Miller, Florida Fish and Wildlife Conservation Commission
11:15	CERULEAN WARBLER HOME RANGE ESTIMATES AND ROOST SITE SELECTION IN NORTHEAST ALABAMA, John P. Carpenter*, Yong Wang, and Hugh Metcalfe, Alabama A&M University	[A]HURRICANE-RELATED DECLINES IN FOOD AVAILABILITY AND MIGRANT LANDBIRD ABUNDANCE AT AUTUMN STOPOVER SITES, Robert C. Dobbs* and Paul R. Martin, Queen's University, and Wylie C. Barrow, Jr. and Clinton W. Jeske, USGS National Wetlands Research Center

11:30 – 1:00 LUNCH

SYMPOSIUM: MIGRATION AND COASTAL ECOLOGY – 107AB
Moderator: Frank Moore

1:00	INTRODUCTION, Frank Moore, The University of Southern Mississippi
1:15	COASTAL ECONOMIC AND SOCIAL DEVELOPMENT, Brent Hales, The University of Southern Mississippi
1:45	MIGRATORY BIRDS AND THE CHANGING COASTAL LANDSCAPE, Jeffrey Buler, The University of Delaware and the USGS Wetlands Research Center
2:15	GLOBAL CLIMATE CHANGE IMPACTS ON COASTAL LANDSCAPES, Kim Hall, Michigan State University
2:45	WEATHER, MIGRATORY BIRDS AND THE COASTAL SETTING, Robb Diehl, The University of Southern Mississippi
3:15 – 3:30	COFFEE BREAK
3:30	POPULATION REGULATION OF MIGRATORY BIRDS, Eben Paxton, Northern Arizona University
4:00	ENDANGERED/THREATENED MIGRATORY BIRDS AND THE GULF COAST, Paul Hamel, Hardwoods Experiment Station, USDA Forest Service
4:30	CONSERVATION OF MIGRATORY BIRDS ALONG THE GULF COAST, Mark Woodrey, Grand Bay NERR and Wylie Barrow, USGS Wetlands Research Center

6:00 – 7:00	EVENING SOCIAL Prefunction Area and Outdoor Terrace of the Convention Center
7:00 – 9:00	DINNER BANQUET 201ABCD

ABSTRACTS – PLENARY & SYMPOSIUM PRESENTATIONS

THINKING LIKE A MOUNTAIN, SEEING LIKE A WOODPECKER: BEHAVIORAL ECOLOGY AND CONSERVATION OF WOODPECKERS.

Jerome A. **Jackson**, Department of Marine and Ecological Sciences, Florida Gulf Coast University, Ft. Myers, FL 33965.

Before a bird hatches it is already responding adaptively to its environment and to other birds, at first instinctively, but later also as a result of learning. While our understanding of these responses is essential to our ability to carry out successful conservation efforts, that understanding is also sometimes shaped by perceptions arising from short-term study, lack of an historical perspective, and preconceived notions arising from lack of insight. Aldo Leopold brought these ideas together suggesting in essence that we think too narrowly in scope and too short term. On the other hand, Margaret Morse Nice taught us to seek understanding through study of the intimate relationships among individuals. Marriage of these seemingly disparate perspectives is essential to sound conservation. Through this lecture I will celebrate the complexity of the interrelationships of woodpeckers and their physical and biotic environment to demonstrate the importance of both the longer view and the intimacy of social interaction to understanding and conservation. I will discuss the dynamic nature of social and habitat relationships inherent in concepts such as individual distance, differential niche use, home range, territoriality, old growth, and biodiversity, as well as problems that arise through misunderstanding of these relationships and concepts.

HOW PHYLOGENIES CAN GUIDE RESEARCH IN OTHER FIELDS: EXAMPLES FROM HUMMINGBIRDS

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Hummingbirds represent one of the most important model systems in research on birds. Not only do they exhibit spectacular species richness and ecological diversity, but they also approach the upper limits for vertebrate metabolism and physiological performance. They have also coevolved extensively with many plant taxa and are relatively easy to manipulate both in the field and in the laboratory. However, the tremendous potential for this group as a model for comparative biology has not been fully realized in part because of the absence of phylogenetic framework. Analysis of DNA sequence data (from 3 mitochondrial genes and two nuclear genes) from a diverse sample of Trochilidae (152 of 315 species sampled so far by the Jim McGuire lab) has produced a phylogenetic hypothesis that demonstrates the importance of phylogeny in guiding research in other fields. Examples are presented with respect to the evolution of sexual dimorphism, bill morphology, and biogeography.

FLOCKING TO THE COAST: IMPLICATIONS OF RECENT HUMAN DEVELOPMENT ALONG THE GULF COAST FOR MIGRATING BIRDS.

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Along the northern Gulf coast, the loss and fragmentation of natural habitats due to rapid human population growth is at odds with the critical habitat needs for the millions of migrating birds that stop over here before and after crossing the Gulf of Mexico. To better understand the conservation implications of this conflict, we studied 1) the habitat use by migrating land birds at different spatial scales across this region using weather radar observations and ground surveys, 2) the movement and behavior of birds during stopover using radio telemetry, and 3) recent land cover changes along the Gulf coast. Migrants appear to respond to landscape structure before making landfall, preferring to stop over in landscapes dominated by hardwood forests (particularly bottomland hardwood forests) and avoiding landscapes dominated by non-forested land, such as agricultural fields, clear-cuts, and urban areas. However, the correlation between bird density and hardwood forest cover weakened with greater proximity to the coast. Moreover, land bird densities were highly-concentrated along the immediate coast out to about 25 km inland. Thus, migrants face strong extrinsic constraints on habitat use after negotiating the Gulf of Mexico during spring. Within Mississippi, the availability of hardwood forest habitat and the amount of protection these forests receive from human development declines with greater proximity to the coast. Additionally, the recent conversion of natural habitats for human land uses is greatest nearest the coast. Thus, our findings should increase the urgency for the conservation of forested coastal habitats for migrating birds.

COASTAL ECOLOGY AND BIRD MIGRATION IN A RAPIDLY CHANGING CLIMATE.

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Over the last 100 years, the average global surface temperature has increased approximately 0.8°C (1.4°F), and both the rate of warming, and the rate of sea level rise, are expected to continue to increase. Warming is associated with shifts in range boundaries (e.g., towards the poles) and shifts in timing (phenology), and both types of changes are likely to be seen in focal bird species, and in plants and insects that contribute to habitat quality for migrants in coastal habitats. Suites of climate change scenarios, paired with range change or energetic models, can help us to understand the relative probability of various types of changes, and to move forward with conservation planning in the face of uncertainty. A risk assessment framework is particularly helpful for understanding the role of climate change in determining the frequency of rare yet potentially catastrophic events, such as hurricanes. Impacts of sea level rise include habitat loss through inundation and erosion, as well as stronger storm surges that penetrate far inland where saltwater intrusion will affect the availability of fresh water. Predictive tools like spatial models allow us to visualize how the impacts of sea level rise will vary, highlighting places where impacts will be particularly strong, like the Mississippi Delta, where rapid subsidence is currently underway. To be effective over the long term, it is critical that strategies for protecting and restoring coastal habitats to benefit bird populations are developed with climate change in mind.

ENDANGERED/THREATENED MIGRATORY BIRDS AND THE GULF COAST.

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To determine the relative importance of factors in different portions of the annual cycle influencing the survival and successful reproduction of migratory birds with low populations or those designated as threatened or endangered requires leaps of faith. Application of theoretical constructs concerning demographic rates to specific cases must be done with limited and imprecise data. Each migrant poses its own set of social and political, as well as biological questions. A check of North American migrants listed as Threatened or Endangered yields a set of such cases, including Peregrine Falcon (*Falco peregrinus*), Snowy (*Charadrius alexandrinus*) and Piping (*C. melodus*) Plovers, Southwestern Willow Flycatcher (*Empidonax traillii extimus*), Black-capped Vireo (*Vireo atricapilla*), Bachman's (*Vermivora bachmanii*), Golden-cheeked (*Dendroica chrysoparia*), and Kirtland's (*Dendroica kirtlandii*) warblers, among others. Fortunately, to this point only one of the critically imperiled species, Peregrine Falcon, is a trans-Gulf migrant. Cerulean Warbler (*Dendroica cerulea*), listed as Vulnerable by IUCN, provides an exemplar of the potential future for other species, including Swallow-tailed Kite (*Elanoides forficatus*), Bicknell's Thrush (*Catharus bicknelli*), Olive-sided Flycatcher (*Contopus cooperi*), and Golden-winged Warbler (*Vermivora chrysoptera*). Comparison of Cerulean Warbler to the critically imperiled species yields insight into the influence of stopover habitat, not only on the northern Gulf Coast, but throughout the periphery of the Gulf, on fitness of migrants. Opportunities to reduce our ignorance through improved monitoring of movements, to improve habitats through management strategies, and to maintain particular elements in the landscape through protective conservation actions, exist throughout the basin.

SCIENCE-BASED CONSERVATION OF MIGRATORY BIRDS ALONG THE NORTHERN COAST OF THE GULF OF MEXICO

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The varied habitats found along the northern Gulf coast support a wide variety of North American birdlife for at least part of their annual cycle. Thus, this area is critical for science-based conservation efforts to protect, maintain, and increase existing bird populations. The Gulf Coast Joint Venture (GCJV) is the regionally based, biologically driven, landscape oriented partnership for the delivery of habitat conservation important to priority bird species from Brownsville, Texas, to Mobile Bay in Alabama. Its mission is to advance the conservation of important bird habitats within the GCJV region through biological planning, implementation of habitat conservation actions, and focused monitoring and evaluation of the planning and implementation processes. Currently, conservation planning efforts focus around four major bird groups: waterfowl, waterbirds, shorebirds, and landbirds. The GCJV,s Monitoring, Evaluation, and Research Team (MERT), consists of working groups which address conservation planning for each of these major bird groups. Recognizing the critical importance of the GCJV region to transient migrant landbirds, the Landbird Working Group of the MERT selected a suite of nearctic-neotropic migratory birds (Cerulean, Golden-winged, and Swainson's warblers) as species to guide the process of setting habitat objectives for priority migrant landbirds in the region. In addition to providing an overview of the GCJV structure and current planning efforts, this presentation will highlight a recently proposed conceptual model for bird-landscape relations along the northern

Gulf Coast. This effort uses a structural equation meta-model to evaluate the interrelationships between geographic position, human development, habitat, and migrant landbird use.

ABSTRACTS – ORAL PRESENTATIONS

Arranged by first author's last name

[A]TERRESTRIAL HABITAT USE AND CHRONOLOGY OF MIGRATING BIRDS THROUGH SOUTHERN TEXAS

Arlene **Arnold***, Bart Ballard, and Thomas Langsheid, Caesar Kleberg Wildlife Research Institute, Texas A&M University, Kingsville, Texas 78363.

Southern Texas is an important corridor for migrating birds and has been the subject of recent development interest. Yet, it is poorly understood how migrants are using stopover habitats in this region. We investigated migration chronology and stopover habitat use by birds in southern Texas to provide information to aid management decisions in the face of impending landscape changes. We compared species richness and density of migrating birds in ten habitats within three counties in southern Texas. Avian surveys were conducted along 500m transects during spring and fall migration seasons of 2006 and 2007. Overall, we observed 223 bird species throughout the study. Species richness was greatest in mesquite parks (108) and oak islands (106) and was lowest in mesquite shrub-grasslands (70). Species richness and bird density peaked in mid-April during spring each year. Fall species richness peaked in mid-September, but bird densities were greatest in early September and early November. Oak islands appear to be important stopover habitats. Overall bird density was 63% greater in oak islands than any other habitat sampled. Warblers exhibited heavy use of oak islands, frequency of observations were approximately 40% greater than any other habitat. In general, bird density was lowest in habitats dominated by huisache. For instance, densities of flycatchers were about 3.5 times higher in oak islands than in huisache park. Additionally, there were seasonal differences in habitat use. For example, sparrow densities were approximately 2.5-3 times greater in mesquite shrub-grasslands during spring than fall.

EVIDENCE OF WIDESPREAD NORTHWARD RANGE EXTENSIONS ALONG A 1000 KM GRADIENT FROM TROPICAL TO WARM-TEMPERATE CLIMATES IN NORTHEASTERN MEXICO AND SOUTHERN TEXAS.

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Pioneering ornithologists began collecting extensively in southern Texas and northeastern Mexico (Tamaulipas, Nuevo Leon, and southeastern San Luis Potosí) in the late 19th and early 20th centuries. Fairly extensive bird records from both these regions began to be kept around 1940 and have continued, constantly increasing, through the present. Collectively these records have chronicled a steady northward extension of breeding range that cuts broadly across taxonomic lines. This can be demonstrated for many species using the relatively well studied El Cielo region of southwestern Tamaulipas (23°N), and the Lower Rio Grande Valley (26° N) and Balcones Escarpment (29° N), both in Texas, as benchmarks. Harder to document with certainty because of wide year-to-year fluctuation in population levels, but apparently real, has been a corresponding withdrawal northward of the southern limits of wintering range in some species, the advancing winter ranges of many Nearctic-Neotropical migrants, and an upward withdrawal along elevational gradients by certain montane species. While there is no information on the temporal duration of this phenomenon, published data and personal observation suggest that the speed with which ranges of most species have expanded northward has increased markedly since about 1970. While the underlying factors of this expansion are unstudied, there is a strong positive correlation with rises in mean global temperature.

[A]TEMPORAL AND SPATIAL VARIATIONS OF HABITAT ASSOCIATIONS OF FALL MIGRATING SONGBIRD AT AN INLAND SITE IN NORTHERN ALABAMA USA.

[A]Lisa Gardner **Barillas*** and Yong Wang, Department of Natural Resources and Environmental Science, Alabama A&M University, Normal, AL 35762.

Songbird species show different habitat associations during the breeding season compared to the migratory periods. Migratory songbirds are sensitive to food availability at stopover sites when they need to gain energy stores to continue migration. We tested the hypothesis that songbird migrants show different habitat associations spatially and temporally during migration stopover in the fall. We captured songbird migrants using mist nets at an inland stopover site within the Walls of Jericho Management Area of northeastern Alabama during the fall of 2006 and 2007. Birds were captured in two habitats: the interface between wetland and forest; and an open forest adjacent to a field. A total of 1776 individuals at the wetland site, and 1517 individuals at the forested site were captured. The wetland had higher species richness than the forest. Omnivorous species such as American Goldfinch and Indigo

Bunting were concentrated at the wetland, and species including Wood Thrush, Gray Catbird, and Swainson's Thrush showed stronger associations with the forest. Some warbler species were distributed relatively evenly across both sites. Neotropical migrants used the sites earlier than Temperate migrants. Some habitat use patterns are consistent with breeding habitat associations, and may be related to food availability and habitat structure. However, some species showed more flexibility in habitat use, which may be related to the need to gain energy stores quickly to continue migration. These patterns have important implications for the conservation of these migratory species, as competition increases with more species using similar habitats.

NEST BOXES AND CONSERVATION OF PROTHONOTARY WARBLERS: A 21-YEAR STUDY.
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Prothonotary Warblers have consistently declined in abundance in the United States over the past four decades. Conservation efforts are needed and, as demonstrated in this study, can be remarkably successful. From 1987 through 2007 we monitored productivity of Prothonotary Warblers nesting along a 32-km transect of nest boxes on the James River, near Hopewell, VA. More than 25,000 nestlings fledged from these boxes and production of young has increased throughout the duration of the study. My students, colleagues, and I have banded more than 1/3 of all Prothonotary Warblers recorded by the BBL. Increases in numbers of Prothontary Warblers in regional breeding bird surveys may indicate the impact of the project. Because of the large number of breeding pairs of warblers, our study site has been identified as an Audubon Important Bird Area. Virtual elimination of predation at nest boxes affected survival of females and possibly influenced other demographic measurements such as nest initiation date. Increased ambient temperature during the breeding season over the past few decades may have lead to earlier arrival of males, but has not affected clutch size and was not useful in predicting nest initiation dates.

EURASIAN COLLARED-DOVES IN NORTH AMERICA: COLONIZATION DYNAMICS AND IMPLICATIONS FOR NATIVE DOVES.
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The potential ecological impacts of introduced species on native communities are vast and remain largely undocumented, yet biological introductions and invasions are considered among the top five drivers affecting global biodiversity. Few invasive bird species have demonstrated the ability to colonize continents as rapidly as the Eurasian Collared-Dove (*Streptopelia decaocto*), colonizing much of Europe and North America during the last 80 years. The colonization of North America by Eurasian Collared-Doves may have significant implications for native dove populations with which the new invaders may compete for food or other resources. Using data from Project FeederWatch, we describe the colonization dynamics of North America by Eurasian Collared-Doves, and evaluate the impact of the colonizing dove on established dove populations in Florida. The proportion of sites in Florida reporting Eurasian Collared-Doves increased between 2000 and 2006 (linear regression, $P = 0.012$), while mean flock size marginally increased ($P = 0.054$). The proportion of all sites hosting Mourning Doves, White-winged Doves, and Common Ground-Doves remained relatively constant (linear regression, $P > 0.05$), while Rock Pigeons declined ($P = 0.0447$). Sites hosting Eurasian Collared-Doves recorded more individuals of all other dove species than did sites lacking Eurasian Collared-Doves, suggesting that the new invaders are not negatively influencing populations of other doves in Florida. Competitive dynamics may change as Eurasian Collared-Doves become more common and interact with native species in different bioregions.

[A]A COMPARISON OF MIGRANT SPECIES COMPOSITION AT TWO WESTERN NEW YORK TELEVISION TOWERS.
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Communication towers are responsible for significant mortality in avian populations that migrate at night. Using data collected from 1970 through 1999, we compared the species compositions of birds killed at two western New York towers (WKBW and WGRZ) television towers. We analyzed data from 5-year blocks (1970 to 1974, 1975 to 1979, etc.) and from the ten dates with the highest numbers of birds killed. Significant differences were found in the species composition between WKBW and WGRZ during 5-year blocks across the three decades. A total of 48 species were responsible for the differences between the two towers. Species contributing to these differences ranged from 1 in the 1990-1994 time block to 29 in the 1980-1984 time block. On six of the ten dates with the highest numbers of birds killed we did not find significant differences in species composition between the two towers. However on the other four dates there were significant differences between the towers. Despite being only approximately five miles apart, the two towers in this study differ in elevation and structure, which may have led to the observed differences in avian composition. Our results suggest that the data from a single tower may not be

indicative of all towers within an area, but rather that data be collected from multiple locations to obtain a representation of the effects of towers on local populations.

[A] AVIAN PESTICIDE EXPOSURE AND FOOD INTAKE ON GOLF COURSES.
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The seemingly straightforward question "Are golf courses good places for birds to nest?" remains unanswered, largely due to the unknown impacts of chemical management practices. Our research utilized the Eastern Bluebird (*Sialia sialis*) as an indicator species to investigate effects of golf course pesticide applications on avian development and prey availability. To test the hypotheses that birds on golf courses are exposed to cholinesterase-inhibiting pesticides and/or lack necessary prey availability, we collected nestling blood and prey samples from nestboxes on and off golf courses. Analyses of blood samples from golf course nestlings indicated no exposure to cholinesterase-inhibiting pesticides. Unexpectedly, golf courses had higher mean cholinesterase levels than reference birds. In addition, blood samples collected immediately following pesticide applications showed no significant cholinesterase inhibition compared to pre-spray samples. Ligature sampling determined nestling diet composition to be consistent across habitats with the exception of a lower percentage of Araneae and higher percentage of Hymenoptera consumed on golf courses. No difference was found in the number of prey items or mean biomass fed to each nestling per hour. It is important to note this does not indicate prey is equally abundant on golf courses since parents may have spent more effort foraging to achieve the same feeding rate. Our results suggest that recently fledged birds may be at the highest risk of exposure due to the dates of pesticide applications and their lower foraging efficiency.

[A]COMPARATIVE PHYLOGEOGRAPHY OF NEOTROPICAL BIRDS: ECOLOGY PREDICTS LEVELS OF GENETIC DIFFERENTIATION.
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Large-scale geologic events can produce a common barrier to gene flow for entire communities of organisms. Previous studies have found these barriers partition genetic variation of co-distributed taxa into similar geographic regions. Despite this spatial agreement, there is often substantial across-species variation in pairwise genetic divergence between sister lineages presumed to have formed in concert due to the same emergent barrier. We found this relationship while investigating patterns of genetic differentiation in 60 widespread species of lowland tropical rainforest birds co-distributed across both sides of the northern Andes Mountains. The eastern Andean Cordillera experienced rapid uplift approximately 10 million years ago and subsequently separated lowland tropical rainforest of northwestern South America and Amazon Basin. The genetic variation in cytochrome *b* for the 60 bird species consistently partition into east and west of the Andes. In contrast to this spatial congruence, there is striking variance in levels of cross-Andean divergence across taxa. While much of this variance represents stochastic influences associated with coalescing gene lineages and random mutational process, tests using approximate Bayesian models suggest the uplift of the eastern Andes did not isolate all 60 bird species simultaneously. We tested for statistical correlation between species-specific attributes and levels of cross-Andes mitochondrial divergence given the fact that any signal attributed to ecology and/or life-history must overcome the background noise derived primarily from coalescent and mutational uncertainties. We found highly significant associations between habitat use and cross-Andean divergences. This result provides evidence that links ecology of species with their evolution.

CERULEAN WARBLER HOME RANGE ESTIMATES AND ROOST SITE SELECTION IN NORTHEAST ALABAMA.
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Concern for Cerulean Warblers has spiked in recent years due to the loss of nearly 70% of its population since the 1960s; however, its diminutive size and habitual use of the upper canopy has mired the ability of researchers to gather essential behavioral information required for devising comprehensive management plans. We used radio-telemetry to track eight different Cerulean Warbler males during the 2006 and 2007 breeding seasons in a bottomland hardwood forest of northeast Alabama. The 95% fixed kernel diurnal home range was 4.7 ha (SE±0.6, Range=2.9-7.7) with 10.2% (SE±2.2, Range=2.7-16.3) of the total area overlapped by a neighboring Cerulean male's range. Home ranges typically contained two core areas that were 0.26 ha (SE±0.07, Range=0.06-0.6) and based on 25% probability use contours. Home ranges were composed of 88.6% deciduous/mixed forest (SE±2.7,

Range=77.6-98.9), and the distance of 745 bird locations to the nearest edge and stream was 48.5 m (SE±1.6, Range=0.0-229.7) and 72.9 m (SE±1.8, Range=0.0-236.9), respectively. We also identified the locations of 42 roost trees, of which nearly half were located outside the corresponding male's home range boundary. Males roosted in eleven tree species that were 26.0 m (SE±1.3, Range=10.8-43.5, n=31) tall and 40.0 cm (SE±2.6, Range=10.7-67.3, n=31) in diameter. These results provide more precise estimates of habitat selection and space use requirements, and advance our present knowledge of social interactions among Cerulean Warblers.

[A]SCALE EFFECTS ON OCCURRENCE AND RELATIVE ABUNDANCE OF FOREST SONGBIRDS IN EASTERN OKLAHOMA.

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Several species of forest songbirds reach a western limit of their respective distributions in eastern Oklahoma. The relative influence of broad vs. fine scale forest cover on patterns of occurrence in this region may differ from those same influences in the core of species' ranges. We examined the influence of forest cover at fine and broad scales on the occurrence and relative abundance of a suite of forest songbirds. We sampled breeding birds with four, fixed radius point counts along 1-km transects at 75 eastern Oklahoma sites in 2006 and 2007 (150 sites total). We selected sample sites to represent a gradient of forest cover from urban and agricultural landscapes to entirely forested landscapes in the Ozark and Ouachita Mountains. Forest cover at fine scales varied by numerous structural characteristics (e.g., canopy cover) as well as species composition (e.g., pines vs. hardwoods). For broad scale forest cover, we used land cover data from the Oklahoma GAP project in 1-km buffers placed around the center point of each site in a GIS. For fine scale variables, data was collected on the ground at each site. Preliminary analysis suggests different species select habitat at different scales.

[A]A COMPARISON OF FALL MIGRATION AND STOPOVER BY NORTHERN SAW-WHET OWLS DURING IRRUPTIVE AND NONIRRUPTIVE YEARS IN COASTAL MARYLAND.

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The stopover ecology of the Northern Saw-whet Owl (*Aegolius acadicus*) during its period of fall migration was investigated, with the main area of focus being differences between irruptive and nonirruptive years. Banding data was obtained during the fall seasons of 1991-2004 from the Assateague Island Banding Station off the coast of Maryland. The number of owls migrating annually is variable. Irruptive years are years in which high numbers of owls are migrating, which were 1995 and 1999 in this data set. During these two years, young females dominated the sample, although their relative percentage was lower than nonirruptive years. During these two irruptive years, the proportion of adult females captured was almost 60% less than in nonirruptive years. The proportion of young males almost doubled in irruptive years. Adult males accounted for <2% of the owls captured in both irruptive and nonirruptive years. During irruptive years, owls had a significantly lower mass than owls captured during nonirruptive years. Their condition index, using a variable as created by Whalen and Watts 2002, was significantly lower during irruptive years. During irruptive years, there was also a significantly lower recapture rate and significantly shorter stopover length than seen during nonirruptive years. In irruptive years owls tended to gain mass while in nonirruptive years owls tended to lose mass and this difference was significant. Our data suggests that migration is a density-dependent event which affects stopover patterns seen in Northern Saw-whet Owls.

[A]FOOD SUPPLEMENTATION, TERRITORY ESTABLISHMENT, AND SONG IN THE PROTHONOTARY WARBLER.

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Positive selection pressures often promote the elaboration of sexually selected traits. Bird song has been shown to be important in both inter- and intrasexual selection and the elaboration of the trait has been studied extensively from an intrasexual standpoint. A field experiment investigated the role of song in the Prothonotary Warbler, *Protonotaria citrea* in territory establishment. Songs were recorded for 31 males and song parameters were regressed against dates of territory acquisition, territory size, and territory location. In addition, feeders were placed in the territories of 17 randomly selected males. Song recordings obtained from these males over the entire breeding season were compared with a reference group of 14 males and plasticity of song over the study was determined. Heavier birds and those with longer tails acquired territories earlier (tail length: $n = 31$, $r^2 = 0.31$, $P = 0.001$; body mass: $n = 23$, $r^2 = 0.54$, $P = 0.001$). Males that sang more frequently acquired territories in preferred locations ($t = -2.55$, $df = 29$, $P < 0.001$) and earlier in the breeding season ($n = 31$, $r2 = 0.27$, $P = 0.003$). Supplemented males sang

less frequently following the removal of feeders, while the frequency of song production did not change for unsupplemented males during the same period (paired samples t-test: $t = -3.011$, $df = 16$, $P < 0.05$; $t = 1.853$, $df = 13$, $P > 0.05$, respectively). These findings suggest that current physiological condition constrains song parameters that are important in territory establishment in the Prothonotary Warbler.

CONTRIBUTIONS OF GEORGE F. GAUMER TO ORNITHOLOGY OF THE YUCATÁN AND COZUMEL: THROWING THE BABY OUT WITH THE BATHWATER?

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Before modern optics, sound recorders, and genetic methods were available to ornithologists, knowledge of the avifauna of a newly explored region depended almost entirely on the efforts of pioneering collectors. The ornithology of Mexico's Yucatán Peninsula and nearby islands is greatly indebted to Dr. George F. Gaumer's intensive collecting efforts in the late nineteenth century. Unfortunately, Gaumer often shipped specimens to museums with minimal data, a tendency common to numerous collectors of the era. Consequently, the validity of locality information for numerous records based on Gaumer specimens has since been questioned. Here I consider whether broad skepticism of distributional conclusions dependent on Gaumer's collections has gone too far. At least 33 species from Cozumel's list have been considered hypothetical or worse (i.e., erroneous) by virtue of being based solely on Gaumer specimens. However, at least 11 of these species have since been observed on the island, along with additional species not observed by Gaumer or other early naturalists. Some records for Cozumel, and for the broader Yucatán region, probably reflect real errors by Gaumer. Nevertheless, review of his overall contribution—and of recent records of species previously considered dubious—supports the hypothesis that Gaumer, while fallible, was also extraordinarily thorough and lucky in his collecting activities; we may still expect to find species currently known only from Gaumer's work on Cozumel or elsewhere. The analysis also provides a reminder that island avifaunas may change over time, because of anthropogenic changes, natural events, and chance.

[A]THE RESPONSE OF MALE DICKCISSELS TO GEOGRAPHIC SONG VARIATION.

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Songbirds often imitate the songs of neighbors, and such song sharing by immigrant males may result from various selection pressures. We tested the "deceptive mimicry hypothesis" in the Dickcissel (*Spiza americana*), where playbacks of simulated immigrants mimicking local dialects were predicted to elicit less aggression—and presumably greater tolerance—from established male conspecifics than would playbacks of foreign dialects. Three different song playback treatments were used: 1) songs from local dialects, 2) songs from distant populations that sang radically different songs, and 2) songs from nearby vocal neighborhoods considered to be intermediate between local and foreign dialects. Contrary to our predictions, males tended to respond more aggressively to local dialect playback as more flights were directed toward this treatment over all others during playbacks. After playbacks, song rate response was highest toward local and intermediate dialects, again indicating that simulated immigrant males singing local—or near local—dialects received more aggression than those signing foreign songs. Our results contradict the predictions of the deceptive mimicry hypothesis. Another selection pressure, perhaps female preference, favors song sharing among male Dickcissels.

FUEL RESERVES AFFECT MIGRATORY ORIENTATION OF THRUSHES AND SPARROWS BOTH BEFORE AND AFTER CROSSING AN ECOLOGICAL BARRIER NEAR THEIR BREEDING GROUNDS.

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Fat reserves influence the orientation of migrating songbirds at ecological barriers, such as expansive water crossings. Upon encountering a large body of water, fat migrants usually cross the barrier exhibiting 'forward' migration in a seasonally appropriate direction. In contrast, lean birds often exhibit temporary 'reverse' orientation away from the water, possibly to lead them to suitable habitats for refueling. Previous studies have mainly focused on the effects of fat on migratory orientation before crossing an ecological barrier during autumn. In North America, examples are largely limited to transcontinental migrants that cross the Gulf of Mexico. We examined the effect of fat stores on migratory orientation and activity of both long- and short-distance migrants before and after a water crossing near their breeding grounds. *Catharus* thrushes (Swainson's and Gray-cheeked thrushes, *C. ustulatus and minimus*) and White-throated Sparrows (*Zonatrichia albicollis*) were tested for orientation at the south shore of Lake Ontario before crossing the lake during spring and after crossing the lake during autumn. During both seasons, fat birds oriented in a seasonally appropriate, forward direction. Lean birds, in lower energetic condition, were

either less oriented and/or selected different directions than their fat conspecifics, despite similar nocturnal activity levels. Lean thrushes showed a tendency for reverse orientation upon encountering water in the spring, and axial, shoreline orientation after crossing water in the autumn. Lean sparrows were not consistently oriented in any direction during either season. The responses of lean birds may be attributable to their stopover ecology and seasonally-dependent habitat quality.

[A]HURRICANE-RELATED DECLINES IN FOOD AVAILABILITY AND MIGRANT LANDBIRD ABUNDANCE AT AUTUMN STOPOVER SITES.

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Understanding the consequences of recent hurricanes on the stopover ecology and behavior of Neotropical migrant landbirds may provide important insight into the effects of hurricanes on migratory populations. In 2006 and 2007 we investigated migrant abundance and foraging behavior during autumn stopover in two coastal Louisiana forests that were impacted to different degrees by Hurricane Rita in 2005. We hypothesized that severe hurricane disturbance affects live-foliage searching insectivores more than bark-searching insectivores because of greater hurricane damage to live foliage. Transect surveys found live-foliage searching insectivores to be 72 % more abundant in plots with light hurricane damage than in plots with severe damage ($F1, 3.9 =18.56, P = 0.01$). Bark-gleaning insectivores were also more abundant in plots with light hurricane damage, but not significantly ($F1, 3.1 = 3.61, P = 0.15$). Branch clipping showed that arthropod biomass was 92 % higher on live than on dead branches of the dominant tree species ($Z = -2.63, P = 0.007$), and Blue-gray Gnatcatcher (*Polioptila caerulea*) prey attack rate (an index of prey abundance) was 46 % higher on live than on dead branches ($t = -7.67, P < 0.001$). These patterns, when combined with significantly reduced availability of live foliage in severely damaged plots, suggest that reduction in food availability is an important factor driving the reduced abundance of migrants in severely damaged plots. We suggest that, during stopover, live-foliage searching insectivores are particularly vulnerable to severe hurricane disturbance through the loss of foraging substrates and resulting decrease in food availability.

[A]SPRING STOPOVER OF FOREST-DWELLING AND SHRUB-DWELLING MIGRANTS AT A GREAT LAKES COASTAL WETLAND: THE ROLES OF HABITAT, ARTHROPODS, AND PHENOLOGY.

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Knowledge of habitat use by migrants is critical to sound conservation planning. Along the shorelines of the Great Lakes, differential concentrations of migrants and abundant nearshore resources may create critical stopover habitat for northbound migrants. Spring surveys of migrant birds, arthropod abundance, and phenology of vegetation were conducted at a coastal wetland from 2004 - 2007 in six structurally diverse habitats near the shoreline of Saginaw Bay, Lake Huron. Forest- and shrub-dwelling migrants exhibited the greatest abundance and highest species richness in dunal forest. Midge (Diptera) abundance corresponded neither to patterns of habitat use nor to peak abundance of migrants. Phenology varied significantly each year, but abundance of migrants did not correspond to any developmental stage of woody plants. Migrants' choice of stopover sites along Saginaw Bay appears to be determined by structural characteristics of habitats. Although midges may constitute a significant resource for shoreline migrants in portions of the Great Lakes, habitat structure may be an equally important cue for birds, especially if the emergence of midges is not synchronous with migrants' arrival.

[A]WINTERING BIRDS AND HABITAT PREFERENCES IN THE OKLAHOMA CROSSTIMBERS.

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The Crosstimbers are a forest-prairie transition zone in the Midwest originally dominated by Post and Blackjack Oaks (*Quercus stellata, Q. marilandica*) but recently invaded by Eastern Redcedar (*Juniperus virginiana*). The effect of the spread of Eastern Redcedar on wintering bird populations has not yet been firmly established. We sampled the wintering bird population from mid October 2007 to mid March 2008 in three oak-dominated and three cedar-dominated plots situated around Lake Carl Blackwell, central Oklahoma by using mist nets. Numbers of birds captured were higher overall in redcedar-dominated plots than in oak plots. Carolina Chickadees and Tufted Titmice (*Baeolophus bicolor*) were almost exclusively caught in oak-dominated plots. Ruby-crowned and Golden-crowned Kinglets (*Regulus calendula, R. satrapa*), as well as Hermit Thrush (*Catharus guttatus*) were only caught in redcedar-dominated plots. Remarkable was the capture of an adult male Gray-headed Junco (*Junco hyemalis* ssp. *caniceps*), far outside of its normal wintering range in the southern Rockies. An increase in body weight in all

migratory species was observed during the progression of winter. For Red-breasted Nuthatches, males and females were on several occasions caught simultaneously, indicating a pair bond during winter time for the species. The winter was remarkable because of numbers of species that normally do not occur or only so in small numbers in Oklahoma.

[A]THE EFFECTS OF THERMAL ENVIRONMENT ON INCUBATION BEHAVIOR IN HOUSE WRENS (*TROGLODYTES AEDON*).
Megan J. **Fitzpatrick***, Douglas W. White, and E. Dale Kennedy, Biology Department, Albion College, Albion, MI 49224.
Incubation is a period of stringent energy limitation. In single-parent incubating species that do not mate-feed, females must trade off foraging (gaining energy) and incubating (losing energy, but increasing reproductive fitness). Ambient temperature should affect this balance nonlinearly if embryo development slows and adult thermoregulatory costs increase at temperature extremes. Thus, on- and off-bouts should be short at both ends of the temperature range. We studied length of off-bouts and warming and equilibrium periods in incubating female House Wrens in Albion, MI, in early and late season broods in 2007. We used small temperature-loggers (iButtons™) placed in nests to deduce female incubation patterns in >20,000 bouts from 65 clutches. The accuracy of this method was verified through video and direct observation. Off-bouts doubled in length with increasing temperature between 14 and 29ºC. Below 14ºC off-bout length was stable; above 29ºC off-bouts shortened or varied irregularly with rising temperature. Over moderate temperatures, warming periods shortened by 20% with rising ambient temperatures; equilibrium periods varied least with changing temperature. Bout length also varied significantly with hour of the day, nest box, and length of the previous bout. Off-bout lengths were stable in the first 2-3 hours of the day. Early and late broods showed similar responses to varying ambient temperature. Overall, our results strongly support a nonlinear relationship between ambient temperature and avian incubation.

[A]DECLINES OF SOUND SENSITIVE SPECIES IN RESPONSE TO INCREASED TRAFFIC VOLUME.
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Avian communication is evolutionarily linked with environmental conditions, with signals, receptors, and sensory systems under natural selection to be efficient for a particular habitat. In novel sound environments, vocal signals and reception that were previously well suited can become masked, resulting in degraded communication. Urbanization, particularly increased vehicular traffic, has created new sound environments dominated by low frequency ambient noise. Understanding how these new sound environments impact bird species, for which song serves critical functions in territory defense and mate attraction, will be of great conservation value and could guide management decisions in the future. In this preliminary study, we assessed whether birds with certain song properties showed lower relative abundance in louder areas compared to quiet areas. We predicted that species with songs of low central and peak frequencies (600-3000 Hz) would be unable to avoid the acoustic masking of the soundscape and would be less abundant in those environments. We sampled 56 study sites to estimate the relative abundance of each species. We paired sites (28 pairs) such that one was designated as a loud site and one a quiet site, based on average daily vehicle traffic (VADOT) and distance from nearest road. We estimated central and peak frequencies for primary songs from published recordings using Raven 1.2 (Cornell Lab of Ornithology). As predicted, overall relative abundance of birds decreased in the louder points, as did species diversity. However, species with lower peak and central frequencies showed the strongest declines in the louder points. These early data suggest a variation in noise sensitivity, and directions for further research into the mechanisms driving attrition.

BIRD DENSITY AND MORTALITY AT WINDOWS.
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Little is known about impacts to birds from collisions with windows at commercial buildings. We monitored bird mortality from striking windows at five commercial buildings on two college campuses in northwestern and southwestern Illinois. Bird mortality at Augustana College (northwestern), which was evaluated from 2002-2006, totaled 215 individuals in 48 species for an average rate of 55 birds/building/year. We calculated a mortality rate of 24 birds/building/year for 2004-2005 from 142 individuals within 37 species at Principia College (southwestern). Mortality of North American migrant (NAM) and neotropical migrant (NTM) birds was higher during migration than during summer or winter. We tested the bird density hypothesis at Augustana that density of birds at a given

location will be positively correlated with numbers of birds that die due to strikes with windows. Bird density only partially explained strikes with windows since mortality was also a function of landscaped habitat that attracted birds. Annual bird mortality at commercial buildings may be ~five times higher than previous estimates. These buildings may place bird populations at high risk of strikes at windows.

[A]WINTER WATERFOWL DYNAMICS IN MANAGED MOIST-SOIL WETLANDS IN THE MISSISSIPPI ALLUVIAL VALLEY

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Seasonally flooded emergent wetlands (i.e., moist-soil) provide important habitats for migrating and wintering waterfowl in North America; however, moist-soil vegetation often grows densely and may constrain waterfowl use of these habitats before natural openings form. In 2006, we initiated research to evaluate winter waterfowl abundance in response to fall, pre-flooding treatments of disking, mowing, and no manipulation (control) of vegetation in managed moist-soil wetland sanctuaries in National Wildlife Refuges (NWR) and Wildlife Management Areas (WMA) in Mississippi. Across 9 sites in winters 2006 -- 2007 and 2007 -- 2008, dabbling ducks (Anatini) used mowed areas most followed by disked and control plots ($P < 0.01$). Dabbling duck abundance differed between both mowed and control (47%; /P/ < 0.01) and disked and control treatments (40%; $P = 0.03$), but not between mowed and disked treatments (11%; $P < 0.84$). As natural openings formed in control areas post-flooding and later in winter, waterfowl increased use of these areas and decreased in mowed and disked areas. Our preliminary results suggest that winter waterfowl abundance may be greatest in response to partial mowing of vegetation in moist-soil wetlands. Previous studies have revealed that a 1:1 ratio of emergent vegetation and open water (i.e., a hemi-marsh) may be most attractive to breeding and wintering waterfowl. Partial fall manipulation of dense moist-soil wetlands may increase waterbird use and create hemi-marsh conditions desirable to wintering waterfowl.

[A]LIFETIME FITNESS OF TREE SWALLOWS EXPOSED TO AQUATIC MERCURY.

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Mercury is a toxic heavy metal that bioaccumulates through ecosystems, causing severe health problems in wildlife at high levels. While several studies have addressed the problem of environmental contaminants by examining parameters such as reproductive success or survivorship, none have measured lifetime fitness, which is arguably the most important biological endpoint in assessing the impact of contaminants on wildlife. We captured and monitored Tree Swallows (*Tachycineta bicolor*) from 2005-2007 breeding on a site of known mercury contamination on the South River, VA. Individual females were followed throughout their breeding careers to determine whether mercury level was related to breeding success and survivorship. Preliminary results suggest that on mercury-contaminated sites, females had depressed lifetime reproductive success compared to females breeding on nearby reference sites. In addition, average lifetime exposure to mercury appears to be negatively correl! ! ated to lifetime fitness, further implicating mercury as in the cause of impaired reproductive success in contaminated birds. In evolutionary terms, lifetime reproductive success is one of the most direct measures of fitness and proxies such as survivorship or single-season reproductive success do not effectively capture this. It appears that mercury reduces fitness in Tree Swallows at our study site.

[A]MORPHOLOGICAL DIFFERENCES IN GRAY CATBIRDS ACROSS AGE CLASSES.

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Among passerines the male is larger than the female in many morphological characteristics, even among species that do not show sexual dichromatism. Furthermore, although older birds are generally larger than young birds, comparison among multiple age classes is often difficult. Using banding data from the Pitsfield Banding Station in Kalamazoo, Michigan, from 1990 to 2004, we investigated variation in size among Gray Catbirds (*Dumetella carolinensis*) across the age classes. Overall, average mass of females was significantly higher than average mass of males, but average tail length and wing chord of females were significantly smaller than males. Also, changes in male and female masses over the banding season did not differ greatly. Although second-year birds had shorter wing chords than any other age class, there was not a significant difference in wing chord among older age classes in either sex. The consistency of the wing chord measurement may indicate that catbirds reach an optimal size during

their third year and do not vary substantially in later years. A greater number of male birds were found to increase in wing chord between the second and third year, than between the hatch year and second year age classes. This trend in wing chord decrease was not seen in females. The changes in wing chord after second year could be due to molt patterns, as is seen in other studies.

[A] DO AVIAN ABUNDANCES DIFFER BETWEEN HABITAT TYPES, IMPLICATIONS FOR ASSESSMENT OF HABITAT QUALITY?

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Avian density in specific habitat types has been used to assess habitat quality for specific bird species. Estimates of density do not incorporate detection probability and may bias density estimates low, incorrectly measuring habitat quality. We estimated avian abundances across multiple habitat types to examine predicted differences. We conducted point counts on approximately 40,000 acres of land managed for conservation in the Cumberland Plateau Region of Alabama. Detection probabilities were incorporated in the presence-absence data in order to accurately estimate abundances. We developed competing models, based on hypothesized relationships to determine whether abundance differs among habitat types or is similar among habitats. Habitat types sampled include designated habitat classes developed from land cover maps of Alabama and include dry-oak forest, mixed-mesophytic forest, early successional forest, and agricultural areas. We selected bird species that occurred in more than one habitat type in order to more adequately study hypothesized differences in habitat quality. Preliminary results show that abundances are similar among forested habitats but differ between forested and disturbed habitat types. Our results are an important contribution to our ability to better understand habitat quality for regional conservation planning in Alabama.

[A]THE INFILTRATION OF AQUATIC MERCURY INTO A TERRESTRIAL ECOSYSTEM.

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Traditionally, aquatic mercury has been thought to only threaten wildlife directly associated with the aquatic ecosystem, such as fish-eating species. However, on-going research has identified elevated levels in terrestrial insectivorous birds that breed and forage on sites adjacent to the mercury-contaminated South river in western Virginia. These data suggest that mercury can leave a contaminated aquatic source and enter the terrestrial food web, impacting a wide range of wildlife. The two objectives of this study are to investigate how the exposure of terrestrial insectivorous songbirds breeding at this site varies depending on their foraging habits and determine a mechanism by which aquatic mercury is transported into the terrestrial ecosystem. Preliminary results use foraging distance from the river, type of prey and size of prey to determine the risk of exposure to aquatic mercury in four insectivorous songbirds (CARW, CACH, HOWR and EABL). This study is the first to show that adults with territories as far as 300 meters from the contaminated river are still at high risk of mercury exposure through their diet. Investigation of the most abundant diet items show that predatory terrestrial spiders accumulate the highest loads of mercury. Spider prey was also found to consist of the highest percentage of organic mercury, which readily biomagnifies up the food chain to organisms in higher trophic levels. Future work will address the mechanism of how aquatic mercury becomes available to terrestrial prey and their predators by specifically examining how spiders obtain their high mercury burden.

TEMPORAL PATTERN OF VOCALIZATION TYPE USAGE IN SINGING SESSIONS OF MALE TYRANT FLYCATCHERS.

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It has been hypothesized that variation (e.g., of repertoire elements) in prolonged vocalization sessions of passerine birds can serve to minimize habituation by conspecifics. The repertoire of vocalization types limited in suboscine passerines, raising the question of how a limited set of elements can create patterns that minimize habituation. This question was studied by computational analysis of recorded singing sessions of 20 suboscine species from the subfamily Tyranninae, family Tyrannidae (tyrant flycatchers). The recordings of 12 of the species included two or more distinct vocalization types (VTs). In these species, the interval between vocalization units when the VT changed was on average shorter than that when the VT remained the same. In addition, when the VT changed, the mean interval length between successive vocalization units differed depending on which VT preceded the interval and which VT followed it. On the other hand, species with just a single VT in the session analyzed showed a surprisingly high degree of absolute difference between adjacent vocalization units with respect to both the length of the vocalization and percentage of time elapsed until peak amplitude. A change in the rhythm of vocalization

accompanying a change in VT provided a potential means of drawing a conspecific listener,s attention to the change in VT. The results showed that tyrant flycatchers use temporal patterning to achieve a high level of variety in vocalization sessions despite a limited vocal repertoire.

NESTING HABITAT OF THE GREAT HORNBILL (BUCEROS BOCORNIS) IN THE ANAIMALAI HILLS OF SOUTHERN INDIA.

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There is an abundance of anecdotal evidence in the literature that the endangered Great Hornbill needs mature, large old-growth trees for nesting, but with scant quantitative data this remains and untested hypothesis. We tested this hypothesis by measuring vegetational characteristics at 24 nest sites in southern India and compared this data with that obtained from equal numbers of control (unused) forest sites. The characteristics that were significantly different from surrounding forest at the hornbill nesting sites were several properties related to the large size of the trees. The results represent the first quantitative data arranged in a hypothesis testing format concerning the nesting habitat characteristics of the species, and stress the importance of mature forests with large-sized and emergent trees for the nests of the Great Hornbill. We have now constructed and erected, and are monitoring nesting boxes to increase nesting opportunities for this endangered avian species. Birds showed interest in the boxes but none were actually utilized this first nesting season.

DO EXTRA-MARITAL AFFAIRS MAKE MOUNTAIN BLUEBIRDS BLUE?

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Ornamental traits are thought to evolve because they give individuals an advantage in securing multiple mates. Thus, the presence of ornamentation among males in many monogamous bird species presents something of a conundrum. Under certain conditions, extra-pair paternity (EPP) can increase the variance in reproductive success among males, thus increasing the potential for sexual selection to act. We documented the frequency of EPP in a Wyoming population of the Mountain Bluebird, a socially monogamous songbird in which males possess brilliant UV-blue plumage. EPP was quite common in our population: 72% of broods contained one or more EP offspring. The standardized variance in *actual* male reproductive success (i.e., taking into account the effects of EPP) was seven times greater than the variation in *apparent* success. Males sired approximately two additional young for each EP female that they inseminated. Thus, in the Mountain Bluebird, sexual selection should favor phenotypic traits that reduce the risk of cuckoldry and/or increase the probability of a male siring offspring outside the pairbond. We found that male coloration predicted male success at siring offspring both with his own mate and with females paired with other males. Overall, more colorful males sired more offspring. However, the mechanism(s) by which coloration affects paternity success remain to be resolved.

PREVENTING BIRD-GLASS COLLISIONS.

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An overview and current assessment of various methods to prevent bird strikes at clear and reflective sheet glass will be presented. Flight cage and field experiments were used to evaluate the following strike deterrents: fritted glass, UV-reflecting maple leaf decals, turkey feathers on a line, and a series of designs creating uniform ultraviolet (UV) signal patterns. In general, a single leaf or string of feathers in the center of a picture window is a non-significant deterrent, but these objects become an effective deterrent if uniformly applied to the glass surface and separated by 10 cm (4 in) when oriented in vertical columns or 5 cm (2 in) when oriented in horizontal rows. Fritted sheet glass with a visual appearance of small translucent dots 0.317 cm (0.125 in) in diameter and separated by 0.317 cm (0.125 in) that uniformly cover the glass surface were a significant deterrent. The view through this patterned fritted glass from one meter (> 3 ft) or more away is only slightly impaired for humans. Results of testing the ability of birds to use patterned signals created by UV-reflecting and UV-absorbing areas were mixed and perhaps explained by low UV signal quality. Current testing with greater UV signal quality has been more promising and suggests that birds may be able to use UV signals to avoid the dangers of glass.

[A]IS SONG LENGTH AN IMPORTANT SIGNAL OF AGGRESSION FOR BLUE GROSBEAKS?: A PLAYBACK EXPERIMENT.

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Although investigators have examined how males in some bird species use different songs in their repertoire for different signaling purposes, less is known about how birds alter the characteristics of individual songs to convey different messages. I used playback of short, medium-length and long songs to test the hypothesis that song length is an important signal of aggression for male Blue Grosbeaks (*Passerina caerulea*). Males (n = 15) were tested during the period from 7-29 July 2007. Playback order was randomly determined, and tests were separated by several days. Each playback consisted of a 3-min silent period (pre-playback), a 3-min playback period, and another 3-min silent period (post-playback). I noted the focal male's location every 15 s, as well as the closest approach to the playback speaker, number of flights, number of calls ('chip' notes), and number of songs. Compared to their response to short and medium-length songs, male blue grosbeaks came closer to the speaker ($p = 0.0026$) and remained closer to the speaker (mean distance; $p = 0.0072$) during and after playback of long songs and, during the post-playback period, also uttered more songs ($p = 0.023$). The closer approach and increased singing rates likely signal an increased likelihood of interacting and suggest that altering song length is one way that male blue grosbeaks can signal different levels of aggressive intent to conspecific males.

[A]NESTING ECOLOGY OF URBAN COLUMBIDS IN SOUTH TEXAS.
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Three native dove species, Inca Dove (*Columbina inca;* INDO), Mourning Dove (*Zeniada macroura;* MODO) and White-winged Dove (*Zeniada asiatica;* WWDO), along with one exotic species, Eurasian Collared-Dove (*Streptopilia decaocto;* ECDO) routinely use urban areas in South Texas for nesting. During 2006 and 2007 we studied the nesting ecology of these 4 species at 5 study sites in South Texas. Data were collected to obtain information on the breeding ecology of each species and to determine if overlap in nest site locations among the dove species could lead to competition. Nest initiation in all 4 species began around April 15 and peaked around 25 May. All doves showed an avoidance of honey mesquite but only the ECDO showed a clear preference for ash. Nest sites were similar among species in all variables measured except nest height. Nests of the larger species (ECDO and WWDO) were significantly ($p \leq 0.001$) higher in a tree then those of the smaller species (MODO and INDO). Overall nest success varied among species but not significantly. ECDO had the highest overall success (51%) while MODO had the lowest overall success (31%). Due to similarity between nest initiation dates and nesting sites, nest site competition has potential to occur within these dove populations. However, evidence of height stratification, minimal or zero tree species selection, and absence of colonial nesting by the WWDO seem to indicate that suitable nesting sites are not currently a limiting factor on urban columbid populations.

CHARACTERISTICS AND ENERGETICS OF GREAT EGRET AND SNOWY EGRET FORAGING FLIGHTS.
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We studied the flight patterns of Great Egrets (*Ardea alba*) and Snowy Egrets (*Egretta thula*) arriving at and departing two mixed-species colonies in Wichita, KS, in May-June 2007. For 137 short-distance flights (about 200 m) at one colony, we recorded flight duration, measured flight distance, and counted wing beats. For 90 longer flights (about 1200 m) at a second colony, we recorded flight duration. From these data we calculated wing beat frequencies and flight velocities, then used vector addition to determine air speeds and examine the effects of wind velocity and wind direction on flight patterns. We used published algorithms and data from two of our previous flight line studies to estimate daily flight costs. Flight patterns by Great Egrets and Snowy Egrets showed some similarities, such as mean air speed, but revealed more differences. This included lower wing beat frequencies by Great Egrets and a much stronger effect of headwinds on Snowy Egret flight velocities. Energetic requirements for flight also differed between species, which we ascribe to differences in wing-loading and mass. We then estimated the cost of an average flight, and compared daily flight costs to overall daily energy budgets. Flight comprises 13% of the total energy budget for Great Egrets and 14% for Snowy Egrets. Based on previous foraging studies, we estimate that a Great Egret can meet its daily energy requirements for flight after 41 min of foraging, whereas a Snowy Egret must forage for 84 min to capture enough prey to meet the demands for flight.

[A]SONGS OF THE CRITICALLY ENDANGERED COZUMEL THRASHER: WHAT WOULD A NEEDLE IN A HAYSTACK SOUND LIKE?
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A challenge for conserving exceedingly rare bird species is to develop effective census methods. Acoustic monitoring has proven useful in work with some endangered species, such as the Ivory-billed Woodpecker. The Cozumel Thrasher (*Toxostoma guttatum*) is another species that has become so rare that detection is problematic. Before acoustic methods can be employed, we must first know what to listen for. Here, we use historical recordings to describe the song of the Cozumel Thrasher in relation to those of congeners and other potentially confounding species on the island. Complex mimid songs are characterized by long bouts with many phrases, variable degrees of phrase repetition, mimicry, and large overall repertoires. With a rapid cadence (~3 phrases/sec) and a relative lack of successively-repeated phrases, Cozumel Thrasher song more closely resembles that of Long-billed Thrasher (*T. longirostre*) than that of Brown Thrasher (*T. rufum*). On Cozumel, species potentially confused with Cozumel Thrasher are Black Catbird (*Melanoptila glabrirostris*) and Tropical Mockingbird (*Mimus gilvus*). Songs of Black Catbird are highly variable but can usually be distinguished from repetition of short, complex song elements. Tropical Mockingbirds repeat each song element 1 - 8 times, with long pauses between song sets. Songs of both of these species incorporate interspecific mimicry. While Cozumel Thrasher song is distinct in overall structure from that of other Cozumel mimids, the potential for automated acoustic detection systems would be limited because their songs may be imitated.

[A]PHYLOGEOGRAPHY OF THE YELLOW-THROATED WARBLER (*DENDROICA DOMINICA*).
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The Yellow-throated Warbler is currently subdivided into four subspecies: three across the southeastern United States and one in the Bahamas. I used mitochondrial DNA to access genetic variation within the Yellow-throated Warbler. My hypothesis was that genetic partitions would correspond to the morphological subspecies recognized by taxonomists. Although two of the continental subspecies divide along a known phylogeographic discontinuity, I found no evidence of genetic structure across North America. Genetic variation was uncovered, however, and population genetic as well as coalescent analyses indicated that the North American population recently underwent a rapid expansion. This suggests the Yellow-throated Warbler was confined to a smaller range during glacial maxima and that morphological differences between continental subspecies have evolved relatively rapidly. Follow-up work suggests continental morphological variation is distributed clinally and that North American Yellow-throated Warblers are probably best represented as a single taxon. In contrast, the Bahama subspecies represents a monophyletic linage that likely diverged from the continental population during the late Pleistocene. Follow-up work with morphological and song data confirms a discrete division between Bahama and continental Yellow-throated Warblers and suggests the Bahama subspecies should be elevated to full species.

IMPACTS OF HURRICANE CHARLEY ON A FLORIDA SCRUB-JAY POPULATION.
Karl E. **Miller**, Fish and Wildlife Research Institute, Florida Fish and Wildlife Conservation Commission, Gainesville, FL 32601.
On the afternoon of 13 August 2004, a Category 4 hurricane with sustained winds of >145 mph struck Charlotte County, Florida, passing directly over the second largest population of Florida Scrub-Jays in the region. No empirical data are available on the effects of a direct hit by an intense hurricane on any coastal scrub-jay population. The hurricane caused extensive modification to the habitat, including short-term mast reductions. However, within 2 years after the hurricane, several habitat patches disturbed by the hurricane were colonized by newly formed scrub-jay families. Population size declined from 66 family groups pre-hurricane to 57 family groups in the first year post-hurricane, but rebounded to 63 family groups in the second year post-hurricane. Potential impacts on breeding, recruitment, and dispersal are discussed, including documentation of a brief outbreak of poxvirus. These data reinforce a picture of adaptability for coastal wildlife impacted by hurricanes. Caveats include the fact that this particular population had access to supplemental food (e.g., peanuts) provided by citizens.

INVESTIGATING THE USE OF PARTNERS IN FLIGHT SCORES FOR ECOLOGICAL ASSESSMENT.
Timothy J. **O'Connell**, Department of Natural Resource Ecology and Management, Oklahoma State University, Stillwater, OK, 74078.
In recent years, several authors have developed ecological indicators for broad scale assessment that are based on the condition of landbird assemblages. These indicators are typically referenced to a physiographic province or geopolitical region, and rely on specific knowledge of life history of breeding birds. In some regions, bird-based indicators have been used in concert with land cover and other taxa-specific indicators to provide integrated assessments of ecological condition, but efforts to expand that approach to other regions have been slowed by a lack of indicators and/or source data to which those indicators could be applied. Conservation value scores from the

Partners in Flight (PIF) Species Assessment Database hold some promise as geographically-independent indicators for species assessment, but little is known about how closely such indicators would agree with established indicators. I compared random subsets of Breeding Bird Survey routes from 1973 and 2000 using the established Bird Community Index (BCI) and a summation of PIF combined scores. PIF- and BCI-based assessments did not provide similar assessments for data from the Mid-Atlantic Ridge and Valley or the Mid-Atlantic Coastal Plain physiographic provinces. PIF-based assessments may be unreliable indicators of general ecological condition, but they may provide valuable information relevant to avian conservation.

[A]ASSESSMENT OF HENSLOW'S SPARROW ABUNDANCE AND HABITAT SELECTION ACROSS LOUISIANA.

Laura M. **Palasz*** and Philip C. Stouffer, School of Renewable Natural Resources, Louisiana State University, Baton Rouge LA 70803

The Henslow's Sparrow (*Ammodramus henslowii*) is a grassland species of concern that winters in prairies and open pine savannas across the Gulf Coastal Plain. Previous studies have indicated that these birds occur at higher densities in recently burned habitats in winter, but this has never been examined over a large geographic area containing multiple habitat types. The objectives of the study were to identify areas of important winter habitat in Louisiana, examine the relationship between burn and bird density, and identify important characteristics of habitat selected by birds. We found most of the new potential habitat and the highest densities of birds in two specific ecoregions, suggesting that these may be most important for wintering Henslow's Sparrows. Although time since burn explained little variation in bird density overall, bird densities in the east declined with increasing time since burn while densities in the west did not. No vegetation measurements collected were helpful in interpreting bird abundance patterns across plots, suggesting that characteristics of suitable habitat may vary widely across ecoregions. However, within a plot the probability of flushing a bird increased with increasing herbaceous density at ground level, and with increasing cover of the plant genera *Andropogon* and *Rhynchospora*, suggesting that Henslow's Sparrows are responding to structural components of the habitat on a small scale. Results of this research will help land managers make decisions with appropriate consideration for the larger variation in bird abundance and vegetation associations found across a regional scale.

HURRICANE KATRINA: DID IT AFFECT PURPLE MARTINS AND PURPLE MARTIN ROOSTS?

Emily **Pifer**,*Purple Martin Conservation Association, Erie, PA 16505, John R. Sauer, USGS Patuxent Wildlife Research Center, Laurel, MD 20708, Jane Fallon, USGS Patuxent Wildlife Research Center, Laurel, MD 20708,and John Tautin, Purple Martin Conservation Association, Erie, PA 16505.

Purple Martins (*Progne subis*) are secondary cavity nesters that range throughout the eastern United States and Canada, with smaller populations in the Pacific Northwest, Inter-mountain West and Southwest. East of the Rocky Mountains, martins depend almost entirely on humans for housing. Highest breeding densities are found in the Gulf Coast states of Louisiana, Alabama, Mississippi, and Florida where Category 4 Hurricane Katrina struck on August 28, 2005. Because of the devastation that occurred in these Gulf Coast states, many assumed that martin colonies were destroyed, and that martin populations in the region would be subsequently reduced. Additionally, it was assumed that large, pre-migratory roosts used by martins in the region were destroyed. We present results from a damage assessment based on analyses of pre- and post-Katrina data from the USGS Breeding Bird Survey and NEXRAD radar images from NOAA.

[A]RESPONSES OF FOUR SONGBIRD SPECIES TO EXPERIMENTAL COWBIRD PARASITISM IN A RECENTLY INVADED AREA.

Matthew J. **Reetz*** and Kathryn E. Sieving, Department of Wildlife Ecology & Conservation, University of Florida, Gainesville, FL 32611, and Scott K. Robinson, Florida Museum of Natural History, University of Florida, Gainesville, FL 32611.

The breeding range of the Brown-headed Cowbird (*Molothrus ater*) has included Florida for the past 60 years, during which time cowbirds have expanded throughout the state. To assess potential negative consequences of cowbird expansion into Florida, we surveyed parasitism of 32 host species breeding in north-central Florida. We monitored 1120 nests and 272 family units feeding fledglings. Only 1.5% of nests and 6.25% of fledge families contained a cowbird egg or young despite relatively high cowbird abundance in the study area. To determine if host responses contributed to low observed parasitism, we tested rejection behavior of four common host species known to eject eggs or abandon nests to varying degrees in other regions. We experimentally parasitized 78 nests using viable cowbird eggs obtained from a captive colony. Cowbird eggs were accepted by hosts in 48 cases (61.5%). Brown Thrasher was the only species to consistently eject experimental eggs (14 of 17 cases) while other study

species typically accepted parasitism of their nests. Northern Mockingbird, Northern Cardinal, and Red-winged Blackbird accepted experimental parasitism at rates significantly higher than those published in the literature for each species. Results indicate that rejection behaviors do not appear to be retained in three of the four species tested. This suggests that low parasitism rates observed in north-central Florida are not explained by high rates of egg rejection by hosts.

[A]HABITAT USE BY MARSH BIRDS ALONG THE NORTHERN GULF OF MEXICO, WITH FOCUS ON CLAPPER RAILS.

Scott A. **Rush**, D. B. Warnell School of Forestry and Natural Resources, University of Georgia, Athens, GA ; Soehren, E.C., Alabama Department of Conservation and Natural Resources, State Lands Division, Montgomery, AL; Fisk, A.T., Great Lakes Institute for Ecological Research, University of Windsor, Windsor, ON; Woodrey, M.S., Coastal Research and Extension Center, Mississippi State University, Biloxi, MS and Grand Bay National Estuarine Research Reserve, Moss Point, MS; Cooper, R.J., D. B. Warnell School of Forestry and Natural Resources, University of Georgia, Athens, GA.

Emergent tidal marsh continues to disappear from the Northern Gulf Coast of the United States at an alarming rate. Despite this rapid loss the ecology of marsh birds inhabiting this ecotype, species such as the Clapper Rail (Rallus longirostris), Least Bittern (Ixobrychus exilis), Purple Gallinule (Porphyrula martinica), Common Moorhen (Gallinula chloropus) and Seaside Sparrow (Ammodramus maritimus) remains largely unknown. In an effort to further our understanding of the ecological niche of these birds we studied their spatial ecology at several locations in Mississippi and Alabama. Spatial distributions were studied using standardized marsh bird surveys and GIS. Across our focal systems we found the occurrence of our focal species correlated with landscape features measured at various spatial scales. Application of radio-telemetry and ecological tracers in the form of stable isotope and element analysis provided further exploration into the trophic and reproductive ecology of Clapper Rails from several spatially distinct locations in Mississippi. For Clapper Rails evidence suggests that both diet and reproductive success may vary both within and between estuarine systems. Applying several reproductive metrics we will discuss possible relationships between ecotype, trophic interactions, habitat use, this species' population demographics and the potential impacts of sea level rise. Synthesis of this information will not only further our understanding of the ecology of tidal communities but also find application in their effective management within a changing environment.

EVIDENCE OF A FIVE-YEAR POPULATION CYCLE IN RUSTY BLACKBIRDS (*EUPHAGUS CAROLINUS*).

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We analyzed 12 years of fall migration monitoring data collected at the Observatoire d'oiseaux de Tadoussac (OOT) and data from the EPOQ (Étude des populations d'oiseaux du Québec) checklist database to quantify Rusty blackbird (*Euphagus carolinus*) yearly abundance. Results suggest ongoing decline in Rusty Blackbird numbers and large fluctuations in yearly fall abundance at the OOT (54-2156 individuals). Peak movements were recorded at five-year intervals: in 1997 (2156 individuals; 63.4/day), 2002 (1860; 80.9/day) and 2007 (1299; 31.7/day). Of the 90 birds banded in 2007, 76 (84.4 %) were young of the year suggesting that years with high numbers of Rusty Blackbirds in the fall at Tadoussac may indicate years with high reproductive success There was a strong positive correlation between the wintertime North Atlantic Oscillation (NAO) index and the number of Rusty Blackbirds recorded at Tadoussac in the fall ($R^2 = 0.26$, n = 12) but a stronger negative one with the NAO index of the preceding year ($R^2 = -0.74$, n = 12). Such cyclical reproductive success in the boreal forest could explain why Rusty Blackbirds are more vulnerable to blackbird control programs than other blackbirds, whose reproductive success may not vary as much; thus the urgency for an in-depth look at blackbird control programs, and perhaps, at winter habitat modifications as the main causes of past and ongoing Rusty Blackbird decline.

WHY ARE AMERICAN KESTREL (FALCO SPARVERIUS) POPULATIONS DECLINING IN NORTH AMERICA? EVIDENCE FROM NEST BOX PROGRAMS.

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Statesboro GA 30460. Kenneth Boyd, Natural Resources, Fort Gordon, GA 30905. Russell D. Dawson, Ecosystem Science and Management, Univ. of Northern British Columbia, Prince George, BC V2N 4Z9, and Gary R. Bortolotti, Department of Biology, Univ. of Saskatchewan, Saskatoon, SK S7N 5E2.
Declines in American Kestrel (*Falco sparverius*) populations are widely reported, and Breeding Bird Survey (BBS) data suggest that the North American population declined significantly from 1966 to 2006. Potential factors include the spread of West Nile Virus (WNV), increases in populations of Cooper's Hawks (*Accipiter cooperii*), and loss of suitable habitat. We examined trends in the numbers of nest box-breeding kestrels in nine study areas in Florida, Georgia, Virginia/Maryland, New Jersey, Massachusetts, Pennsylvania, Saskatchewan, and the Yukon Territory, 1984 to 2007. Occupancy rates initially increased in all nine locations, as expected for nest site-limited populations, then markedly declined. Except for the most recent location, established in 1995 and declining since 2002, all locations began to experience declines before WNV arrived in North America in 1999. Therefore, while WNV may contribute to the decline, it is not the primary cause. To test whether changes in kestrel population densities generally are associated with the opposite trend in Cooper's Hawks, we examined the 40 BBS regions for which trends for both species were available. From 1966 to 2005, kestrels decreased in 25 regions while Cooper's Hawks increased in 32. However, the correlation between the two population trends was significantly positive, not negative. Christmas Bird Count data also showed positive, although nonsignificant, correlations. Finally, the habitat within our study areas still appears suitable, and the remaining kestrels appear healthy and have high reproductive success. Thus, the principle cause of the decline probably lies elsewhere, perhaps on the wintering grounds or along migration routes.

[A]MIGRATION AND STOPOVER ECOLOGY OF THE TENNESSEE WARBLER AT AN INLAND STOPOVER SITE NEAR KALAMAZOO, MICHIGAN.

Amanda B. **Stockwell*** and Ryanne Sullivan, Canisius College, Buffalo, NY 14208; Richard Keith and Brenda Keith, Kalamazoo Nature Center, Kalamazoo, MI 49009; and Sara R. Morris, Canisius College, Buffalo, NY 14208.
Stopover sites are used by migrating passerines to provide increased fat stores and a place to rest. In this study, we characterized the stopover ecology of the Tennessee Warbler (*Vermivora peregrina*) at an inland stopover site. We also analyzed the age-related differences among the warblers. Additionally, the mass and recapture rates of birds that were molting to those that were not molting were compared. We found that 95% of the captured birds were hatch-year birds. Overall, 8.0% of captured Tennessee Warblers were recaptured, and this rate was similar for both adults and young birds. Average length of stopover at this site was 5.7 ± 5.2 days. Adults had longer stopovers than young birds at this site, but this difference was insignificant. On average, recaptured warblers significantly increased mass. Both young and adult warblers gained mass between capture and recapture, but these differences were not significant. Regression models confirm mass gain by migrants. Similarly, these regressions estimated mass gain by both young and adult Tennessee Warblers. We found that the mass of birds undergoing flight feather molt did not significantly differ from that of birds not in molt. Migrants that were molting were more likely to be recaptured than migrants that were not molting, but this difference was not significant. The regular use by and observed increases in mass by Tennessee Warblers suggests that this site is suitable for stopover during fall migration.

[A]EFFECTS OF SITE PREPARATION ON BREEDING BIRDS IN EARLY SUCCESSIONAL LOUISIANA PINE PLANTATIONS

Antoinette **Taylor***; Philip C Stouffer; and Michael J. Chamberlain, School of Renewable Natural Resources, Louisiana State University, Baton Rouge, LA, 70803.
Changes to harvesting and planting protocols in pine plantations could have beneficial conservation implications for breeding early-successional birds, while also increasing efficiency of harvest and timber production. Leaving logging debris scattered in rows (rowed) keeps more ground level refugia for birds, and is easier than piling it. Wider row spacing reduces the need for thinning, but may decrease available vegetation. We examined the effects of row spacing and debris distribution on breeding bird abundance in the first two years after planting. We sampled bird abundance using point counts in four sites around Louisiana, each with two levels of row spacing and two levels of debris treatment. Vegetation composition and structure data were gathered from five points on each plot during both growing seasons. Species richness ranged from 6 to 25 species per plot. Indigo Bunting and Blue Grosbeak were the most commonly detected species on all treatments. We found significantly higher bird abundance in plots with rowed debris, regardless of row spacing. The same was true for species of special concern, which included Bachman,s Sparrow, Northern Bobwhite and Prairie Warbler. Higher percentages of grass and forbs, with less bare ground and vines, was positively correlated with bird abundance.

[A]TIDAL MARSH BREEDING BIRDS AS BIO-INDICATORS OF MERCURY CONTAMINATION ALONG THE DELAWARE BAY.

Sarah E. **Warner***, W. Gregory Shriver, and Marnie A. Pepper. Department of Entomology and Wildlife Ecology, University of Delaware, Newark, DE 19717.

It is well documented that avian species are good indicators of Mercury (Hg) contamination in piscivorous food webs. Presently, investigation of Hg contamination in tidal marsh ecosystems is limited. We investigated the potential of two species of tidal marsh breeding birds, Seaside (*Ammodramus maritimus*) and Saltmarsh Sharp-tailed (*Ammodramus caudacutus*) sparrows, to act as Hg bio-indicators among five drainages in Delaware. We sampled sparrow blood in July (2006 and 2007). Sample sizes per drainage ranged from 18 - 28 Seaside Sparrows and 3 -12 Saltmarsh Sharp-tailed Sparrows. We did not detect a difference in blood Hg levels between species ($F = 0.273$, df = 1, $P = 0.602$). Mercury levels were not significantly different among drainages for *A. caudacutus*, most likely due to small sample sizes. However, *A. maritimus* species had 1.6 - 1.8 times greater blood Hg in the two drainages (mean = 0.58 ppm ± SE 0.08) most distant from the Delaware Bay shoreline, compared to the other three (mean = 0.39 ppm ± SE 0.09) that were located in close proximity to the shore ($F = 4.465$, df = 4, $P = 0.002$). In these two more distant drainages, two *A. maritimus* individuals had acute Hg levels reaching 2.1 ppm. This pattern suggests that marshes distant from the Delaware Bay may experience elevated Hg methylation due to limited tidal flushing and that sparrows may be good indicators of Hg contamination in these marshes. This research, to our knowledge, is the first to document Hg contamination in *A. maritimus* and is novel for salt marshes in Delaware Bay.

[A]HOME RANGE SIZE AND HABITAT USE OF TWO SONGBIRD SPECIES IN FOREST STANDS TREATED WITH PRESCRIBED FIRE AND THINNING.

Jill **Wick** and Yong Wang, Department of Natural Resources and Environmental Science, Alabama A&M University, Normal, AL 35762.

Forest management schemes alter bird habitat and may result in differing habitat quality. We evaluated how forest management affects the territory size and habitat use of Hooded Warblers (*Wilsonia citrina*) and Worm-eating Warblers (*Helmitheros vermivorus*) on six treated sites in the William B. Bankhead National Forest, Alabama. The study design is randomized complete block with a factorial arrangement of three thinning levels (no thin, 11 m^2 ha^{-1} residual basal area [BA], and 17 m^2 ha^{-1} residual BA) and two burn treatments (burn and no burn). Data was collected on three replicates. Use of treated and adjacent areas and territory size was determined via territory mapping using radio telemetry and burst sampling methods. Bird activity was recorded to evaluate potential differences in habitat preference during different activities. All nests that were found were monitored and nest success was determined for each plot. We used habitat variables collected within and outside territories to determine habitat preferences. Our results suggest that birds on the treatment plots relied on areas left untreated in the stand or uncut areas adjacent to cut stands. Home ranges of both species were relatively large. Habitat within home range had a greater slope, canopy cover, number of trees, basal area, and tree species richness than unused areas. On average, less than half of the home ranges were located within treatments. Habitat the birds are choosing likely has greater food resources than treated areas.

[A]FORAGING ECOLOGY OF PILEATED WOODPECKERS IN DUKE'S EXPERIMENTAL FOREST IN THE UPPER PENINSULA OF MICHIGAN.

Michael **Wierda*** Department of Forestry and Natural Resources, Clemson University, Clemson, SC 29678 and Jacqueline Bird, Alen Rebertus, and Alec Linsay, Biological Sciences Department, Northern Michigan University, Marquette, MI 49855.

To examine factors associated with Pileated Woodpecker selection of foraged trees, a multiple spatial scale study was conducted. Pileated Woodpecker foraging has been extensively studied, but most studies were conducted in large homogeneous, contiguous tracts of a single assemblage type. These studies reported foraging preferences for stand type, tree type, and tree species; specifically, conifers in the western and deciduous in the eastern ranges. However, it was unclear if this selection resulted from availability because studied areas were dominated by preferred tree types and species or habitat data was not reported. The availability of suitable coniferous and deciduous assemblages in the upper peninsula of Michigan provided an opportunity to examine foraged tree selection with both habitat types present. Foraged trees were surveyed by systematic searches of established plots and available trees were surveyed in habitat plots with in the previously mentioned established plots. Foraged trees were associated with a suite of characteristics. Foraged trees were declining to moderately decayed (d.f. = 4, χ^2 = 10.29 and 297.38, respectively, $P \leq 0.05$), injured and had conks more than expected (d.f. = 4, χ^2 = 360.05 and 644.08, respectively, $P \leq 0.05$). Coarse examination of the data suggested that deciduous trees in general and aspens

and yellow birch in particular were preferred. Further examination suggested that these trees were selected based on their characteristics alone, and not on stand type, tree type, or tree species.

[A]CHANGES IN IMMUNOCOMPETENCE OF THE GRAY CATBIRD DURING AN EXPERIMENTAL WEST NILE VIRUS INFECTION.

Amanda Jo **Williams*** , Jennifer C. Owen, and Frank R. Moore, Department of Biological Sciences, University of Southern Mississippi, Hattiesburg, MS 39406 and Mary Garvin, Department of Biology, Oberlin College, Oberlin, OH 44074.

Bacterial and fungal infections are attacked primarily by the innate immune system, while the energetically more expensive acquired immune system is principally responsible for virus killing. The up regulation of the acquired immune system of birds infected with a viral pathogen may cause an energetic trade-off resulting in a reduction in innate immune capabilities. To test this, we experimentally infected 11 hatching-year male Gray Catbirds (*Dumetella carolinensis*) with West Nile virus and measured the activity of the immune system before, during, and after infection. Eight uninfected conspecifics were used as controls for seasonal and stress-related variation in immunocompetence. Innate immunity was quantified using a microbicidal assay, a technique that correlates immunocompetence with the ability of a bird's blood to kill a panel of microbes (*Staphylococcus aureus*, *Candida albicans*,/and two strains of *Escherichia coli*). Acquired immunity was measured as the virus clearance rate for each bird. Infected birds are expected to have lower bacterial and fungal-killing rates than uninfected birds due to a shift in resources away from innate immunity in the West Nile-challenged birds. We found no change in the microbial-killing ability of the innate immune system of infected birds, suggesting that either (i) resources were not sufficiently limited to cause suppression of the innate immune response or (ii) down regulation of the innate branch did not alter the birds' ability to mount an adequate immune response.

[A]TERRITORY FIDELITY AND AGE STRUCTURE IN A TROPICAL UNDERSTORY BIRD, CHESTNUT-BACKED ANTBIRD (*MYRMECIZA EXSUL*)

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Territory fidelity of Chestnut-backed Antbirds was studied on a 300-ha plot within old-growth forest from 2005-2008 at the La Selva Biological Station in northern Costa Rica. Preliminary data indicate that territory fidelity is high in this species. The proportion of individuals recaptured or resighted from one year to the next was 0.78 and 0.65 in the intervals 2005-2006 (N = 27) and 2006-2007 (N = 52), respectively, and these figures also provide a minimum estimate of annual survival for the population. Although ample opportunities for detecting territory-switching existed, territory-switching was rare, occurring only twice during 2005-2007. Both cases involved individual birds moving < 100 m into an adjacent territory. Age structure of the population was similar in 2006 and 2007 (~90% adults), but differed in 2005, when adults comprised only 36% of all birds captured. Simple recapture/resight rates were higher for males than females, but within-sex recapture/resight rates were similar for birds first banded as adults and juveniles. Unpaired males responding aggressively to playback were less likely to be resighted or recaptured the following year, suggesting they are best considered floaters. Whether there are floater females in this population remains unknown. Preliminary results from 2008, and implications for natal and breeding dispersal mechanisms in this species will be discussed.

ABSTRACTS – POSTER PRESENTATIONS

Arranged by first author's last name

[A]REPRODUCTIVE ECOLOGY OF THE EURASIAN TREE SPARROW IN TWO SUBURBAN ENVIRONMENTS IN ST LOUIS.

Lyndell M. **Bade***[1], Colleen Crank[2], Kathleen Beilsmith[3], and Patricia G. Parker[1]; [1]Department of Biology & Whitney R. Harris World Ecology Center, University of Missouri-St Louis. 1 University Blvd, St Louis MO 63121, [2]Missouri Botanical Garden & Litzsinger Road Ecology Center. 9711 Litzsinger Road, Ladue MO 63124, [3]Parkway North High School. 12860 Fee Fee Road, St Louis MO 63146.

Eurasian tree sparrows, *Passer montanus*, were introduced to North America in 1870 in St Louis, Missouri. Currently their range is limited to St Louis and surrounding areas in Missouri and Illinois. We studied this species, which is ecologically similar to the wide-spread and abundant house sparrow, in the only area where the two species co-exist in the Americas. We documented the reproductive ecology of the Eurasian tree sparrow at two sites, one developed and one undeveloped. In a preliminary study utilizing citizen scientists and high school students, we measured nest building, clutch initiation date, clutch size, predation, and abandonment. We banded, weighed, and collected blood samples from adults and nestlings. At both sites, the size of first clutch, measured as number of eggs laid, was significantly larger than all subsequent clutches. Initiation dates of first clutch at the undeveloped site were significantly earlier compared to the developed site. Predation rates were higher at the undeveloped site (39%) than at the developed site (22%), but the difference was not significant. This study contributes to our understanding of the possible ecological limitations of this species. Future studies will examine additional aspects of the reproductive ecology of Eurasian tree sparrows and will provide a basis for comparisons with the invasive house sparrow. (Funded by NSF GK-12 Program.)

OKLAHOMA MARSHBIRD MONITORING PROJECT.

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Rails and bitterns are secretive in nature and habitat specific, so they are missed frequently during Breeding Bird Surveys and state wide atlas projects. For these reasons Oklahoma is not recognized as an important breeding area for most secretive marshbird species. During the springs of 2006 and 2007, we conducted extensive surveys for marshbirds in western and central Oklahoma. Transects of varying length with broadcast calling points placed every 200m along those routes were set-up, and surveys were conducted twice. Even with an extremely rainy season where most locations were too flooded for proper surveys, a handful of novel discoveries were made, including a small population of the Black Rail and active nests of the American Bittern and Virginia Rail, species with only a few known breeding records in the past century. Additional surveys in 2008 and 2009 may lead to further such discoveries.

[A]AN EXAMINATION OF THE ROLE OF WEIGHT, PLUMAGE COLOR, CERE COLOR AND TOTAL AREA OF UV REFLECTANT PLUMAGE ON MATE SELECTION IN BUDGERIGARS (*Melopsitticus undulates*)

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The purpose of this study was to determine the influence of four physical traits (weight, plumage color, cere color and area of UV reflectant plumage) on the mate selection process in Budgerigars (*Melopsitticus undulates*). Seven male and six female Budgerigars of various plumage colors and UV patch sizes were studied. The birds were housed in an aviary and provided with nest boxes when they reached sexual maturity. Periodic observations were made through a one way window over the course of 4 months and the birds' social interactions were recorded. The results showed that weight was not a reliable indicator for determining a bird's ability to attract a mate. Plumage color, on the other hand, may have been a factor contributing to mate selection, as most birds paired with a mate of similar coloration. The female's cere color may be associated with mate selection as well, but the color of the male's cere seems irrelevant. Two of the first pairs to form and produce eggs involved males with large UV patch sizes. There were, however, two other pairs of blue and white birds that mated quickly and produced eggs. Additionally, the male with the largest UV patch size was the only male not to bond with a female. This suggests that UV patch size alone is not a reliable indicator of the bird's ability to attract a mate and that it is likely that there are other signals being utilized. Additional studies will need to be conducted using larger sample sizes to determine the extent to which each of the four factors examined have on the mate selection process.

THE TERN AND PLOVER CONSERVATION PARTNERSHIP: A MODEL FOR INTERIOR LEAST TERN AND PIPING PLOVER CONSERVATION

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The Tern and Plover Conservation Partnership (TPCP) combines research and mediation to protect endangered Interior Least Terns (*Sternula antillarum athalassos*) and threatened Piping Plovers (*Charadrius melodus*) in Nebraska. In addition to their state and federal Endangered Species Act status, both terns and plovers are considered Tier 1 At-Risk species by the Nebraska Natural Legacy Project. Formerly, these birds nested on midstream sandbars in braided prairie rivers. As a result of changes to the water flow, bed and bank structure, and hydrograph of these rivers, fewer of these dry, unvegetated sandbars are being created and maintained. Consequently, the terns and plovers are looking elsewhere for suitable nesting habitat. In Nebraska, this includes human-created habitat such as sand and gravel mines, lakeshore housing developments, and dredge spoil piles. Nesting in human-created habitats puts these two legally protected species in conflict with industry and property owners. The TPCP works to mediate these conflicts. Here we report on our attractant-deterrent methods used to direct the birds' nest site selection. We also report results from our ongoing study of the birds' nesting success at human-created habitats.

MOVEMENTS, HABITAT SELECTION, AND STOPOVER DURATION OF MIGRANT SONGBIRDS IN THE WESTERN LAKE ERIE BASIN OF OHIO.

Ashley A. **Buchanan** and Paul G. Rodewald*, School of Environment and Natural Resources, Terrestrial Wildlife Ecology Lab, The Ohio State University, Columbus, OH 43210-1085.

Migration is a critical period for landbirds, yet few studies have investigated movements and habitat selection during stopover. We used radio-telemetry to quantify migrant movements within and among habitat patches in an agriculturally dominated landscape within 5 km of Lake Erie in Ohio. From 20 April to 1 June, we continuously tracked 18 Red-eyed Vireos (*Vireo olivaceus*; REVI) and 20 Yellow-rumped Warblers (*Dendroica coronata*; YRWA) in 2006, and 15 REVI and 18 YRWA in 2007. We measured local and landscape level habitat characteristics to determine their association with stopover behavior. Movements were highly variable; some individuals remained very local and many moved widely [single-day max=10 km (YRWA) and 4.4 km (REVI)]. For YRWA, mean (±SD) total distance traveled the first 3 days was 5.1 km (±3.4; n=18) in 2006 and 7.6 km (±2.1; n=15) in 2007. Mean (±SD) total distance traveled for REVI the first day was 1.1 km (±0.89; n=18) in 2006 and 0.8 km (±0.69; n=12) in 2007. Mean minimum stopover duration was longer than expected for YRWA in 2006 (7.0 days±3.61 SD; range 1-13 days; n=17) and 2007 (4.8 days±2.68 SD; range 2-10 days; n=15). REVI were late migrants (mostly after 18 May) and stopover duration was brief (1.6 days±0.98 SD; range 1-4 days; n=18) in 2006 and 2007 (1.7 days±1.57 SD; range 1-6 days; n=10). Using an information theoretic approach, we detected a negative relationship between energetic condition at capture and stopover duration for YRWA. Our results should be valuable for stopover habitat restoration and management.

[A]RESPONSES OF FLOCKS OF TUFTED TITMICE TO DIFFERENT-SIZED RAPTORS.

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For small songbirds, large raptors, such as Red-tailed Hawks (*Buteo jamaicensis*) and Great Horned Owls (*Bubo virginianus*), represent less of a threat than smaller raptors, such as Sharp-shinned Hawks (*Accipiter striatus*), Cooper's Hawks (*A. cooperii*), and Eastern Screech-Owls (*Megascops asio*). As such, responses to the presence of different-sized raptors might be expected to vary relative to the degree of threat. During January and February 2008, free-ranging flocks (N = 8) of Tufted Titmice (*Baeolophus bicolor*) in Madison County, Kentucky, were presented with several species of raptors that varied in size and their responses were monitored. In response to smaller, higher-threat predators, titmice tended to utter more alarm calls and alarm calls consisting of a greater number of notes than when presented with larger, lower-threat predators. Titmice also tended to move closer to the smaller raptors than the larger raptors. These results indicate that Tufted Titmice perceive differences in the level of threat posed by different raptors. In addition, because their duration (number of notes) varied relative to level of threat, the alarm calls of Tufted Titmice may serve as a graded signal that both informs conspecifics that a potential predator is nearby and, in addition, the degree of threat posed by that predator.

WHITE-THROATED SPARROWS USE POLARIZATION CUES ON THE HORIZON TO CALIBRATE THEIR MAGNETIC COMPASS AT SUNRISE AND SUNSET.

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Migratory Savannah Sparrows (*Passerculus sandwichensis*) have been shown to use polarized light cues at sunrise and sunset to recalibrate their magnetic compass at high latitudes during autumn migration (Muheim *et al.* 2006). We studied the interaction of magnetic cues and celestial information at sunrise and sunset in the compass orientation of White-throated Sparrows (*Zonotrichia albicollis*) at a stopover site on the south shore of Lake Ontario. Birds were captured at the Braddock Bay Bird Observatory during autumn and spring migration and tested for orientation both before and after exposure to either a 90°-shifted polarization pattern on the horizon or a 90°-shifted magnetic field. During exposure, the birds had access to both magnetic and celestial stimuli, and experienced a conflict in the compass direction indicated by these two cues. During testing, assessed in orientation funnels covered by a white Plexiglas, the birds could only use their magnetic compass. Sparrows recalibrated their magnetic compass using the pattern of polarization both at sunrise and sunset during both spring and fall; both a shift of the polarized light pattern and a shift of the magnetic field led to a recalibration of the magnetic compass. Consistent with other funnel studies (Muheim *et al*. 2006) and experiments with free-flying migrants (Cochran *et al.* 2004), our results confirm the significance of celestial cues near the horizon in the passerine orientation system.

[A]DNA SEQUENCE-BASED IDENTIFICATION OF ROOTLETS USED IN GRAY CATBIRD (*DUMETELLA CAROLINENSIS*) NEST LININGS
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Blood-feeding arthropods are known to affect health of nestling birds and, therefore, exert an important selective pressure. The use of active plant material in the nest is reported among some passerine species as a means of controlling blood-feeding arthropod infestations. Many species of birds, including the Gray Catbird (*Dumetella carolinensis*) construct nest cups with rootlets. Roots are known to give off volatile chemicals, particularly as defense compounds, that may deter blood-feeding arthropods. Identification of catbird nest cup materials is the first step in evaluating the presence of such volatile compounds. Unfortunately, the lack of distinguishing morphological characters associated with rootlets and their small size makes visual identification impossible. Identification of rootlet DNA via PCR is challenging because toughness of root material makes tissue disruption difficult and numerous compounds present in root tissue interfere with DNA amplification. To address these issues, we have refined a protocol for nucleotide sequence-based identification of rootlet material by improving the PCR pre-processing steps, including improved tissue homogenizing and the addition of bovine serum albumin to the amplification reaction mixture.

[A]SEASONAL USE OF DYNAMIC LAKE HURON COASTAL HABITATS BY MIGRATING SHOREBIRDS.
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Most shorebirds traverse long distances that require migrants to utilize stopover sites during passage. With near–low historical water levels, Great Lakes coastal habitats presently appear to provide migratory shorebirds with novel, alternate stopover locations. However, shorebirds' seasonal passage through the Great Lakes has received little study. Using the International Shorebird Survey protocol, systematic surveys at three sites along Lake Huron's Saginaw Bay were undertaken during spring and fall migration, 2007 to assess species richness, abundance, chronology, and habitat use of migrating shorebirds. Sites combined, 15 species totaling 973 individuals were observed during spring surveys, while 21 species totaling 2,881 individuals were seen during fall. Data indicate that peak passage in spring occurs near 25 May, while peak fall abundance occurred on 5 and 15 August and 7 September. Habitat use varied seasonally and by site, but migrants tended to use mud/water film (1-2 cm) and shallow water (2-7 cm) habitats preferentially. Unlike spring, the protracted fall migration of shorebirds extended until mid-November, consisting largely of hatching year birds. It appears that during low water episodes of the Great Lakes, coastal habitats may provide stopover opportunities for first-year birds that would not ordinarily be available.

[A]PASSERINE MIGRATORY MOVEMENTS ALOFT IN THE SOUTHWESTERN UNITED STATES
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Populations of nearctic-neotropical Passerines bi-annually travel thousands of kilometers between breeding and overwintering ranges, and research on these birds has described intrinsic mechanisms that aid successful migration.

Knowledge of their behaviors aloft should contribute further understanding of how they mitigate effects of what is likely the most strenuous part their annual cycles. In western North America, what little we know about landbird migrants' en route biology is derived from local-scale work on the ground at a few riparian zone stopover sites in Arizona and New Mexico. Their broad-scale behaviors aloft in this region remain more poorly understood. Using data collected by weather surveillance radars in the American Southwest in spring and fall 2005 and spring 2006, we identified targets likely dominated by nocturnally migrating Passerines and determined their flight altitudes, flight speeds, and directions over ground. Although we used conservative criteria to identify landbird migrant targets, migrating or foraging bats are likely present across the region in some of our data. We found migrants in both springs flew at significantly lower altitudes and significantly higher speeds than in fall. In all seasons migrants maintained seasonally appropriate directions over ground. We detected significant differences that varied both geographically within seasons and seasonally within sites in migrants' flight altitudes, speeds, and directions. Our description of Passerines' flight behaviors includes a faster spring transit in this region, possibly indicating selection pressures favoring early arrival on breeding grounds.

[A]MAKING THE CONNECTION BETWEEN SHOREBIRDS AND OFF-ROAD VEHICLES.
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Rapid declines in shorebirds populations have sparked a flurry of research aimed at improving conservation efforts. However, there are still large gaps in knowledge concerning the causes of shorebird declines. One factor that has been consistently highlighted as a key cause of decline is human disturbance. Recreational activities in particular, pose a large threat to shorebirds. Yet, the growing popularity of recreational activities continues to augment shorebird disturbance. A thorough understanding of the relationship between recreational activities and shorebird decline is necessary if effective conservation efforts are to be achieved. This project aims to improve understanding of human disturbance and its effect on shorebirds by examining the relationship between off-road vehicles and migrating shorebirds. The purpose of the study is to determine if there is a correlation between off-road vehicle use and shorebird abundance. Field work will be conducted on a barrier island in Maryland that is managed by the U.S. National Parks Service, with results scheduled to be published in a thesis report in April 2009. The findings from this study will help inform current efforts to conserve shorebirds and the coastal ecosystems they depend on. The study will also yield information on the ecology of coastal ecosystems, specifically concerning the quality of shorebird feeding habitat in areas experiencing high levels of tourism activity. This information, combined with data collected on off-road vehicles, will be incorporated into future park management plans in order to minimize disturbance to migrating shorebirds.

FEEDING PREFERENCE OF *CULEX PIPIENS* BETWEEN TWO POTENTIAL WEST NILE VIRUS RESERVOIR HOST SPECIES
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West Nile virus is maintained in nature in two distinct cycles: an enzootic cycle involving transmission by mosquitoes among bird reservoir hosts, and an epizootic cycle involving transmission between birds and mammals. The enzootic cycle is maintained by species of mosquitoes that feed primarily on birds, while the epizootic portion involves transmission of virus from birds to mammals by mosquitoes that feed on both. The degree to which a reservoir host species is involved in the cycle depends on many aspects of the ecology and physiology of both the vector and host species. One important component of this interaction is the feeding preferences of the mosquito vector. We studied the feeding preference of *Culex pipiens*, an important enzootic vector species in eastern North America, between the Gray Catbird (*Dumetella carolinensis*) and the House Sparrow (*Passer domesticus*), two potential reservoir host species. Mosquitoes were released into the bottom of a Y-maze and allowed to choose between a catbird or house sparrow confined in the end of each arm. Although field studies and transmission models provide strong support for House Sparrow as the more important reservoir host species, we found that mosquitoes consistently preferred the Gray Catbird. Because host-seeking mosquitoes use carbon dioxide and heat, among other cues, to locate birds, this preference might be expected solely as a result of body mass differences between experimental hosts.

[A]AVIAN RESPONSE TO OLD WORLD BLUESTEM *BOTHRIOCHLOA ISCHAEMUM* MONOCULTURES IN MIXED GRASS PRAIRIE.
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Despite persistent and widespread declines of grassland birds in North America, few studies have assessed differences between native grasslands and seeded monocultures as songbird habitat. In the Great Plains, many fields enrolled in the Conservation Reserve Program have been seeded to Old World Bluestems (OWB), but there is evidence to suggest that OWB may not provide suitable conditions for several grassland bird species. Our objectives were to compare breeding bird communities in OWB monocultures to native mixed grass prairie and evaluate the influence of vegetation structure and composition on bird abundance and diversity in all seasons. In addition, we quantified food availability by comparing arthropod community composition and biomass between the two habitat types. In 2007, we established 6 native mixed grass prairie and OWB fields in Garfield, Grant, and Alfalfa counties, Oklahoma. We used distance sampling to survey birds in each site throughout the 2007 breeding season, and will continue sampling approximately monthly through July 2008. Mean species richness was similar among the two field types. However, native fields had higher overall richness and more unique species. Grasshopper sparrow densities were significantly higher in OWB monocultures. A multiple regression analysis with stepwise selection showed a significant negative relationship between vertical obstruction and grasshopper sparrow abundance.

AUTOMATIC DETECTION OF RECORDED NOCTURNAL FLIGHT CALLS: A COMPARISON OF METHODS

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Nocturnal recordings of songbird flight calls are increasingly used in attempts to monitor avian migration. Since the associated analysis techniques rely heavily upon automated computer scans of the audio files, it is important to quantitatively establish how effective these scans actually are at locating suspected flight calls. Five different observers manually logged flight calls from one hundred randomly chosen fifteen minute audio segments recorded during Fall 2007 at three locations in western Pennsylvania. We examined variation among observers and how the quality of the recording and the time of night affected the agreement between observers. Individual observers found between 52 and 94% of total logged flight calls. Most observer error occurred during twilight samples. This was due to greater frequency of calling at this time and erroneous attribution of resident terrestrial vocalizing birds. We also utilized two software packages commonly used to locate flight calls from audio recordings: Tseep-x and XBAT. Within XBAT, we adjusted several search parameters to determine the optimum settings for detecting flight calls including Signal to Noise Ratio, Frequency, and Bandwidth. Our results indicate that it is possible to drastically improve call detection by manipulating the search parameters. Our tests showed that automatic detectors can successfully locate at least 75% of unique manually logged calls, while tseep-x located only 22.5%. However, detectors which locate higher percentages of flight calls also generate more false positives. The trade-off of increasing false positives with settings that increase detection success requires enhanced detection protocols. We conclude with possible recommendations for improved automatic detection of nocturnal flight calls.

BREEDING BIRDS AND NEST PRODUCTIVITY AT GREEN WING ENVIRONMENTAL LABORATORY, NORTHCENTRAL, ILLINOIS.

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Green Wing Environmental Laboratory (GWEL) is a 170 ha biological field station in northcentral Illinois that is composed of small woodlots, edge habitat, and wetlands, and is found in a landscape dominated by agriculture and fragmented ecosystems. Birds breeding in small habitat patches at this site may experience low reproductive success due to high predation and parasitism at nests. We conducted three studies in 2005-2007 aimed at assessing the breeding birds of GWEL. Study 1 assigned breeding status using the methodology of the Breeding Bird Atlas. We observed 124 species, 97 of which showed evidence of breeding: 66 confirmed, 14 probable, and 17 possible. In Study 2, we estimated abundance of summer birds and found that the Red-winged Blackbird (*Agelaius phoeniceus*), Song Sparrow (*Melospiza melodia*), and Gray Catbird (*Dumetella carolinensis*) were present in the highest numbers. In Study 3, an analysis of nest productivity, daily nest survival (DNS) was high and we found no evidence of Brown-headed Cowbird (*Molothrus ater*) parasitism for two species, Red-winged Blackbird (DNS = 0.92±0.016) and Gray Catbird (DNS = 0.96±0.01), reported to reproduce in edge habitat. These studies suggest that edge species are common at GWEL and experience high reproductive success. Future work should examine nest productivity of confirmed breeders characterized as forest nesting, e.g., Wood Thrush (*Hylocichla mustelina*) and Ovenbird (*Seiurus aurocapilla*), and species of conservation concern, e.g., Field Sparrow (*Spizella pusilla*).

[A]RESEARCH ON THE HALF SHELL: DIET COMPOSITION OF AMERICAN OYSTERCATCHERS DURING THE NON-BREEDING SEASON.

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The diet composition of American Oystercatchers (*Haematopus palliatus*) varies throughout their range. The largest concentration of oystercatchers on the Atlantic coast of the United States during the non-breeding season occurs in the Cape Romain Region of South Carolina. Oystercatcher foraging ecology previously had not been studied in South Carolina. We quantified the diet composition of oystercatchers in three bays in the Cape Romain Region during the 2006 and 2007 non-breeding seasons. Diet composition was similar among all bays and both years. Eastern oysters (*Crassostrea virginica*) comprised at least 85% of the items consumed. Other types of prey items consumed included ribbed mussels (*Geukensia demissa*), hard clams (*Mercenaria mercnaria*), and banded tulip snails (*Fasciolaria tulipa*). Although oysters made up the majority of the diet during both tidal stages, oystercatchers consumed mussels at a higher rate during rising tides than during falling tides.

[A]A EASTERN PHOEBES USE DIFFERENT STRATEGIES TO PROVISION YOUNG.

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How sex, brood size, brood age, and individual quality contribute to variations in parental provisioning behavior remain unclear and require additional studies. Our objective was to compare the provisioning rates of male and female Eastern Phoebes and determine the possible effects of brood size and age on provisioning. Eastern Phoebes are double-brooded species that readily nest in human-made structures. We monitored (n = 16) and video-taped nests for 2 – 4 hr almost daily. For each visit, we noted the sex of the visiting adult, prey type, prey size, and number of young fed. Using repeated measures ANOVA, we found no significant difference between ($P = 0.22$) mean number of feeding visits for males (1.4 ± 0.4) and females (3.3 ± 0.1) in the mean number of visits per nestling per hour. Provisioning rates did not differ with either nestling age ($P = 0.9$) or brood size ($P = 0.74$). In contrast, mean prey size was significantly larger for larger broods ($P = 0.04$), and interactions between pair and sex were significant ($P < 0.001$), indicating that within pairs male and female provisioning rates differ. Our results are not consistent with other phoebe provisioning behavior studies in that we found no significant difference in different pairs, suggesting different strategies of provisioning behavior. Other studies have indicated that factors such as extra-pair copulations and individual quality influence provisioning. Further studies are necessary to determine what influences these different strategies of provisioning behavior.

[A]SEASONAL DIFFERENCES IN ENERGETIC CONDITION OF BLACKPOLL WARBLERS ON APPLEDORE ISLAND.

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Migrating passerines require tremendous amounts of energy to complete their migration. Many passerines deposit substantial fat stores in preparation for migratory flights, especially prior to crossing major ecological barriers. Blackpoll Warblers are known to make extensive over-water flights during the fall when migrating from New England to South America. During spring, Blackpoll Warblers in New England have already completed more than half of their migration and do not face as large of an ecological barrier en route to their breeding grounds. Our goal was to determine if the condition of Blackpoll Warblers captured on Appledore Island, Maine during spring migration differed from that of birds captured during fall migration. We compared fat scores, masses, and condition indices of Blackpoll Warblers captured during both seasons from 1990 to 2007. Generally, migrants captured during the spring were in better condition of those captured during the fall. During the spring most birds had substantial fat scores (88.9% had a fat score ≥ 1), while during the fall fewer individuals had similar fat scores (29.8% had a fat score ≥ 1). Likewise, average mass and average condition index was higher during spring than fall. Additionally, our data shows that both males and females had a higher mass and condition index during spring than fall. Our results were unexpected; and may indicate that these migrants do not use all their acquired fat stores during spring flights, and these remaining energy stores may provide additional energy for reproduction.

[A]ECTOPARASITES AFFECT BIRD CONDITION IN NEOTROPICAL FOREST FRAGMENTS.

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Forest fragmentation affects bird populations through isolation and decreased area, which result in local extinctions and altered community structure. Birds occupying small fragments can have lower body condition than conspecifics in larger fragments. Causes of reduced condition are unclear, but may include effects of parasites. We studied the effects of ectoparasitic lice and feather mites on six understory bird species in terra firme rainforest fragments near Manaus, Brazil. We collected a rectrix feather from mist-netted birds to induce feather regrowth, which was collected upon recapture and used as a proxy for body condition. We also used pyrethrin powder to remove ectoparasites from half of the birds captured and predicted that feather growth rates would increase in the ectoparasite-removed group. Instead, we found that feather growth rates were higher only for ectoparasite-removed birds occupying fragment interiors in three of our six study species (*Gymnopithys rufigula, Percnostola rufifrons,* and *Xiphorhynchus pardalotus*). Thus, removing ectoparasites increased host body condition, but interacted with higher ectoparasite transmission rates in small fragments and along edges. Habitat use and ectoparasite-removal did not affect induced feather growth rates of *Glyphorynchus spirurus*, possibly because it is not sensitive to fragmentation and is often infested with subcutaneous mites not effectively removed with pyrethrin powder. Fragment-interior captures of *Pithys albifrons* had higher feather growth rates compared to birds captured along fragment edges and in small fragments, but there was no effect of removing ectoparasites. Ectoparasite-removed *Pipra pipra* had lower induced feather growth rates than the control group. Lice were rarely encountered on this species, but feather mites were common, supporting other research that feather mites actually improve host body condition.

[A]HETEROPHIL TO LYMPHOCYTE RATIOS AS INDICATORS OF STRESS IN BUDGERIGARS (*MELOPSITTACUS UNDULATES*) UNDER DIFFERENT HOUSING ARRANGEMENTS.
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Using heterophil to lymphocyte ratios (H/L), a group of 13 budgerigars (*Melopsittacus undulatus*) from a local pet store were evaluated for stress levels in three different housing/social condition. These conditions included (1) all the birds in a social group in a small enclosure at the pet store, (2) after a week of being separated and held in a small birdcage (solitary), and (3) after a week of being held in pairs in a small birdcage. These treatments were sequential in time for the 13 birds so that each bird was first at the pet store with the others, then in a week of solitary and finally in a week of being paired with another bird. Blood smears were made at the end of each week of treatment. Numbers of WBC/1000 RBC and relative numbers of WBC in 100 cells were calculated. WBC counts were not high enough to indicate any diseased birds. H/L ratios were used to assess relative levels of stress in the three treatments. Being in solitary was the most stressful (mean H/L ratio = 1.00) compared to being in pairs (mean H/L ratio = 0.69, $P = 0.01$) and pet store conditions were intermediate (mean H/L ratio = 0.76) but not statistically different from the other two conditions.

[A]BACTERIAL DEGRADATION OF FLIGHT AND BODY CONTOUR FEATHERS BY *B. LICHENIFORMIS*
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The structure of contour feathers varies from the flexible, pennaceous barbs and rachis of body feathers to the stiff, reinforced barbs and rachis of flight feathers. Another of the differences is the strength with which the barbules interlock. The barbules of flight feathers interlock strongly, whereas the barbules of body contour feathers interlock weakly. These structural differences may correlate with differences in durability or resistance to bacterial degradation.
The feather-degrading bacterium *Bacillus licheniformis* degrades feathers by secreting an enzyme that breaks up the β-keratin that forms over 90% of the feather structure. As the enzyme breaks apart the β-keratin molecule, oligopeptides are released into the surrounding medium. The more oligopeptides present in the medium after feather fragments and bacteria are removed, the more degradation has occurred and the more light is absorbed by the sample. In order to study the role of feather structure in resistance to bacterial degradation, we measured the rate of bacterial degradation of white flight and body contour feathers of domestic geese by *B. licheniformis.* Samples in which white flight feathers degraded absorbed more light than samples in which white body contour feathers degraded, indicating that more oligopeptides were released in medium surrounding flight feathers than in medium surrounding body contour feathers. These data mean that *B. licheniformis* degrades flight feathers more rapidly than white body contour feathers, thus feather structure affects the rate of degradation.

[A]USING FACTOR ANALYSIS AS A TOOL FOR THE IMPROVEMENT OF FIELD SAMPLING STRATEGIES.

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The state of Michigan began a long-term monitoring project in 1999 to asses the spatial and temporal trends in concentrations of several bioaccumulative compounds of concern using bald eagles as a biosentinel. Because data are collected at the nest site, significant time is spent locating and traveling to the nest tree. Once the nest tree is identified, one member of the field crew climbs the tree, retrieves the eaglets, and lowers them in a specially designed bag to be processed on the ground. Each eaglet is in hand for approximately 15 minutes while blood and feathers are collected, and morphometric measurements are recorded. The time spent traveling to nest sites and processing birds is a limiting factor on how many samples will be collected each season. Travel to a nest site at which eaglets are not of appropriate age for handling results in lost time for data collection, and undue stress for both the eaglets and adults. It is therefore in the best interest of the project and the resource to reduce the frequency of nest visits conducted when eaglets are not of appropriate age. Field crews have observed that in warmer than average years, the eagles' nesting schedules were less predictable. This application of factor analysis used existing field data from 2006 and 2007, which the National Oceanic and Atmospheric Administration indicated as warmer than average years for Michigan, to identify characteristics useful in predicting which nest sites are likely to exhibit earlier or later than normal breeding schedules.

[A]ANALYSIS OF THE VOCALIZATIONS OF THE NORTHERN CARDINAL (*CARDINALIS CARDINALIS*).
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Male Northern Cardinals use regionally distinctive repertoires of variable song types. We investigated how songs functioned in cardinal communication by comparing songs given in different contexts. We recorded songs in Albion, MI, during spring (March - early May) and summer (late May - July) 2006 and classified them based on season and on whether they were given spontaneously or made in response to songs from other males. Using Avisoft SASLab-Pro, we distinguished song types, their length, and number of notes. For song types used for male-male aggression, we expected songs to be longer and have more notes when given in spring and in response. For song types used for spontaneous advertising, we expected no seasonal or contextual differences. Nine song types were found. Two were used primarily in male-male aggression; only one was used primarily for spontaneous advertising. No consistent association existed between song function and complexity (number of note types per song). Effects of context and season were inconsistent among song types, perhaps because song length and number of notes varied greatly both between and within song types. Context may have influenced song variations we were not able to quantify. In the future, more cardinals could be banded to follow males throughout a breeding season and to determine the influence of individual variation or nesting stage.

[A]A COMPARATIVE STUDY OF FEEDING HABITS AND HELMINTH DIVERSITY IN SOUTH TEXAS DOVES.
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Four species of native columbids, the Inca Dove (*Columbina inca*; INDO), Common Ground-Dove (*Columbina passerina*; COGD), Mourning Dove (*Zeniada macroura*; MODO), White-winged Dove (*Zeniada asiatica*; WWDO), and two introduced species; the Eurasian Collared-Dove (*Streptopelia decaocto*; ECDO) and Rock Pigeon (*Columba livia*; ROPI) reside in South Texas. Though dietary habits of all but the INDO and CGDO are well known little information is available linking basic food habits of the doves with helminth assemblages. We examined crop contents of 258 doves collected from 10 June – 6 October, 2007. The crop contents of INDO, ECDO, and ROPI consisted primarily of commercial cultivated seeds (millet 55%; milo, 44%; and milo, 87% respectively), which are primarily found at feedlots and birdfeeders. These doves also had a low (1-3 helminth species) diversity of parasites. Doves that foraged in rural areas, WWDO, MODO, and GCDO, had a diet that consisted of mainly doveweed (*Croton* sp.) and grasses (*Panicum* sp.) but no one species was dominant in their diet. Helminth diversity in these doves tended to by higher (6-10 helminth species). Seed diversity varied among dove species, and was lowest in the ROPI (4 seed species) and highest in the CGDO (18 seed species). In addition we also found that direct lifecycle nematodes tended to be absent in urban feeding doves while those doves feeding in rural areas had a high diversity of nematodes. Our data seem to indicate a correlation between feeding habits and parasite infection which could potentially influence populations of South Texas columbids.

[A]RELATIONSHIPS BETWEEN DOMINANCE MEASURES AND PHYSICAL

CHARACTERISTICS OF THE BUDGERIGAR (*MELOPSITTACUS UNDULATES*).

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Fourteen budgerigars were studied from 17 August 2007 to 7 October 2007 at Saint Mary's College, Norte Dame, Indiana. Birds were kept in a large aviary. Following an acclimation period of one week, behavioral observations of dominance interactions were observed for one month. Weights were obtained at the beginning and end of the study to document weight change. UV patch sizes were measured and blood samples were taken at the end of the study. Blood smears were used to measure the differential white blood cell counts of each bird. Mann-Whitney U Tests and Spearman rank correlations were used to examine the relationships between dominance measures (% dominance and % interactions) and the physical characteristics of each bird. Females gained significantly more weight than males, who tended to lose weight ($U=1.5$, $P = 0.01$). However, H/L values and dominance class ($U=13$, $P=0.48$), dominance class and weight change ($U=10$, $P = 0.24$), sex class and percent dominance ($U=19$, $P=0.84$), sex class and H/L values ($U=21$, $P > 0.99$), sex class and percent interaction ($U=10$, $P=0.27$) and percent interaction and dominance class were not significantly different ($U=10$, $P=0.69$). Furthermore, percent dominance and H/L values ($r=0.099$, $P=0.75$), weight change and percent dominance ($r = -0.31$, $P=0.31$), weight change and H/L values ($r=0.01$, $P=0.96$), percent interaction and H/L values ($r=0.28$, $P=0.40$), percent interactions and weight change ($r= -0.14$, $P=0.69$), sex class and percent interaction ($U=10$, $P=0.27$) and percent interaction and dominance class ($U=10$, $P=0.69$) were not significantly correlated.

THE BIRDS OF GREEN WING ENVIRONMENTAL LABORATORY IN NORTHCENTRAL ILLINOIS.

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Green Wing Environmental Laboratory (GWEL), a biological field station in the Prairie Peninsula Physiographic Area of northcentral Illinois, contains 170 ha of forest fragments, edge, white pine plantations, wetlands, sedge meadows, old field, reconstructed prairie, small pot-holes, and streams. Our objective was to assemble a cumulative list and summarize baseline ecological information for the avifauna of GWEL based on field studies from 2001-2007. During this time we observed 188 species within 17 orders and 47 families. Abundant summer breeders included Red-winged Blackbird (*Agelaius phoeniceus*), Song Sparrow (Melospiza melodia), and Gray Catbird (*Dumetella carolinensis*). During fall and spring migration, Lesser Yellowlegs (*Tringa flavipes*), Golden-crowned Kinglet (*Regulus satrapa*), and Yellow-rumped Warbler (*Dendroica coronata*) were abundant. In winter, abundant species included the American Crow (*Corvus brachyrhynchos*), Dark-eyed Junco (*Junco hyemalis*), and Blue Jay (*Cyanocitta cristata*). We observed many species of conservation concern, such as Golden-winged Warbler (*Vermivora chrysoptera*), Common Yellowthroat (*Geothlypis trichas*), Wood Thrush (*Hylocichla mustelina*), and Whip-poor-will (*Caprimulgus vociferus*). Edge nesting species, such as Red-winged Blackbird and Gray Catbird, experience high reproductive success. However, anecdotal observations of breeders in interior-edge habitat, e.g., Red-eyed Vireo (*Vireo olivaceus*) and Veery (*Catharus fuscescens*), suggest these birds may suffer from high rates of nest depredation and parasitism by the Brown-headed Cowbird (*Molothrus ater*). A more complete understanding of the birds of GWEL would come from more additional estimates of abundance and richness for all seasons and studies of nest productivity in all habitats.

[A]SPLEEN SIZE AND ACTIVITY AS IT RELATES TO MIGRATORY DISPOSITION IN THE GRAY CATBIRD (*DUMETELLA CAROLINENSIS*)

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The avian spleen, a secondary immune organ and site of antibody production, is important for disease resistance. The size and activity of the spleen is thought to be indicative of the bird's immunocompetence. During periods of stress, a bird may have a smaller spleen with fewer sites of lymphocyte proliferation. Migration is potentially an energetically expensive period in bird's annual cycle. We have two competing hypotheses, (1) Due to increased energy demands during the migratory period, migrating individuals will have smaller and less active spleens than non-migrating conspecifics, (2) Alternatively, given the increased exposure to novel pathogens and parasites during the migratory period the spleen will be larger and more active in migrating individuals. The focal species is the Gray Catbird (*Dumetella carolinensis*). This project takes advantage of an ongoing project for which all the birds were infected with eastern equine encephalitis virus. Birds (n=40) were randomly assigned to two rooms with 10 males and 10 females in each room. Birds in the treatment room were photoadvanced in January 2008 to induce migratory disposition. The control birds were maintained on a constant photoperiod. In mid-February, all the birds were euthanized and necropsied for the purpose of the virus study. The spleens were weighed, infused with paraffin, sectioned, and stained. The stained sections were used to quantify lymphocyte activity. We compare relative spleen

mass and lymphocyte activity between migrating and non-migrating individuals. These and related data will be presented to provide a more comprehensive picture of the bird's immune system during the migratory period.

[A]PHENOTYPIC ORGAN FLEXIBILITY AROUND THE ANNUAL CYCLE IN TWO NEARCTIC-NEOTROPICAL MIGRATORY THRUSH SPECIES.

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Migrating birds exhibit reversible changes in the size of several organs in relation to their migratory status. During stopover, for example, migrants increase the size of 'nutritional' organs (gizzard, intestines, liver and kidneys) to accommodate hyperphagia, whereas these organs show significant atrophy during the flight period. 'Exercise' organs (pectoral muscle, heart and lungs), on the other hand, tend to increase in size before take off to facilitate long distance flight. However, little is known about how body composition during migration relates to other phases of the annual cycle; and whether species with different migratory strategies exhibit differential dynamics in organ flexibility. To answer these questions, we measured organ wet mass in two thrush species, the long distance migrant Veery (*Catharus fuscescens*) and the shorter distance migrant Wood Thrush (*Hylocichla mustelina*) during different phases of the annual cycle. We compared both 'nutritional' and 'exercise' organ sizes among three groups of thrushes within each species: [i] birds in breeding condition, [ii] birds preparing to cross a geographic barrier (Gulf of Mexico) in fall migration (pre-barrier condition), and [iii] birds that just completed the trans-gulf flight in spring migration (post-barrier condition). Our data suggest that birds in breeding and pre-barrier condition tend to have larger 'nutritional' organs and pectoral muscles than birds in post-barrier condition, whereas the lungs and heart show an opposite trend within migrating birds. These differences are more pronounced in the Veery than in the Wood Thrush suggesting a relationship between migration distance and the degree of phenotypic plasticity.

[A]RESISTANCE OF TURACO FEATHERS TO BACTERIAL DEGRADATION.

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Turaco feathers are colored with turacin or turacoverdin, copper-based pigments found only among turacos. Some pigments such as melanin are known to inhibit the rate at which bacilli degrade the ß-keratin protein of feathers. We measured the influence of turacin on bacterial degradation by comparing the rate at which red turacin-pigmented feathers degrade to the rates at which black melanin-pigmented turaco feathers and non-melanic, white goose feathers degrade. Samples of feathers suspended in feather medium were inoculated with feather-degrading *Bacillus licheniformis* and incubated on a rotorary shaker for five days at 37°C. The rate of feather degradation was quantified by measuring the increase in colony forming units of bacilli and weight loss of the feather.. Problems with our optical assay of oligopeptides, which are a breakdown product of feather keratin, necessitated reliance on these less sensitive measures. The increase in numbers of bacilli and the decrease in weight indicate that the rate of degradation for feathers with turacin is slightly slower than that of non-melanic feathers and much faster than that of melanin-containing feathers.

[A]MID-CONTRACT MANAGEMENT EFFECTS ON BREEDING GRASSLAND SONGBIRDS IN CP33 HABITAT BUFFERS IN EASTERN MISSISSIPPI.

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Native grass habitat buffers, such as those created under the CP33 practice of the Conservation Reserve Program, provide essential habitat for grassland birds in agricultural landscapes. Periodic disturbance is required to maintain early successional plant communities in the buffers, thus preserving the habitat for grassland birds. However, the effects of type and time since of disturbance on habitat suitability and reproductive success of grassland birds nesting in the buffers are unknown. During the 3rd growing season after establishment (May – August 2007) and prior to implementation of any mid-contract management activities (burning and disking), we used line-transect surveys and systematic nest searching to characterize the abundance, species richness, and reproductive success of breeding grassland songbirds in CP33 buffers around 15 crop fields in Clay County, MS. During the surveys, we observed 19 species using CP33 buffers with Red-winged Blackbirds and Dickcissels being the most common species observed. We located 107 nests of 5 species in the CP33 buffers. Apparent nest success for Red-winged Blackbirds and Dickcissels in the buffers—which also comprised a majority of the nests found—was 22% and 15%, respectively. Mid-contract management activities will be implemented in the buffers following the 3rd and 4th growing seasons and bird use of managed and unmanaged buffers evaluated. Results will characterize the relative

contribution of CP33 buffers toward grassland bird conservation in southern agricultural systems and evaluate the benefits of alternative disturbance regimes (e.g., disking) in conserving the wildlife habitat value of native grass buffers for grassland birds.

POST KATRINA MONITORING OF NESTING BIRDS IN COASTAL ALABAMA.
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Coastal Alabama provides habitat for many species of birds that nest in large cololnies such as wading birds, terns, shorebirds, and Brown Pelicans (*Pelecanus occidentalis*), as well as many other water birds. Changes to nesting habitat, due to development of coastal areas or weather, may have a great impact on colony size, colony desertion and/or establishment. These impacts were observed in coastal Alabama following hurricane Katrina. This study provides information as to how changes in area, vegetation, and geomorphology, due to recent physical disturbances, have affected the colonial nesting birds in coastal Alabama.

STOPOVER BEHAVIOR OF MIGRANT LANDBIRDS IN TWO FRAGMENTED LANDSCAPES: LAKESHORE AND INLAND REGIONS OF OHIO.
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In fragmented Midwestern landscapes, migrating landbirds use remnant forest patches for stopover, yet their behavior in these situations is not well known. From mid April to early June in 2006-2007, we used radio-telemetry to quantify habitat use, movements, and stopover periods of migrants [29 Swainson's Thrush (SWTH); 10 Yellow-rumped Warbler (YRWA)] within inland urban areas of Columbus, Ohio and the agriculturally-dominated western Lake Erie basin [33 Red-eyed Vireos (REVI); 38 YRWA]. At Lake Erie, movements were variable; some individuals remained local, but others moved widely and frequently among multiple forest patches. Mean distance traveled in the first 3 days was 6.2 km(±3.4SD) for YRWA and 0.95 km(±0.81) for REVI (first day only). Migratory stopover was markedly different in urban areas where mean distance traveled in three days was only 1.0 km(±0.36SD) for YRWA and 0.58 km(±0.343) for SWTH. In contrast to Lake Erie, urban YRWA and SWTH only rarely relocated
to other forest patches. The 3 SWTH to relocate were at the smallest sites (e.g. <1ha), suggesting a minimum patch size for SWTH. At Lake Erie, stopover duration was relatively long for YRWA (6.0 days ±3.34) and brief for the late migrant REVI (1.6 days±1.19). In urban areas, stopover duration was 4.2 days(±2.7) for YRWA and 3.7 days(±3.4) for SWTH. Telemetry results from Lake Erie will be compared with patterns of habitat use obtained from pt-count and mistnet surveys. Results demonstrate variation among species in their utilization of stopover habitat and how behavior can shift in response to different stopover situations.

[A]FAT STORES AND ENERGETIC CONDITION OF *CATHARUS* THRUSHES DURING SPRING AND AUTUMN MIGRATION AT A GREAT LAKES STOPOVER SITE.
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Much of our knowledge about the energetics of migration in North American passerines comes from either studies of stopover ecology along the northern shore of the Gulf of Mexico or from their breeding grounds (i.e. upon arrival in the spring or just before departure in autumn). The physiological conditions and requirements of migrants at stopover sites between those particularly taxing milestones of their migratory journey are largely unexplored. Using nine years of spring and autumn data from a constant effort banding operation on the southern shore of Lake Ontario (i.e., Braddock Bay Bird Observatory), we examined the fat stores and energetic condition of Catharus thrushes at a stopover site along their continental path. Contrasts are drawn between Swainson's Thrush (Catharus ustulatus), Gray-cheeked Thrush (C. minimus), and Veery (C. fuscescens), all long-distance, transcontinental migrants, and the Hermit Thrush (C. guttatus), a short-distance temperate migrant, to identify differences in timing and energetics, including yearly, inter-seasonal, and intra-seasonal variation in arrival fat and energetic condition. Within species and within season correlations between energetic condition, arrival date, and wing length, possibly resulting from differential migration, are also considered. Addressed within these analyses is the validity of the "spring-fatter" hypothesis and the insurance hypothesis for reaching the breeding grounds with excess fat. Our results will be compared to previously published findings from the Gulf of Mexico (e.g. Yong and Moore, 1997) and more northern latitudes to reveal potential regional variation related to location along the migratory path.

[A] SEASONAL VARIATIONS IN RECOVERIES OF SOUTH CAROLINA-BANDED BROWN PELICANS AND ROYAL TERNS: A COMPARISON OF TWO SEABIRD SPECIES EXPERIENCING A DECLINE IN LOCAL NESTING NUMBERS.

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Although nesting Brown Pelicans and Royal Terns display stable numbers in neighboring states, South Carolina began experiencing a decline in nest numbers of both species in 1989. The cause of this decline is unknown. The goal of this study is to compare seasonal distributions of Brown Pelicans and Royal Terns banded as nestlings in South Carolina, and to identify areas of high concentration during summer and winter months. This project used Geographical Information Systems to analyze the location of 1343 Royal Tern and 1664 Brown Pelican band encounters. Using Kernel Density Analyses, Band Recoveries Encountered in Winter Months (BREWM) of each species were clustered by number per square kilometer. Brown Pelican BREWM clusters were found along the Atlantic coast from North Carolina to Florida and Cuba. Royal Tern BREWM clusters were absent in the Carolinas but were present in Georgia, Florida, Cuba, and Jamaica, suggesting Royal Terns undergo a more complete winter migration. Additionally, Royal Tern BREWM display dense clustering on the west coast of Florida, an area with no Brown Pelican BREWM clustering. Areas with high density BREWM clusters shared by both species were found along Florida,s eastern coast. Preferred seasonal habitat identified in this project suggests management aimed to prevent further declines of Brown Pelicans and Royal Terns in South Carolina must not only be on a multistate level but must be of international scale.

CAROLINA CHICKADEE CALLS ENCODE INFORMATION ABOUT PREDATOR THREAT.

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Individuals of many group-living species of birds respond to potential predators by giving alarm calls, and some species have different, spatially referential alarm calls for aerial versus terrestrial predators. Characteristics of the terrestrial alarm call of Black-capped Chickadees (*Poecile atricapilla*) were also found to vary with predator size and level of perceived threat (Templeton et al. 2005. Science 308:1934-1937), and our objective was to determine if the alarm call of another species of chickadee exhibited similar variation. From January – March 2007, free-ranging flocks (N = 8) of Carolina Chickadees (*Poecile carolinensis*) in Madison County, Kentucky, were presented with several species of raptors that varied in size and their responses were monitored. Chickadees responded to the raptors by uttering 'chick-a-dee' calls that consisted of different numbers and types of notes. We found that larger, lower-threat predators (e.g., Red-tailed Hawk, *Buteo jamaicensis*) elicited calls with significantly more 'chick-a' notes and few 'dee' notes, whereas smaller, higher-threat predators (e.g., Eastern Screech-Owl, *Megascops asio*) elicited calls with few or no 'chick-a' notes and significantly more 'dee' notes. These results suggest that the 'chick-a-dee' alarm call of Carolina Chickadees is not only specific to terrestrial threats, but also serves as a graded signal of urgency that varies along a continuum. Dual-component alarm calls that communicate both a spatial reference (e.g., perched vs. flying avian predator) and threat urgency provide clear benefits relative to the survival and fitness of chickadees.

[A]THE BACTERIAL DEGRADATION OF PHAEOMELANIC AND EUMELANIC FEATHERS.

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Although the role of melanin in feathers has received much attention in the ornithological literature, few studies have focused on the potential differences between eumelanin, responsible for black, gray, and dark brown, and phaeomelanin, responsible for rufous, buff and yellow, or the selective pressures acting upon them. We believe that feather-degrading bacteria may be one selective pressure that favors one pigment over the other. We measured the rate at which feather-degrading bacteria (*Bacillus licheniformis*) degraded eumelanic and phaeomelanic feathers. Melanin is known to inhibit bacterial degradation of feathers, but there are no data on differences in the effect of eumelanin and phaeomelanin, which differ in size, structure, and chemical properties. Understanding the potential differences between different types of melanin may help us explain feather patterns that involve bars, stripes and spots of black, brown, buff, and gray as well as more general variation in the concentration of melanin such as Gloger's rule.

[A]COMPARISON OF AVIFAUNA IN THREE RIPARIAN ENVIRONMENTS IN WESTERN NEW YORK: THE IMPACT OF ANTHROPOGENIC HABITAT ALTERATION.

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As part of the Buffalo River Remedial Action Plan, we assessed the avifauna along three riparian environments in the same river system of differing levels of anthropogenic degradation: Buffalo River (highest degradation), Buffalo Creek (moderate degradation), and Cazenovia Creek (lowest degradation). To compare the patterns of bird distribution between the three locations, we conducted point counts at 10 points per location during three dates in June in 2005 and 2006. Cazenovia Creek had the highest species richness and species diversity during both years. The species diversity was lowest in the Buffalo River during June for both years. Our results documented substantial differences in the avifauna of the three areas. To ensure that the differences were due to habitat rather than observer teams, differences in detection rates of the three observer teams were analyzed. The three observer teams had detection rates ranging from 0.74 to 0.96, with averages of 0.83, 0.89 and 0.90, which were not significant. Similarly, we did not find differences in bird detectibility (sighting probability) among the three locations. Average sighting probabilities were 0.86 for Buffalo Creek, 0.87 for Buffalo River, and 0.89 for Cazenovia Creek. These data show that there is little variation between the groups at each of the three locations, and thus our data provides a sound baseline for assessing the impact of the remediation action plan developed for the Buffalo River.

[A]ANNUAL VARIATION IN THE STOPOVER ECOLOGY OF THE TENNESSEE WARBLER IN MICHIGAN.
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During migration, the availability and suitability of stopover sites plays an essential role in the survival of migrating passerines. Stopover sites provide migrants an opportunity to rest and gain or regain the fat stores that are necessary as a fuel for migration. However, only a few studies have investigated possible annual variation in the stopover ecology of migrants at a given site. Using fall migration banding data, we examined possible annual variation in the recapture rate, stopover length, and mass gains by Tennessee Warblers (*Vermivora peregrina*) at an inland stopover site in Kalamazoo, Michigan, during a 16-year period (1990 to 2005). The proportion of birds recaptured varied significantly over the 16 years of the study, ranging from 1.6 to 12.1%. However, we found that the stopover length did not vary significantly across the 16 years of this study. Furthermore, average mass change of recaptured migrants did not differ among years. We also found in 11 of the 16 years that migrants appeared to be gaining mass based on regressions of mass on time of capture. Our results suggest that pooling data from multiple years is appropriate, thus allowing more data from migrants to be used in analyses of stopover.

HABITAT SELECTION IN THE ENDANGERED FLORIDA GRASSHOPPER SPARROW (*AMMODRAMUS SAVANNARUM FLORIDANUS*).
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The Florida Grasshopper Sparrow (*Ammodramus savannarum floridanus*) is an endangered subspecies endemic to dry prairies in central Florida, a habitat that has declined by nearly 90% since European settlement. The subspecies is presently known to occur on only three public properties: Three Lakes Wildlife Management Area, Kissimmee Prairie Preserve State Park, and Avon Park Air Force Range. Monitoring efforts using point count censuses have estimated the size and spatiotemporal occurrence of these three populations since the 1990s. We collected vegetation data in 2005 and conducted a principal components analysis of how various habitat factors influenced the rate at which point count sites were occupied by sparrows across years. The sites most consistently occupied tended to have been burned more recently and had more areas of bare ground, and also tended to have a higher amount of herbaceous vegetation cover. Field observations demonstrate that imported red fire ants (*Solenopsis invicta*) destroy Florida Grasshopper Sparrow nests at least occasionally, and we also measured the density of fire ant mounds at all three sites. Mound density was significantly lower at Three Lakes and in native prairie areas of Kissimmee Prairie, neither of which are grazed by cattle, than at an improved pasture at Kissimmee Prairie or at Avon Park, both of which are grazed regularly. We used bait stations to sample fire ants in an ungrazed cattle exclosure at Avon Park and on an adjacent grazed control site and found fewer fire ants inside the exclosure, although the differences were not statistically significant.

OCCUPANCY MODELING TO EXAMINE DETECTION PROBABILITIES AND POPULATION TRENDS OF THE ENDANGERED FLORIDA GRASSHOPPER SPARROW.

James W. **Tucker**, Jr.*, Gregory R. Schrott, and Reed Bowman, Archbold Biological Station, P.O Box 2057, Lake Placid, FL 33862.
The Florida Grasshopper Sparrow (Ammodramus savannarum floridanus) is an Endangered subspecies endemic to the dry prairies of central Florida. This subspecies presently occurs on only three public properties, where populations have been monitored using point counts since 1991 at Three Lakes Wildlife Management Area, 1996 at Avon Park Air Force Range, and 1998 at Kissimmee Prairie Preserve State Park. Independent summaries of annual breeding populations at the three sites indicate that the population at Three Lakes Wildlife Management Area has remained relatively stable, the population at Kissimmee Prairie Preserve State Park has declined slightly, and the population at Avon Park Air Force Range declined steeply between 1999 and 2003 and then remained stable at very low numbers. Annual summaries for the three areas have been based on count indices and have not incorporated detection probability into the population estimates. We acquired point count data and used occupancy models to estimate detection probabilities and occupancy rates for each of the three areas. Both detection probabilities and occupancy rates varied with time since last burning and year of study at Avon Park Air Force Range and Kissimmee Prairie Preserve State Park. We did not have fire history information for Three Lakes Wildlife Management Area, but our analysis found occupancy rates were constant among years and detection probabilities varied both among years and counts within years.

AVIAN SPECIES AS INDICATORS OF RIPARIAN FUNCTION IN CHIAPAS, MEXICO.
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The Coastal Watersheds of Chiapas, Mexico are among the most biodiverse areas in the world. Restoration of the riparian zones is one of the top conservation priorities. In addition to several endemic species found there, this is an important over-wintering area for many Neotropical migrants. We report on the use of avian species as indicators of riparian zone function. The birds were captured using standard mist net techniques and banded. Birds observed but not banded were noted for presence. Banding was carried out a minimum of one week each month from September 2004 through July of 2005 at two sites located in the Coapa River watershed. These sites varied markedly in maturity of the riparian forest and complexity of the forest cover. Abundance, species richness, Shannon-Weaver Index, and a newly proposed riparian use function were calculated. ANOVA was used to determine the significance of the differences observed. Based on these data we were able to differentiate between sites with forests of differing maturity and complexity. This work is ongoing and has recently been expanded to a second watershed, the Novillero River. The indices calculated may provide a valuable tool in support of conservation in this biologically rich area.

CERULEAN WARBLER STOPOVER ECOLOGY.
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The Cerulean Warbler (*Dendroica cerulea*) is rapidly declining on its breeding grounds and has been recognized as warranting special concern. Almost nothing is known of the species' habits or stopover ecology during migration between North America and its wintering grounds in South America. We detected 98 male and 34 female Cerulean Warblers during 117 surveys in Honduras, Guatemala, Mexico, and Belize between 2004 and 2007. Within our sample area, we found Ceruleans to be concentrated in a narrow arc from Caribbean coastal Honduras through central Guatemala and southern Chiapas. Peak stopover occurred during the first two weeks of April. Cerulean Warblers appeared to favor primary broadleaf forests over secondary forests or non-forest habitats. Migrants did not show elevational preferences. The limited geographic range of the species during migration through Middle America coupled with high rates of deforestation in that region should be considered another point of concern for the species and warrants specific conservation planning and further investigation.

DETECTION OF VOLATILES IN THE UROPYGIAL GLAND SECRETIONS OF GRAY CATBIRDS (*DUMETELLA CAROLINENSIS*) THROUGH SOLID-PHASE MICROEXTRACTION HEAD SPACE SAMPLING AND GAS-CHROMATOGRAPH-MASS SPECTROMETRY
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The uropygial gland of birds produces secretions that are important in maintaining the health and structural integrity of feathers. These secretions are believed to perform a number of functions including waterproofing and conditioning the feathers, as well as protection from insect pests, and even predators. Some of the components of the gland secretions, including waxes and lipids, have been described over the past 50 years for several species of birds. However, in 2004 it was discovered that in some species, preen gland secretions contain volatile compounds. Such compounds are particularly interesting because of their potential importance in olfactory communication both within and across species. We used solid-phase microextraction headspace sampling followed by gas chromatography-mass spectrometry to detect and identify volatiles in uropygial gland secretions of Gray Catbirds (*Dumetella carolinensis*). The major analyte class detected with our sampling method is a series of carboxylic acids. The role of these compounds could be important in communication and defense, especially during breeding when birds are especially vulnerable to arthropods such as biting midges and mosquitoes.

[A]MICHIGAN BALD EAGLE BIOSENTINEL PROGRAM, MONITORING TRENDS OF PERSISTENT ORGANIC POLLUTANTS IN GREAT LAKES ECOSYSTEMS

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Bald Eagles (*Haliaeetus leucocephalus*) are tertiary predators of aquatic systems in Michigan. This affords us the opportunity to monitor spatial and temporal trends of persistent organic pollutants (POPs) in Great Lakes and interior aquatic communities. The Michigan Biosentinel Program began a systematic statewide monitoring system using blood and feathers of nestling eagles (eaglets) in 1999. The large body size of nestling eagles allows monitoring to be conducted by blood and feather sampling techniques and sufficient sample volumes are available to attain low quantification levels (QLs). This program continues to build on annual work which began in 1986. A five year sampling strategy is used (i.e., twenty percent of the state is sampled each year) and samples are collected in the spring each year from 5 to 8 week old eaglets. Analyses at three geographic scales (category, sub-population and Great Lakes watershed) and two temporal periods (1987-1991 and 1999-2003) have been conducted. Significant differences in total polychlorinated biphenyl (PCB), total dichloro-diphenyl-trichloroethane (DDT), and p,p'-DDE (a metabolite of DDT) were found both among geographic scales and temporal periods. There were geographic differences and decreasing trends in total PCBs, DDTs, and DDE. Mercury did not show the same differences or trends.

[A]STRUCTURE OF ALBINO FEATHERS: WHY SO WEAK?

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An albino Great Frigatebird (*Fregata minor*) hatched on Christmas Island (2°N, 157°W) in the central Pacific in 1984. It was fed at its nest by typically colored parents, grew normally, fledged successfully and was seen flying around the colony on 4 November 1984 and again in February 1985. Its flight, which appeared normal, was above the low-lying vegetation characteristic of the island. On 1 July 1985 RWS and EAS observed the same albino, now a juvenile, back at its nest. It had been rendered flightless, by excessive damage to the wing and tail feathers. On 11 July 1985, RWS and EAS collected it. The pattern of wear from abrasive, airborne particles has been described by Schreiber *et al.* (Condor 108: 736-741. 2006), but the structural weakness of the albinistic feathers is unexplained. Barbs up to 4 cm. from the tip of many flight feathers are missing as are the barbules on many of the remaining barbs. Furthermore, the feathers are brittle. Our anatomical comparison of the albino flight feathers with black flight feathers of a normal juvenile frigatebird and white flight feathers of a Northern Gannet show a number of differences that may account for the structural weakness of the albinistic feathers.

[A]DYNAMICS OF *STAPHYLOCOCCUS AUREUS* ON BIRD FEATHERS.

Meredith P. **Wilson*** and Edward H. Burtt, Jr. Department of Zoology, Ohio Wesleyan University, Delaware OH 43015.

Avian plumage provides habitat for a diverse community of microorganisms, among them *Staphylococcus aureus*, which is potentially pathogenic to both birds and humans. Because of its zoonotic importance, we present an analysis of the seasonal, annual, taxonomic, and ecological dynamics of *S. aureus* in avian plumage. Our analysis is based on samples of *S. aureus* collected from the plumage of 1,939 mostly songbirds of 67 species. The bacterium occurred on 67% of the birds sampled, but occurred more often in the summer and early fall than in the winter and early spring. Annual differences among emberizine sparrows trended downward from 1995 until 2002, but increased

sharply in 2003. Our seasonal variation supported previous findings that plumage bacteria were more abundant in the summer and fall. With species grouped by foraging guild, those that foraged in the air had a higher percentage of *S. aureus* than those that foraged on the ground, bark or among leaves. The seasonal trend is similar to that previously reported for feather-degrading bacilli, but the frequent occurrence of *Staphylococci* in the plumage of aerial foragers is very different from that of *Bacilli*, which were most common among ground foragers. This study is a small step toward understanding the role wild birds play in the dispersal of *Staphylococcus aureus* and the potential role the bacterium plays in the plumage ecology of birds.