Kearney2011

Joint Meeting of the

Association of Field Ornithologists
Cooper Ornithological Society
Wilson Ornithological Society

9 – 13 March 2011

Kearney, Nebraska

Photo by Paul Johnsgard

General Information

The joint meeting of the Association of Field Ornithologists, Cooper Ornithological Society and Wilson Ornithological Society will be held in Kearney, Nebraska, from Wednesday through Sunday, 9 – 13 March 2011. All information about the meeting can be found at the Kearney2011 website:

http://snr.unl.edu/kearney2011

Activities

Most conference activities, including symposia, paper and poster sessions, council and business meetings, plenary lectures, opening and closing receptions and closing banquet will take place at the Younes Conference Center in Kearney, Nebraska. An evening at the Great Platte River Road Archway will take place on Thursday, 10 March 2011 (http://www.archway.org). There will be morning and evening trips every day to observe Sandhill Cranes at the Rowe Audubon Sanctuary (http://www.rowesanctuary.org), field trips to the Rainwater Basin to see geese, ducks, shorebirds and eagles (http://www.rwbjv.org), and field trips to the Nebraska Sandhills to see lekking grouse and prairie-chickens (http://www.sandhillsmotel.com). An assortment of day trips to area attractions is also being planned.

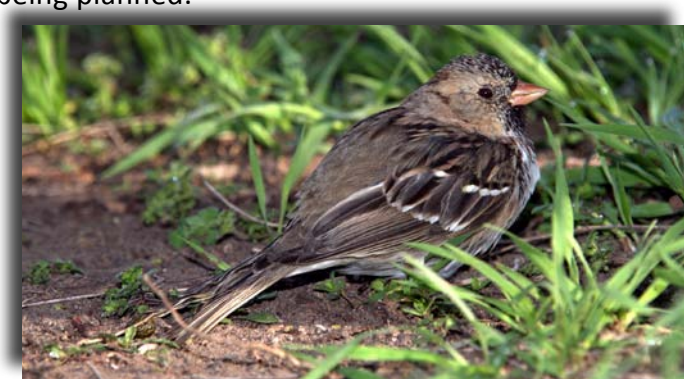


Photo by Paul Johnsgard

Registration

Early registration is highly recommended for the cost savings and to help us in planning the conference. Attendees can register for the meeting via the online, secure registration site at:

http://snr.unl.edu/kearney2011/registration.asp

15 January 2011 (online or postmarked on or before)
$245 for professionals
$160 for students
$130 for guests/accompanying persons
Registration fees include opening and closing receptions (food and beverages), poster reception (food and beverages), lunch on Thursday, Friday and Saturday, eligibility to participate in scientific programs, admission to all scientific sessions, symposia and exhibits AND the opportunity to experience the spectacle of spring migration along the Platte River in Nebraska.

16 January 2011 to 9 March 2011
$280 for professionals
$185 for students
$130 for guests/accompanying persons

$75 Single-day registration fee
Includes admission to daytime scientific sessions for a single day but does not include eligibility to submit an abstract for the scientific program.

The registration desk will be open in the Younes Conference Center from:
16:00 – 19:00 on Wednesday, 9 March
07:30 – 20:00 on Thursday and Friday, 10 and 11 March
07:30 – 17:30 on Saturday, 12 March

The deadline for submission of abstracts for inclusion in the Scientific Program will be **15 January 2011**. Students and post-docs applying for travel or presentation awards must submit all of their application materials by **1 December 2010**.

Online registration must include complete credit card information. Charges will appear on your credit card statement to University of Nebraska School of Natural Resources (SNR). Registration is not considered complete until a check, money order, purchase order, or credit card information is received. Make checks payable to University of Nebraska with Kearney2011 in the memo. All payments must be in U.S. dollars drawn on a U.S. bank.

Faxed registrations must include complete credit card information, including number, expiration date and cardholder number. VISA and MasterCard only are accepted for credit card payment.

Organizations can be billed only if a purchase order accompanies the registration by fax or mail.

There are two (2) special registration categories available for Kearney2011, Single-Day and Guest/Accompanying Person. The Single-Day registration fee is $75.00 and permits admission to daytime scientific sessions for a single day. It does not include eligibility to submit an abstract for the scientific program. The Guest/Accompanying Person registration fee is $130 and covers the conference social events; optional events and field trips are not included.

Closing Reception and Banquet

The Closing Reception and Banquet will be held at the Younes Conference Center on Saturday, 12 March. We encourage all conference attendees to request banquet tickets when they register. The cost is $45 for professionals and $20 for students; a vegetarian meal option will be available and there will be a cash bar. The Wilson Ornithological Society is providing free banquet tickets to all students giving presentation-award-eligible papers or posters.

Cancellations

We understand that other responsibilities and personal obligations may prevent you from attending Kearney2011 after you have already registered.

If you find that you cannot attend Kearney2011, we encourage you to send a substitute in your place. Substitutions can be made at any time, even on-site at the conference.

If you find it necessary to cancel after you have already paid your registration fee, we can refund your fee minus a $25 processing fee.

To provide cancellation notice and request a refund, please send a letter to: Mary Bomberger Brown, Kearney2011, 3310 Holdrege Street, Lincoln, NE 68583, fax your request to 402-472-2946 or email the information to mbrown9@unl.edu.

Non-U.S. Attendees

Under the Visa Waiver Program, citizens of 27 countries in Europe and the Far East may visit the U.S. for up to 90 days without a visa if the attendee has a passport with a computer-readable bar code.

However, international travelers who are seeking to travel to the United States under the Visa Waiver Program are now subject to enhanced security requirements and all eligible travelers who wish to travel under the program must apply for authorization online as part of the new Electronic System for Travel authorization (ESTA). The authorization is valid for two years or until your passport expires, whichever comes first.

If you have not done so already, visit https://esta.chp.dhs.gov/esta to apply for entry. The program does not apply to travelers entering by land from Canada and Mexico. Attendees from these countries are reminded to bring a valid passport to cross into the U.S. Please note that authorization does not guarantee entry into the U.S.

Answers to questions regarding international travel can be found at the U.S. Department of State visa website at http://travel.state.gov/visa/visa_1750.html or contact your local consulate.

Conference Hotel and Lodging

Younes Hospitality Hotels
Holiday Inn, Wingate Inn and Hampton Inn

The guestroom rate at the three Younes Hospitality hotels nearest the Younes Conference Center is $84.95 per night for up to four (4) persons per room. Reservations can be made by calling the hotels, remember to mention that you are attending the "ornithological conference".

All of the hotels offer free Wi-Fi and free parking and the Hampton Inn and Wingate Inn offer free hot breakfast. For more information visit Younes Hospitality:

http://www.younes.com

Be sure to make your room reservation soon as "crane-iacs" from around the world fill Kearney motels during the spring migration season.

- Hampton Inn 308-234-3400
- Holiday Inn 308-237-5971
- Wingate Inn 308-237-4400

Additional lodging information from the Kearney, Nebraska Visitor's Bureau is at:

http://www.visitkearney.org/

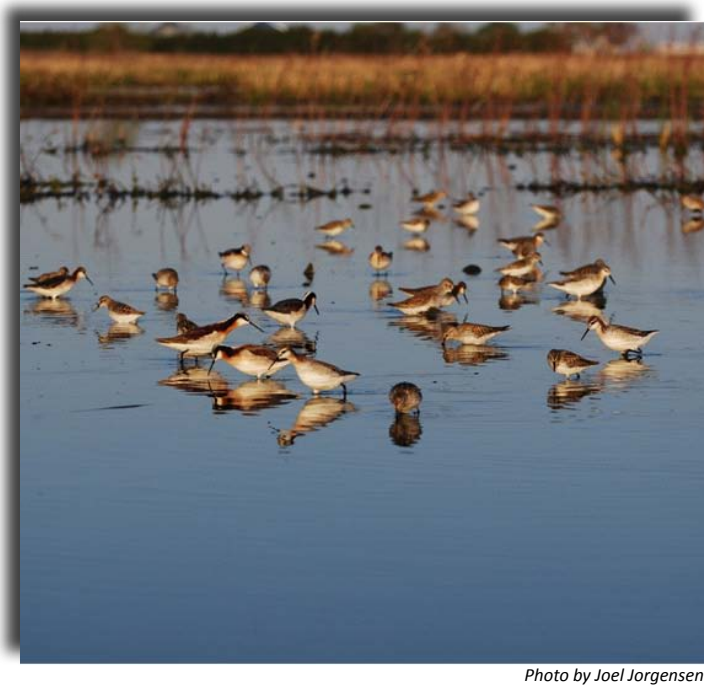


Photo by Joel Jorgensen

Travel to Kearney, Nebraska

Kearney, Nebraska is conveniently located along the Oregon and Mormon Trails and Pony Express Route. In fact, as the pioneers measured it, Kearney was the halfway point on their journey west—1733 miles from Boston and 1733 miles from San Francisco. For modern travelers Kearney is easily reached by automobile or airplane.

The Younes Conference Center is located at the Interstate 80 (I-80) Kearney exit (exit 272, Highway 44); look for the Holiday Inn-Hampton Inn-Wingate Inn complex on the northwest corner of the interchange.

For those traveling by air, Kearney is served by Great Lakes Airlines (www.flygreatlakes.com; 800-554-5111 or 308-233-5040 in Kearney) with several flights every day from Denver International Airport. Great Lakes Airlines is a code-share partner with United and Frontier Airlines. For those flying to the Lincoln or Omaha airports, we have arranged a special reduced fare with the Eppley Express shuttle service (800-888-9793 or 308-234-6066; www.eppleyexpress.com) to bring you out to Kearney. When you contact Eppley Express make sure you tell them you are attending the "Big Bird Conference" to get the special fare.

For International Travelers, to ensure smooth travel to the U.S. apply for your visas and passports in a timely manner.

For those interested in carpooling, we are arranging a "ride share" bulletin board.

The Omaha airport is served by several rental car companies:

Alamo (800-462-5266; www.alamo.com)
Avis (800-331-1212; www.avis.com)
Budget (800-527-0700; www.budget.com)
Dollar (800-800-3665; www.dollar.com)
Enterprise (866-502-1260; www.enterprise.com)
Hertz (800-654-3131; www.hertz.com)
National (800-227-7368; www.nationalcar.com)
Thrifty (800-847-4389; www.thrifty.com)

The Lincoln airport is served by:

Alamo (800-462-5266; www.alamo.com)

The Kearney airport is served by:

Thrifty (800-847-4389; www.thrifty.com)

Enterprise (308-236-6200); 301 S 2nd Ave

2 mi north of hotels

Travel to Kearney by train is not recommended; the California Zephyr stops 40 miles away at the Holdrege Amtrak station in the wee hours of the morning and there is no shuttle service or car rental available.

Keep in mind that 500,000 Sandhill Cranes and several million waterfowl fly to Kearney every year……

Host City: Kearney, Nebraska

Kearney (pronounced “kar´-nee”) is a crossroads for people and wildlife.

In 1848, a fort was established to provide protection for travelers heading west along the Oregon Trail. Named for Colonel Stephen Watts Kearny, Fort Kearny afforded a safe haven for pioneers, pony express riders, prospectors and others as they followed the great Platte River road. Originally built near Nebraska City, the fort was later relocated to its present site, south of present day Kearney, to increase the military presence in the busy central Nebraska corridor. In its 23 years as a U.S. Army Post on the Oregon Trail, Fort Kearny was never attacked.

At Spring Creek Prairie near Denton, Nebraska, original traces of the Oregon Trail’s “Nebraska City-Fort Kearny cutoff” can still be seen today. The city of Kearney derives its name from the original fort but due to a postal error an "e" was inadvertently added and then never changed.

Kearney began a period of rapid growth increasing from 245 residents in 1873 to well over 10,000 in the late 1880's. Optimistic residents sought to have the nation's capitol moved to Kearney from Washington, DC.

The bubble burst in the 1890's. Real estate values collapsed and businesses and people drifted away. In 1900, only 5,364 people remained. In the early twentieth century, Kearney began a steady, if not dramatic, recovery. By 1930 the population had increased to over 8,500 and the community was laying the foundations of its present diversified economy.

The next catalyst for development was the completion of Interstate 80 in 1964 linking Kearney to the busiest east-west superhighway in the country. Its strategic geographic positioning, midway between the Atlantic and Pacific oceans as well as within Nebraska's borders, catapulted Kearney into a leading convention and tourism location.

Kearney, population 27,000+, now boasts a balanced economy ensuring a bright future for its residents.

March Weather in Kearney, Nebraska

Be ready for anything! Layer, layer, layer!

Daytime temperatures can hit 60° F or more, but as the sun goes down, temperatures can drop dramatically.

If you are going to be outdoors, particularly in the crane blinds, layer your clothing. Recommended gear: thermal underwear, medium weight jacket and heavy weight jacket; stocking hat with ear protection (or earmuffs); scarf; thermal mittens or gloves; wool socks (not cotton); insulated hiking boots; and eyewear and face protection (particularly if windy).

The average high temperature is 49° F. The average low temperature is 25° F. The record high temperature for 10 March is 87° F (1989). The record low temperature for 10 March is -5° F (1998). Average precipitation in March is 2.05 inches, however not a lot if it is rain.

Audio Visual Materials

All conference center rooms will be equipped with Power Point on Windows PC computers. Presenters should bring files on CDs, USB thumb drives or flash drives to upload their presentations in advance of scheduled sessions. Slide projectors and other AV equipment WILL NOT be available unless requested in advance when submitting an abstract. Specific instructions for preparing and loading presentations will be available on the meeting website.

Internet Access

Internet access will be available in the conference center. The conference hotels all have free wireless access.

Call for Papers

Members of AFO, COS, WOS, professional and amateur ornithologists, students and others are all invited to contribute to the scientific session. To apply for a place on the program, follow the instructions for online submission found on the Kearney2011 website (http://snr.unl.edu/kearney2011); abstracts **WILL NOT** be accepted via fax or email.

DEADLINE FOR RECEIPT OF ABSTRACTS BY THE SCIENTIFIC PROGRAM COMMITTEE IS 15 JANUARY 2011. This is also the deadline for early (discounted) registration rates.

Abstracts for paper and poster presentations will be accepted on a first-come first-served basis until the schedule is full. Each conference registrant will be limited to a single presentation as the presenting author. Authors wishing to give a second presentation may contact the Scientific Program Committee in case space becomes available in the program.

The Scientific Program Committee will select and organize papers in appropriate sessions based on scientific content of the abstract. Abstracts should summarize findings, not methods. Indicate preference for either paper or poster presentation. If all paper sessions are filled, it may be necessary to accept some abstracts for poster presentation that had been submitted for paper presentation.

Paper presentations will be limited to 15 minutes, including time for questions; the Scientific Program Committee encourages speakers to prepare 12 minute long presentations leaving time for 3 minutes of questions.

There will be one (1) poster session at Kearney2011. Posters should be no larger than 3 feet wide x 4 feet tall (36 inches wide x 48 inches tall) and be designed in "portrait" format, not "landscape".

Exhibits and Sponsorship Opportunities

A vendor area will be set up in the Younes Conference Center near the registration desk with easy access for all participants at the conference.

Commercial and non-profit vendors are encouraged to participate. All vendors must be registered for the conference at the professional rate.

Opportunities are available for sponsorship of various breaks, receptions, and other functions during the conference. Please contact Mary Bomberger Brown at 402-472-8878 or mbrown9@unl.edu for more information about vendor space and sponsorships.

Photo by Paul Johnsgard

Message Board

A message board will be maintained throughout the conference in the Younes Conference Center near the registration desk.

Spring Migration in the Platte River of Nebraska

by Paul A. Johnsgard

Photo by Linda Brown

The arrival of the Sandhill Cranes on the Platte River -- and the millions of waterfowl that also visit each spring -- is one of the greatest wildlife spectacles in the world.

For untold centuries, the majority of the world's population of Sandhill Cranes has come to the Platte River and Rainwater Basins of central Nebraska. There, for about six weeks, they forage in adjacent fields to prepare themselves for their journey to breeding grounds in Canada, Alaska and Siberia and return to roosting sites on the Platte River each evening. Unique among Great Plains rivers, the Platte's sandy bottom and wide channels, provide safe nocturnal roosting sites over a stretch of nearly 100 miles. The cranes arrive in February from scattered wintering areas in Texas, New Mexico, Arizona and northern Mexico, beginning an epic journey of up to as much as about four thousand miles for those headed to northeastern Siberia. The shallow channels of the Platte River, with its many sandbars and islands, provide safe nighttime roost sites. Waste grain in cornfields provides the carbohydrates that rapidly build up the fat reserves required to complete this long migration to their frozen tundra breeding grounds. Wet meadows of native grasses provide invertebrates as sources of protein and daytime loafing areas.

Photo by Wayne Hathaway

Cranes have remarkably long fossil histories, dating back about 50 million years to Eocene times. A fossil wing bone dating back nine million years that is inseparable from those of modern Sandhill Cranes was discovered in Nebraska, as have fossils of a similar age that belonged to a close relative of African Crowned Cranes. Like all cranes, Sandhill Cranes mate permanently, with strong pair and family bonds, and have potentially very long lifespans. Some Sandhill Cranes banded in the Platte Valley in the 1960s are known to have survived more than 30 years. Like most cranes they typically lay two eggs per clutch, although only one chick typically survives to fledging. Individual Sandhill Cranes spend about three weeks along the Platte River during the spring period, gaining as much as 15 percent additional body weight. Most cranes leave the valley in early April, when south winds and daytime rising thermals aid in their northward migration. About the time the Sandhills are leaving, the first Whooping Cranes begin to arrive in the Platte Valley.

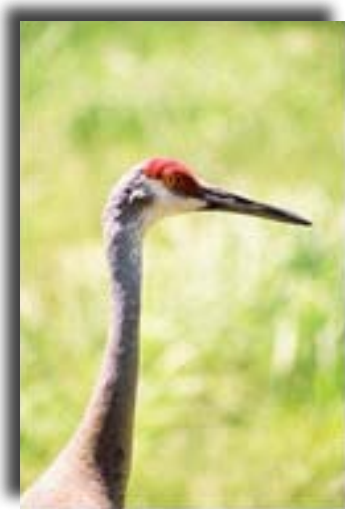


Photo by Wayne Hathaway

There are six subspecies of Sandhill Cranes, of which three are migratory. The Greater, Canadian and Lesser races all migrate through Nebraska. Of the Nebraska cranes, the Lesser makes up the largest percentage. The total number of Sandhill Cranes passing through Nebraska since the 1990s has usually been estimated to range from 450,000–500,000.The population in the 1960s was probably under 200,000, but irrigation, fertilization and associated increases in corn production have provided a spring feast for both cranes and geese. Relatively few Greater Sandhill Cranes stop in the Platte Valley, and birds of the intermediate Canadian race intergrade both with Lessers and Greaters, so their numbers are very uncertain.

Sandhill Cranes

- Total numbers using the Platte Valley are probably over 400,000, which roost at night in groups of up to about 20,000 birds.
- These birds usually forage within 3–4 miles of the Platte River, but at times may be found up to 10–15 miles away.
- Adults are 3 to 4.5 feet tall and gray-plumaged with red crowns.
- Lesser Sandhills typically weigh 5–6 pounds, Canadians about 7–8, and Greaters usually 9-10.
- The migration peak is typically from March 20–30, with nearly all birds gone by mid-April.

Whooping Cranes

Whooping Cranes usually occur in family groups, with rarely more than six per group. Singles are also common, and may represent sub-adults that have been separated from their families. Whooping Cranes are usually seen in Nebraska from early April to early May.

- Unlike Sandhills, Whooping Cranes usually forage in rather isolated wetlands, such as the Rainwater Basin.
- Adults are 4–5 feet tall, and their plumage is mostly white, with black flight feathers and red crowns. The wingspan is about 7.5 feet. Their weights often exceed 15 pounds.

Photo by NEBRASKALAND Magazine

- Although the entire Aransas-Wood Buffalo flock must pass through Nebraska in spring, there are relatively few sightings, and birders would be extremely lucky to see one.

Geese and Ducks

Enormous numbers of geese and ducks use the Platte River and Rainwater Basin during spring migration. As many as 7–9 million pass through the area during the spring, mostly from early February to the end of March. As many as 50% of the mid-continent Mallard population and 30% of the mid-continent Northern Pintail population use the region during the spring migration. Up to 90% of the mid-continent Snow Goose population (well over a million birds) pass through south-central Nebraska, as do a substantial numbers of Cackling Geese (probably close to 100,000), and uncertain but probably comparable numbers of Canada Geese and Greater White-fronted Geese. Ross's Geese make up a small percentage (about 2–3 percent) of the Snow Goose flocks.

Photo by Joel Jorgensen

Ducks using the Platte Valley and Rainwater Basin commonly include the following: Wood Duck, Gadwall, American Widgeon, Mallard, Blue-winged Teal, Northern Shoveler, Northern Pintail, Green-winged Teal, Canvasback, Redhead, Ring-necked Duck, Lesser Scaup, Bufflehead, Common Goldeneye, Hooded, Common Merganser and Ruddy Duck.

Prairie Chickens and Sharp-tailed Grouse

Prairie Chickens and Sharp-tailed Grouse begin their courtship rituals on traditional display sites (leks) as soon as the ground is snow-free or as early as February in Nebraska. Males begin arriving on the leks before sunrise and during the peak display period (mid-April) may display for 2–3 hours, given good weather and no disturbance. Males often return to their lek in late afternoon, although late afternoon activity is less intense. Females visit leks for only a few weeks, and if fertilized will not return again unless their first nesting is unsuccessful. Females select the most dominant males (master cocks) for mating partners, so that often 80–90 percent of the matings on a lek will be done by a single dominant male.

Society Events

All events held in the Younes Conference Center

Wednesday, 9 March 2011

08:00 – 17:00
Association of Field Ornithologists Council Meeting

08:00 – 17:00
Cooper Ornithological Society Council Meeting

08:00 – 17:00
Wilson Ornithological Society Council Meeting

08:00 – 17:00
Nebraska Bird Partnership Steering Committee Meeting

Thursday, 10 March 2011

07:00 – 08:30
OSNA Board of Directors breakfast business meeting

12:00 Wilson Ornithological Society Annual Business Meeting

13:00 Margaret Morse Nice Medal presentation and plenary lecture (lunch provided)

Friday, 11 March 2011

07:00 – 08:30
Cooper Ornithological Society Young Professional Award breakfast

12:00 Association of Field Ornithologists' Annual Business Meeting

13:00 Association of Field Ornithologists' plenary lecture (lunch provided)

Saturday, 12 March 2011

12:00 Cooper Ornithological Society Annual Business Meeting

13:00 Cooper Ornithological Society plenary lecture (lunch provided)

14:00 Cooper Ornithological Society Young Professional Award lecture

19:00 Student Presentation Awards presentations

Special Events

Wednesday, 9 March 2011

19:00 – 21:00
Opening Reception,
Younes Conference Center

Thursday, 10 March 2011

18:30 – 22:00
Great Platte River Road Archway

Friday, 11 March 2011

18:30 – 22:00
Poster Reception

Saturday, 12 March 2011

18:00 – 22:00
Closing Reception and Banquet with Student Presentation Awards

Committees or groups desiring to meet during the Kearney2011 conference should contact Mary Bomberger Brown (mbrown9@unl.edu) prior to the conference or at the registration desk during the conference for time and space availability.

Scientific Sessions

Scientific sessions (papers, posters, and plenaries) will take place in the Younes Conference Center. Meeting attendees will receive a copy of the program when checking in at the registration desk.

Paper, Poster and Symposium Sessions

Concurrent paper sessions will be held at the Younes Conference Center. Session and room assignments will be determined in late February 2011 and will be found on the Kearney2011 website.

The poster session will be held at the Younes Conference Center on Friday, 11 March from 18:30 – 22:00.

Plenary Sessions

Each society is hosting a plenary lecture; the lectures will take place over the noon hour with lunch provided.

Thursday, 10 March 2011

WOS Plenary Presentation - Margaret Morse Nice Award Lecture

The Ecology of Red-cockaded Woodpeckers, by necessity a Multidiscipline Study

by Richard N. Conner

Scientist Emeritus with the Southern Research Station of the U.S. Forest Service

The Red-cockaded Woodpecker (*Picoides borealis*) is a cooperatively breeding species that inhabits open park-like, fire-maintained pine forests in southeastern United States. This woodpecker selects only mature living pines for cavity excavation and nesting, pines that have very specific characteristics.

In order to have sufficient nonliving heartwood for the cavity chamber, the pine must be old, often in excess of 80 to 120 years depending on pine species, for an adequate diameter of heartwood to have formed. If the cavity chamber includes living sapwood, the chamber will fill with sticky pine resin rendering it a death trap for the woodpecker.

Red-cockaded Woodpeckers also actively select pines that have been infected by redheart fungus (*Phellinus pini*). The fungus decays and softens the hearwood of the pine, facilitating cavity excavation. Pines that do not have redheart fungus take much longer to excavate, sometimes as long as 12 years and may involve several generations of woodpeckers.

The ability of pines to produce resin and the resin's chemistry also appear to influence which pines are selected as cavity trees. Red-cockaded Woodpeckers excavate small wounds, termed resin wells, around the entrance to their nest and roost cavities and fresh sticky pine resin flows from these daily-maintained wells. The continuous flow of pine resin coats the bole of the pine with resin and creates a sticky barrier that deters predation by rat snakes (*Elaphe* spp.). If the flow of pine resin is inadequate, the resin barrier can be breached by rat snakes that climb the bole of the pine and predation of young and adult woodpeckers can occur. Red-cockaded Woodpeckers actively select pines that are the best resin producers, and in loblolly pines (*Pinus taeda*) may select pines with resin that has certain viscosity and crystallization properties. Thus, a study of Red-cockaded Woodpeckers involves forest ecology, fire ecology, botany, mycology, herpetology, and chemistry.

Richard N. Conner is a Scientist Emeritus with the Southern Research Station of the U.S. Forest Service. He has studied and researched avian forest ecology for the past 40 years. He received a B.A. from Rutgers University in biological sciences and an M.S. in wildlife management and a Ph.D. in zoology from Virginia Polytechnic Institute and State University. He has studied the behavior and ecology of woodpeckers for over 40 years, and focusing on the Red-cockaded Woodpecker and fire-maintained pine ecosystems in the southern U.S. He has also studied forest bird communities, the dynamics of snags and their value for cavity nesters, as well as doing research on terrestrial snakes and anurans.

Friday, 11 March 2011

AFO Plenary Presentation

Sandhill Cranes and the Platte River: Local and Global Perspectives

by Dr. Gary L. Krapu

Research Scientist with the USGS Northern Prairie Wildlife Research Center

The Midcontinent Population (MCP) of Sandhill Cranes (*Grus canadensis*) is the largest and most wide ranging population of cranes in the world with breeding grounds located on two continents and three nations. Virtually all of the 600,000 cranes in the MCP stop for varying lengths of time along the Platte and North Platte rivers in early spring, creating a unique spectacle.

I examine underlying factors that have led to development of this exceptionally strong spring staging tradition in the Platte Valley, describe temporal and spatial aspects of use by each subpopulation, and evaluate the significance of this annual stopover to the MCP.

Cranes have successfully adapted to massive habitat change in the Platte Valley over the past 70 years and continue to be challenged by new developments which I will address. Aided by new technology, I follow the cranes from when they depart from the Platte to their return the following spring identifying important stopovers, major breeding grounds and wintering areas, along with key habitat resources supporting the MCP.

My research has documented a much larger number and wider breeding distribution in Sandhill Cranes in northern Russia than previously thought and I describe a 2009 expedition that led to the discovery of the species breeding westward to near the Lena River Delta.

Although the trajectory of MCP growth over the past 70 years reflects a major conservation success story, climate change, energy development, and intensification of agriculture could pose potential long-term threats to the population which I will discuss.

Dr. Gary L. Krapu is a research scientist with the USGS Northern Prairie Wildlife Research Center where he has studied issues important to the conservation and management of migratory water bird populations for the past 41 years. He received his B.S. in zoology from North Dakota State University, and an M.S. and Ph.D. in animal ecology from Iowa State University at Ames. He has authored or co-authored over 120 peer-reviewed scientific papers that focus primarily on wetland habitat needs, nutritional requirements, and factors limiting populations of Sandhill Cranes, waterfowl, and arctic-nesting shorebirds. He has studied the Midcontinent Population (MCP) of Sandhill Cranes for the past 33 years, in part, focusing on habitat requirements of the population during spring staging in the Central Platte Valley, and evaluating the role of this spring stopover in contributing to MCP needs. He also has studied the MCP across its geographic range seeking to establish its current breeding distribution, determine key habitats supporting the MCP throughout the annual cycle, and identify factors limiting subpopulations. He currently is studying the geopgraphic distribution and ecology of Sandhill Cranes in arctic Russia. For the past several decades, his research findings have been applied widely to guide conservation efforts and management of MCP Sandhill Cranes.

Saturday, 12 March 2011

COS Plenary Presentation

Diversification along Ecological Gradients in the Tropics

by Dr. Thomas B. Smith

Professor of Ecology and Evolutionary Biology, University of California
Director, Center for Tropical Research

The mechanisms responsible for diversification in the tropics have long been a central question in evolutionary biology. Two competing hypotheses of speciation predominate: those that emphasize the role of geographic isolation during glacial periods and those that stress the role of ecology and diversifying selection across environmental gradients.

With half of the Earth's mature tropical forests already lost, and many rainforest plant and animal species threatened by deforestation and climate change, understanding the mechanisms of diversification are critical for making informed conservation decisions.

I explore alternative mechanisms of diversification in rainforest bird and lizard species in sub-Saharan Africa, examining patterns of divergence with gene flow along gradients versus divergence between refugia. Results suggest adaptive diversification is taking place along the forest-ecotone gradient.

Additionally, I examine conservation implications of human activities along gradients and show that recent deforestation in the tropics has homogenized gradients, causing a loss of adaptive phenotypic diversity. With as much as two-thirds of the world's terrestrial land area impacted by human activities, I discuss the implications of gradient flattening and its corresponding impacts on adaptive diversity and conservation strategies.

Dr. Thomas B. Smith is a professor of Ecology and Evolutionary Biology at the University of California, Los Angeles and founder and director of the Center for Tropical Research. He obtained a B.S. in Natural Sciences and an M.S. in Wildlife Ecology from the University of Wisconsin at Madison and a Ph.D. in Zoology from the University of California at Berkeley. Tom has spent more than 25 years investigating evolutionary and conservation questions in the tropical rainforests of Africa, Australia, South America, and Hawaii. His research has focused on understanding the mechanisms of diversification in the tropics, evolution in human-altered environments, the ecology of disease, and developing new approaches for mapping evolutionary processes. He has authored or co-authored more than 150 papers. As a frequent consultant for conservation organizations, Tom has helped implement conservation programs and establish new national parks in tropical countries. His research has been featured around the world in print, on the radio, and in film. Over the years, his research has been supported by major research grants from the National Science Foundation, the National Aeronautics and Space Administration, the Environmental Protection Agency, the U.S. Agency for International Development, and the National Institutes of Health. He is a Fellow of the California Academy of Sciences, the American Ornithologists' Union, and is currently a member of the National Geographic Committee for Research and Exploration.

Symposia Sessions

Our Expanding Understanding of Cerulean Warbler Breeding Biology and Migratory Behavior
Symposium Organizers

Paul B. Hamel, *Center for Bottomland Hardwoods Research,* phamel@fs.fed.us
Petra Bohall Wood, *West Virginia Coop. Fish & Wildlife Unit, West Virginia University,* pbwood@wvu.edu

Photo by Wayne Hathaway

Long-term Population Effects of Piping Plover and Least Tern Management on the Great Plains
Symposium Organizer

Daniel H. Catlin, *Virginia Polytechnic Institute and State University, Department of Fisheries and Wildlife Sciences,* dcatlin@vt.edu

Photo by Paul Johnsgard

Research on Prairie Grouse in North America
Symposium Organizers

Clait E. Braun, *Grouse Inc.***,** sg-wtp@juno.com
John W. Connelly , *Idaho Department of Game and Fish*, JCsagegrouse@aol.com
Les Flake, *South Dakota State University,* ldflake@yahoo.com
K. C. Jensen, *South Dakota State University,* Kent.Jensen@SDSTATE.EDU

Photo by Paul Johnsgard

Avian Conservation and Ecosystem Services in Agricultural Landscapes
Symposium Organizers

John Quinn, *School of Natural Resources, University of Nebraska–Lincoln,* jquinn2@unl.edu

Jennifer Jelicka, *Environmental Studies,University of California,* jenvs@ucsc.edu

Student and Post-Doctoral Awards

Student Travel Award Application Requirements

The Association of Field Ornithologists, the Cooper Ornithological Society, and the Wilson Ornithological Society are pleased to support participation of students at the 2011 Annual Meeting by offering up to $15,000 in student travel awards. Awards will be granted primarily to graduate students, although outstanding papers from undergraduates and post-docs will also be considered.

Post-doctoral applicants should have graduated after March 2010 and should be presenting work done as a graduate student. Applicants must present an oral or poster presentation for which they are the sole or lead author at the meeting (although they need not enter the student paper competition).

Award amounts vary depending on transportation costs and the number of students applying. Typically, travel awards cover only part of the travel expenses, and do not cover meals, lodging or registration fees.

In addition to application materials described below, students must also submit standard abstract materials through the website by **15 January 2011** to receive a place on the scientific program.

Application Procedures

The application deadline for all travel and presentation awards is **1 December 2010**. Late applications WILL NOT be accepted. Note: The purpose of the advanced deadline for the awards application is to allow the selection committee to inform applicants of funding decisions about travel awards **before** the deadline for early registration and program abstracts.

To apply for travel awards, email the following items as a single PDF or WORD document to Kearney2011travelawards@gmail.com:

1. The Travel Award Cover Sheet
2. One-page curriculum vitae
3. An expanded abstract, including title and authors. For multi-authored papers, put an asterisk (*) after the name of the person presenting the paper. Abstracts should be double-spaced with 12-point font, 2-page maximum including any references, tables, and figures. The expanded abstract should state objectives, methods, major results, and scientific significance.

Abstracts will be evaluated for composition, scientific merit, and originality by a representative from each society.

Note: Students applying for travel awards must still register for the meeting and submit a regular (shorter!) standard abstract for the scientific program. Please consult the conference web site for details of these processes, which are separate from the travel award review. The Travel Awards Committee aims to inform students of the result of their applications by 7 January 2011, a week prior to the abstract submission deadline.

Student Presentation Award Application Requirements

Up to six Student Presentation Awards, available for all students and one Undergraduate Presentation Award will be awarded during the joint AF0-COS-WOS meeting in 2011. These include four Oral Presentation Awards (AFO, COS: A. Brazier Howell Award, Frances F. Roberts Award, WOS: Alexander Wilson Prize), two Poster Presentation Awards (AFO, WOS: Lynds Jones Prize), and one Undergraduate (Oral or Poster) Presentation Award (WOS: Nancy Klamm Undergraduate Presentation Award). All student awards are available to undergraduate and graduate students except the Nancy Klamm Award, which is restricted to undergraduates. Awards will be made based on quality of research and presentation. Award recipients will receive cash and other awards.

All students participating in the competition will receive a 1-year gratis membership in the Wilson Ornithological Society and a ticket to the closing banquet.

Eligibility: To be eligible, the student must be the sole (or first author if the presentation is coauthored) and presenting author, and must be a student (individuals that graduated in December 2010 are eligible). Only one

student is eligible for an award for each presentation. The student MUST indicate his/her eligibility on the abstract submission form. Students applying for Student Travel Awards are not automatically considered for Presentation Awards.

If you have any questions, please contact us:
Bob Beason, robert.c.beason@gmail.com
Michael Lombardo, lombardm@gvsu.edu
Susan Skagen, skagens@usgs.gov

COS Young Professional Award

The Cooper Ornithological Society invites applications for its 2011 Young Professional Award (YPA). The award recognizes early-career researchers for outstanding contributions to ornithology. Two awardees will be selected to participate in a special presentation session at the Kearney 2011 meeting; each will be given 25 minutes each (20 minutes for their talk, 5 minutes for questions) to present their research to all conference attendees. The two awardees each will receive a cash prize, will have their travel expenses covered by COS, and will be invited to a breakfast attended by the COS president, officers, and the chair of the YPA committee on the day prior to the plenary session.

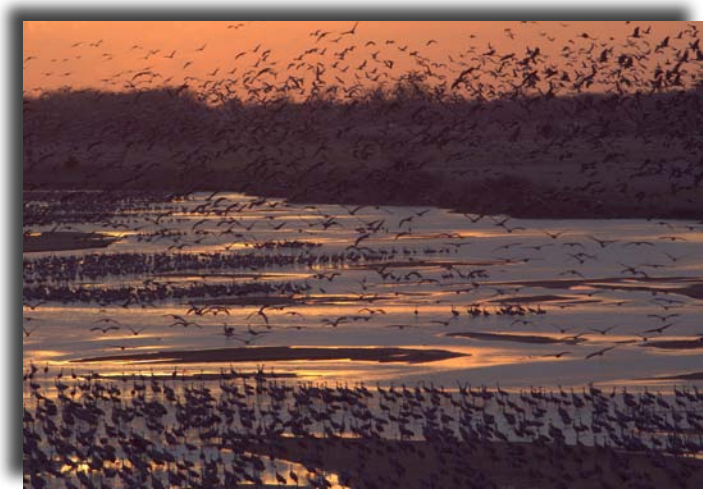


Photo by Paul Johnsgard

Candidates must be COS members and must either have graduated within 3 years of the meeting or at the time of the meeting be in the final phase of graduate studies (last 9 months). In addition, candidates must be sole author (or senior author, if the presentation is co-authored) of the presentation and are expected to be first author of published papers reporting the research. The YPA has a limit of one per lifetime.

To apply for the 2011 YPA annual meeting, submit the following items (as a single pdf attachment) via e-mail to Susan Skagen (skagens@usgs.gov) by **1 December 2010.**

1. 2-page curriculum vitae indicating graduation date
2. A mini-paper following the guidelines of paper submission outlined in Nature. Body of text (abstract through discussion) should not exceed 1,500 words; literature cited, tables, figures, and figure captions are not included in the word count, but figures and tables are limited to 4 total (figures plus tables) elements.

In case an applicant is not chosen as one of the YPA winners, eligible individuals should apply separately for regular Student Travel Awards (deadline also **1 December 2010**). The two YPA recipients will automatically receive travel funds from COS and will be deleted from the regular Travel Awards competition.

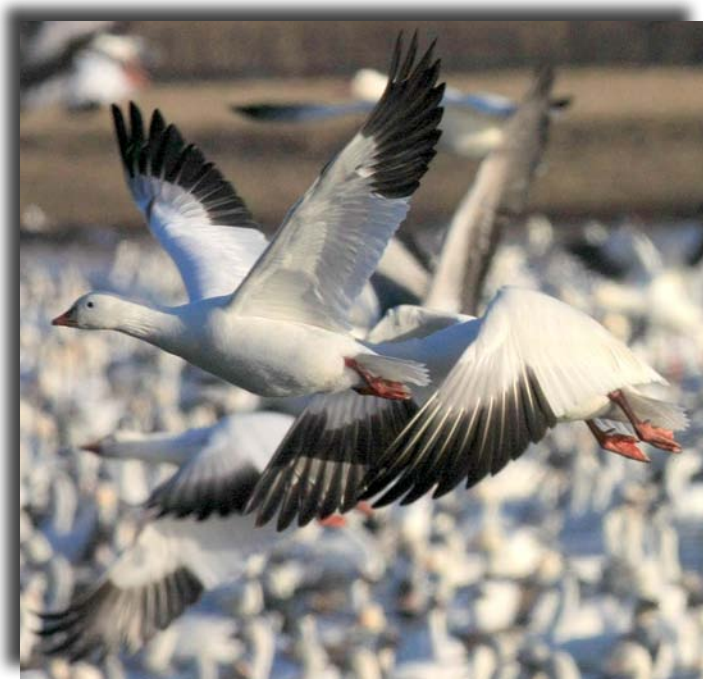


Photo by Paul Johnsgard

Applicants for the 2011 YPA will be notified of the evaluation committee's decisions by 5 January 2011. All applicants must also register for the conference and then submit a standard abstract to the Program Committee Chair on or before 15 January 2011. If submitting the abstract prior to the announcement of YPA award results, YPA applicants should indicate if they are eligible and wish to be considered for regular student presentation awards in case they are not selected for the YPA.

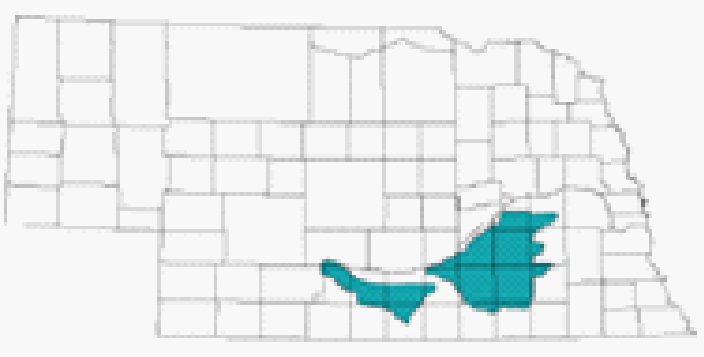
Field Trips

Conference attendees will have a variety of opportunities to participate in field trips associated with Kearney2011.

Pre-Conference

Rainwater Basin

The Rainwater Basin complex occupies a 6,150 square mile area in south-central Nebraska. It was named for the abundant natural wetlands that form where clay-bottomed depressions catch and hold rain and runoff water. Rainwater Basin wetlands are most noted for their importance to waterfowl, especially during the spring migration. They host seven to fourteen million spring-migrating ducks and geese annually.



Approximately 90% of the mid-continent population of Greater White-fronted Geese, 50% of the mid-continent population of Lesser Snow Geese, 50% of the mid-continent population of Mallards and 30% of the continent population of Northern Pintails use the Basins during spring migration. Over 257 species of birds have been recorded in the Rainwater Basin and 131 species may breed there. Recent surveys have identified that at least 200,000-300,000 shorebirds of 34 different species migrate through the Basins during the spring. Thirty-four species of waterbirds including herons, egrets, rails, terns and gulls have been observed in the Rainwater Basin. Rainwater Basin wetlands are regularly used by the federally endangered Whooping Crane and the threatened Piping Plover.

Prairie Chicken and Sharp-Tailed Grouse

Prairie Chicken and Sharp-tailed Grouse courtship rituals begin as early as February in Nebraska. The males gather on the grounds to perform, claim territory, intimidate rivals and attract females. Males begin arriving on the leks about 45 – 60 minutes before sunrise and may display for 2 – 3 hours depending on the weather and disturbance. A second displaying period occurs in late afternoon and early evening. The Sandhills Motel in Mullen, Nebraska has permission from local ranches and landowners to bring visitors to both Prairie Chicken and Sharp-tailed Grouse leks. To minimize disturbance to the lek and provide optimum viewing, a bus is used for a blind. The seats under the windows facing the lek are removed to allow for camera and spotting scope tripods. An overnight trip for lek viewing includes an overnight stay in the Sandhills Motel, roundtrip bus transport to the lek for a 2-4 hour viewing and a guide.

Photo by Paul Johnsgard

Mid-Conference

Rowe Audubon Sanctuary

Rowe Audubon Sanctuary is located in the middle of a magnificent crane staging area. The Sanctuary offers guided field trips to view the spectacular concentrations of Sandhill Cranes from viewing blinds on the banks of

the Platte River. Field trips are timed to provide superb opportunities to view the spectacle and group size is limited to maintain the quality and uniqueness of the experience. Rowe Sanctuary's five crane blinds are fully enclosed structures and hold 26 – 32 people each. The blinds provide protection from the elements but are

Photo by Joel Jorgensen

not heated. Benches are provided. Morning trips leave from Rowe Sanctuary at 5:30 am. Evening trips leave from Rowe Sanctuary at 5:30 pm. Transportation from the Younes Conference will be provided.

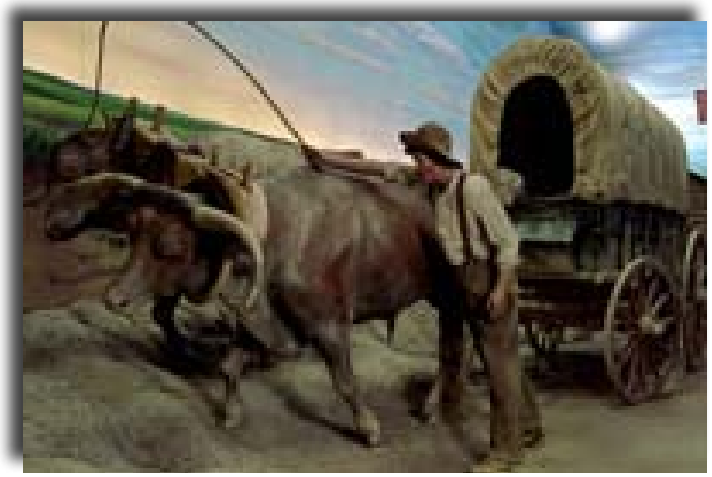
Great Platte River Road Archway

From 1843 to 1869, nearly half a million men, women and children rode and walked the trails to the West Coast--nobody who took the trip and lived to tell about it, failed to be changed by it.

During their trek across America, the pioneers encountered Native American tribes; trappers and

Photo by Ken Dewey

traders making their way to annual rendezvous; stagecoach drivers and their passengers; pony express riders; and the telegraph. As the early settlers established their homesteads, they witnessed the birth of the railroads, the Lincoln Highway, America's first transcontinental road; I-80, the nation's first interstate; and America's Information Highway.



The Great Platte River Road Archway is an interactive adventure that pays tribute to the pioneers who passed through Nebraska on their way West. The Archway will be open and serving a chuck wagon supper on Thursday, 10 March (limited to 200 people). If the weather and the corn harvest cooperate, we will have the opportunity to visit a Pawnee earth lodge and sample traditional Native American corn soup.

Post-Conference

Prairie Chicken and Sharp-Tailed Grouse

Prairie Chicken and Sharp-tailed Grouse courtship rituals begin as early as February in Nebraska. The males gather on the grounds to perform, claim territory, intimidate rivals and attract females. Males begin arriving on the leks about 45 – 60 minutes before sunrise and may display for 2 – 3 hours depending on the weather and disturbance. A second displaying period occurs in late afternoon and early evening. The Sandhills Motel in Mullen, Nebraska has permission from local ranches and landowners to bring visitors to both Prairie Chicken and Sharp-tailed Grouse leks. To minimize disturbance to the lek and provide optimum viewing, a bus is used for a blind. The seats under the windows facing the lek are removed to allow for camera and spotting scope tripods. An overnight trip for lek viewing includes an overnight stay in the Sandhills Motel, roundtrip bus transport to the lek for a 2 – 4 hour viewing and a guide.

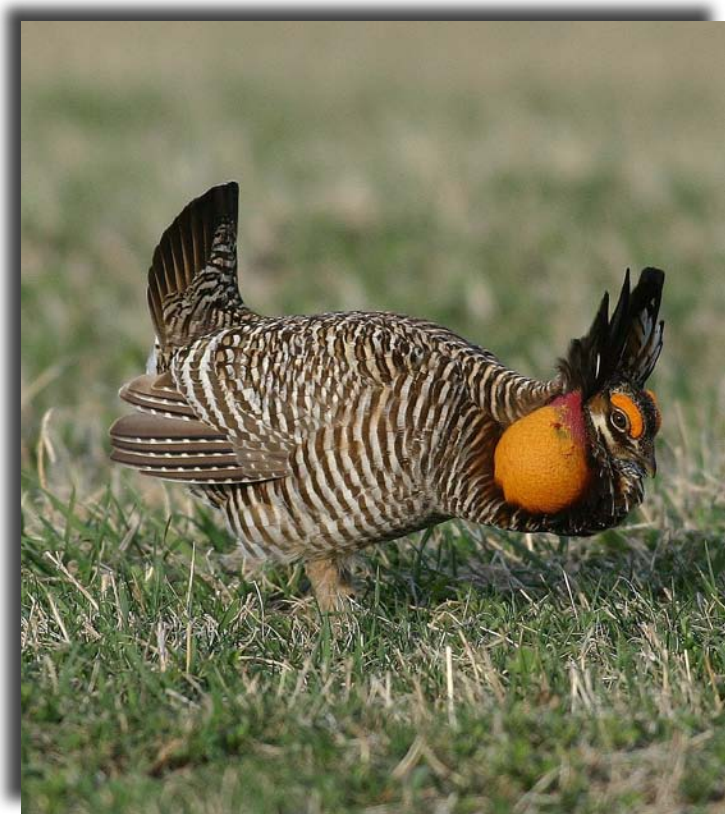


Photo by Paul Johnsgard

Photo by Paul Johnsgard

Wings over Nebraska Social Tours

Great for guests and accompanying persons

All trips start at 9 a.m. and return by 4 p.m.

Wednesday, March 9

Habitat Restoration Tour

Visit sites along the Platte River including Jeffrey Island, The Crane Trust, and The Nature Conservancy.

Cost $30 (includes lunch)

Thursday, March 10

All about Hastings Tour

Visit the Home of Kool-Aid (yes, Kool-Aid was invented in Nebraska), the Hastings Museum, Eileen's Cookies (bring $$ - you'll want to take some home), and have lunch at a local eatery.

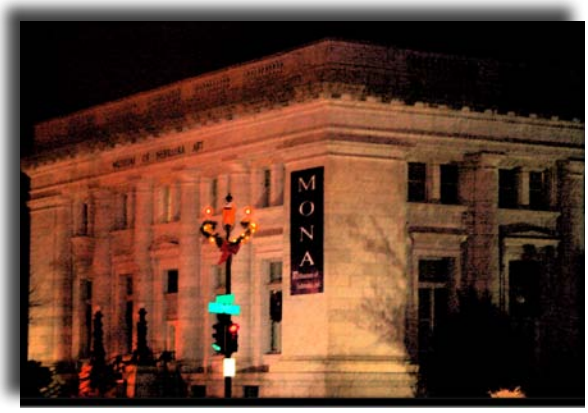
Cost $45 (admission and lunch included)

Friday, March 11

Kearney, the Sandhill Crane Capitol of the World Tour

Visit the Museum of Nebraska Art (MONA), Kearney Children's Museum, Great Platte River Road Archway, and Firefighters' Museum and have lunch at a local eatery.

Cost $45 (admission and lunch included)



Saturday, March 12

Visitor Center-Sanctuary Tour

Visit Rowe Audubon Sanctuary, the Crane Trust, and Nebraska Nature and Visitor Center.

Cost $30 (includes lunch)

Sponsors

University of Nebraska Kearney

Nebraska Ornithologists Union

Nebraska Nature and Visitors Center

Nebraska Bird Partnership

Photo by Joel Jorgensen

Time	Auditorium 1	Auditorium 2	Auditorium 3	Auditorium 4
Thursday	SY1: **Our Expanding Understanding of Cerulean Warbler Breeding Biology and Migratory Behavior**. Organizers: Paul B. Hamel, Center for Bottomland Hardwoods Research, and Petra Bohall Wood, WV Coop. Fish & Wildlife Unit, West Virginia Univ.	SY2: **Research on Prairie Grouse in North America**. Organizers: Clait E. Braun, Grouse Inc., John W. Connelly, Idaho Dept. Game and Fish, and Les Flake and K. C. Jensen, South Dakota State Univ.	CO1: Foraging ecology	CO2: Habitat ecology
8:45	Cerulean Warbler Technical Group fosters real conservation progress for a challenged species. **Paul B. Hamel**, US Forest Service, Center for Bottomland Hardwoods Research, Stoneville, MS 38776, T. Bently Wigley, National Council for Air and Stream Improvement, Inc., Clemson, SC 29634, Deanna K. Dawson, USGS Patuxent Wildlife Research Center, Laurel, MD 20708, Patrick D. Keyser, Dept. Forestry, Wildlife, and Fisheries, Univ. Tennessee, Knoxville, TN 37996, and David Mehlman, Migratory Bird Program, The Nature Conservancy, Santa Fe, NM 87501		Carbohydrate analysis of berries available for foraging by birds. **S. D. Kevan** and C. E. Trainor, Enviroquest Ltd., Cambridge, ON N3C2B7, Canada	Effects of recreational trails on passerine abundance and nest success in southern Wisconsin forests. **Martin J. Pfeiffer**, Natural Resource Specialist, Carson National Forest, Taos, NM 87571 and Anna M. Pidgeon, Dept. Forest and Wildlife Ecology, Univ. Wisconsin - Madison, Madison, WI 53706
9:00		Introduction	[s]The use of aquatic and terrestrial insects by Willow Flycatchers at Fish Creek, Utah revealed by carbon and nitrogen stable isotopes. **Amanda V. Bakian** and Kimberly A. Sullivan, Dept. Biology and the Ecology Center, Utah State Univ., Logan, Utah 84322	[s]Forest breeding bird response to a multiflora rose invasion: a long term study. **Christine Rega** and W. Gregory Shriver, Dept. Entomology and Wildlife Ecology, Univ. Delaware, Newark, DE 19716, and Vince DÅfAmico, US Forest Service NRS-04, Univ. Delaware, Newark DE 19716
9:15	Cerulean Warbler *Dendroica cerulea* response to forest management in the Appalachian Mountains. **T. J. Boves**, T. A. Beachy, P. Keyser, and D. A. Buehler, Dept. Forestry, Wildlife, and Fisheries, Univ. Tennessee, Knoxville, TN 37996, P. B. Wood, J. Sheehan, J. Mizel, and G. George, Div. Forestry and Natural Resources, West Virginia Univ., Morgantown, WV 26506, J. L. Larkin, A. Evans, and M. White, Dept. Biology, Indiana Univ.	Multiple paternity and con-specific brood parasitism among Greater Prairie-Chickens: A conditional strategy for coping with anthropogenic landscape disturbance? **Andrew J. Gregory**, L.B McNew, B.K. Sandercock, and S.M. Wisely, Kansas State University, Wamego KS 66547	[s]Multi-scale temporal variation in prey deliveries at Mississippi Kite nests. **Scott J. Chiavacci** and James C. Bednarz, Dept. Biological Sciences, Arkansas State Univ., Jonesboro, AR 72467	[s]Effects of prescribed fire and timing of summer livestock grazing on avian habitat selection in a high-elevation sagebrush ecosystem. **Heidi J. Erickson** and Cameron L. Aldridge, Natural Resource Ecology Laboratory, Colorado State Univ., Fort Collins, CO 80523
9:30		Comparative demography of Greater Prairie-Chickens: regional variation in vital rates, sensitivity values, and population dynamics.	[s]Scatter-hoarding of acorns by Island Scrub-Jays, *Aphelocoma insularis*, on Santa Cruz Island. **Mario B. Pesendorfer**, School of	[s]Interacting effects of land management and hydrology on bird communities along the Platte River. **Alexandra Frohberg** and Keith

Time	Auditorium 1	Auditorium 2	Auditorium 3	Auditorium 4
	Pennsylvania, Indiana, PA 15705, and A. D. Rodewald, M. Bakermans, and F. Newell, School of Environment and Natural Resources, Ohio State Univ., Columbus, OH 43210	Lance B. McNew, A. J. Gregory, S. M. Wisely, and **B. K. Sandercock**, Division of Biology, Kansas State Univ., Manhattan, KS 66506.	Biological Sciences, Univ. Nebraska-Lincoln, and Scott Sillett, Migratory Bird Center, Smithsonian Conservation Biology Institute, National Zoological Park, Washington, DC	Geluso, Dept. Biology, Univ. Nebraska at Kearney, Kearney, NE 68849, and Mary Harner, Dept. Biology, Univ. Nebraska at Kearney, Kearney, NE 68849 and the Platte River Whooping Crane Maintenance Trust, Wood River, NE 68883
9:45	Avian community and species response to hardwood forest management for Cerulean Warblers. **J. Sheehan**, P.B. Wood, G. George, M. McDermott, J. Mizel, P. McElhone, K. Perkins, and M. Shumar, WV Coop. Fish and Wildl.	Analyses of the distribution and population trends of Lesser Prairie-Chicken with reference to Kansas populations. **Rob Channell** and Greg Farley, Dept. Biological Sciences, Fort Hays State Univ., Hays, KS 67601.	[S]Comparative foraging behavior of two generalist tyrant flycatcher (Aves: Tyrannidae) species in Belize. **Megan Shave**, Biology Dept., Stonehill Coll., Easton, MA 02357, and John Kricher, Biology Dept., Wheaton Coll., Norton, MA 02766	[S]Effects of grazing intensity and years grazed on songbird nesting success in northern mixed-grass prairies. **Emily N. Pipher** and Nicola Koper, Natural Resources Institute, Univ. Manitoba, Winnipeg, MB R3T 2N3, Canada
10:00	Research Unit, Div. Forestry and Natural Resources, West Virginia Univ., Morgantown, WV 26506, D. Buehler, P. Keyser, T. Beachy, and T. Boves, Dept. Forestry, Wildlife, and Fisheries, Univ. Tennessee, Knoxville, TN 37996, J. Larkin, A. Evans, and M.White, Dept. Biology, Indiana Univ. Pennsylvania, Indiana, PA 15705, A. Rodewald, M. Bakermans, and F. Newell, School of Environment and Natural Resources, Ohio State Univ., Columbus, OH 43210, and S. Stoleson, USFS Northern Research Station, Irvine, PA 16329	Impacts of Conservation Reserve Program (CRP) and landscape composition on presence and density of prairie grouse leks in South Dakota. Travis J. Runia and **Kent C. Jensen**, Dept. Wildlife and Fisheries Sciences, South Dakota State Univ., Brookings, SD 57007	Daily feeding patterns in winter: predation pressure may not be driving behavior. **David Bonter** and Benjamin Zuckerberg, Cornell Lab of Ornithology, Cornell Univ., Ithaca, NY 14850, and Carolyn Sedgwick, Dept. of Natural Resources, Cornell Univ., Ithaca, NY 14850	Breeding bird responses to American Woodcock habitat management in Northeastern Vermont. **Jameson F. Chace**, Dept. Biology, Salve Regina Univ., Newport, RI 02840, Thomas LaPointe and Rachel Cliche, Nulhegan Basin Division of the Silvio O. Conte National Fish and Wildlife Refuge, Brunswick, VT, and Leslie Moffat, Middlebury Coll., Middlebury, VT
10:15	Break	Break	Break	Break
	SY1: Cerulean Warbler (cont.)	SY2: Prairie Grouse (cont.)	CO3: Phylogeography	CO4: Breeding biology
10:30	A comparison of breeding density estimates from fixed-radius point counts, distance-sampling, and territory mapping for forest songbirds. **F.L. Newell**, A.D. Rodewald, and M.H. Bakermans, School of Environment and Natural	Greater Sage-Grouse and wind energy development. **Jeffrey L. Beck** and Chad W. LeBeau, Dept. Renewable Resources, Univ. Wyoming, Laramie WY 82071, Andrew J. Gregory, Division of Biology, Kansas State Univ.,	[S]The genetic makeup of the Boreal Chickadee: using mtDNA and microsatellites to discern the population structure of a small boreal songbird. **Linda A. Lait** and Theresa M. Burg, Dept. Biology, Univ. Lethbridge, Lethbridge, AB	[S]Settlement order and productivity of Bell's Vireos (*Vireo bellii bellii*). **Cara Joos**, Division of Biological Sciences, Univ. Missouri, Columbia, MO 65201, Frank R. Thompson, III, USFS Northern Research Station, Univ. Missouri, Columbia, MO

Time	Auditorium 1	Auditorium 2	Auditorium 3	Auditorium 4
	Resources, Ohio State Univ., Columbus, OH 43210, P.B. Wood, J. Sheehan, G.A. George, M.E. McDermott, P.M. McElhone, K.A. Perkins, and M.B. Shumar, WV Coop. Fish and Wildl. Research Unit, Div. Forestry and Natural Resources, West Virginia Univ., Morgantown, WV 26506, D.A. Buehler, P.D. Keyser, T.A. Beachy, and T.J. Boves, Dept. Forestry, Wildlife, and Fisheries, Univ. Tennessee, Knoxville, TN 37996, and J.L. Larkin, A. Evans, and M. White, Dept. Biology, Indiana Univ. Pennsylvania, Indiana, PA 15705	Manhattan KS 66506, Gregory D. Johnson, Western EcoSystems Technology Inc., Cheyenne, WY 82001, and Matthew J. Holloran, Wyoming Consultants LLC, Laramie, WY 82072	T1K 3M4, Canada	65211, and John Faaborg, Div. Biological Sciences, Univ. Missouri, Columbia, MO 65201
10:45		The effect of hunting on population size in Greater Sage-Grouse. **Robert M. Gibson**, School of Biological Sciences, Univ. Nebraska-Lincoln, Lincoln, NE 68588	[S]Do new distributional records represent vagrancy or the typical range? Testing for climatic niche equivalency using extralimital and winter range occurrence records of Black-fronted Ground-Tyrant (*Muscisaxicola frontalis*). **Richard E. Gibbons**, Louisiana State Univ. Dept. Biological Sciences and Museum of Natural Sciences, Baton Rouge, LA 70803, Javier Barrio, Centro de Ornitolog?a y Biodiversidad (CORBIDI), Urb. Huertos de San Antonio, Lima 33, Peru, Gustavo Bravo, Dept. Biological Sciences and Museum of Natural Sciences, Louisiana State Univ., Baton Rouge, LA 70803, Luis Alza, Centro de Ornitología y Biodiversidad (CORBIDI), Lima, Peru	[S]Influence of prior fate and nest predator community on renesting decisions of multi-brooded forest songbirds. **Laura J. Kearns** and Amanda D. Rodewald, Ohio State Univ., Columbus, OH 43210
11:00	From research to management: development of best management practices for Cerulean Warblers. **Scott H. Stoleson**, USFS Northern Research Station, Irvine, PA 16329, Jeffery L. Larkin, Biology Dept., Indiana Univ. Pennsylvania, Indiana, PA 15705, David Buehler and Patrick Keyser, Univ. Tennessee, Knoxville, TN 37996, Paul Hamel, USFS Southern Research Station, Stoneville, MS 38776, Amanda	Crucial nesting habitat for Gunnison Sage-Grouse: a spatially explicit hierarchical approach. **Cameron L. Aldridge** and D. Joanne Saher, NREL, Colorado State Univ., Fort Collins, CO, Theresa M. Childers and Kenneth E. Stahlnecker, National Park Service, Black Canyon of the Gunnison National Park and Curecanti National Recreation Area, Gunnison, CO, and Zachary H. Bowen, USGS, Fort Collins, CO	[S]Testing the Pleistocene aggregate island complex (PAIC) model of diversification in co-distributed avian lineages. **Peter A. Hosner** and Robert G. Moyle, Univ. Kansas, Lawrence, KS 66046	[S]Drought-delay impacts on Black-tailed Gnatcatcher *Polioptila melanura* and Verdin *Auriparus flaviceps* productivity in the Sonoran Desert. **Chris McCreedy** and Charles van Riper, School of Natural Resources, Univ. Arizona, Tucson, AZ 85705

Time	Auditorium 1	Auditorium 2	Auditorium 3	Auditorium 4
11:15	Rodewald, School of Environment and Natural Resources, Ohio State Univ., Columbus, OH 43210, and Petra B. Wood, WV Coop. Fish and Wildl. Research Unit, Div. Forestry and Natural Resources, West Virginia Univ., Morgantown, WV 26506	Use of molecular tagging to estimate demographic parameters in Gunnison Sage-grouse. **Sara J. Oyler-McCance** and Jennifer A. Fike, USGS Fort Collins Science Center, Fort Collins, CO 80526, and Michael Phillips and Paul Lukacs, Colorado Division of Wildlife, Fort Collins, CO 80526	[S]Preliminary genetic analysis of the Painted Bunting *Passerina ciris* in South West Oklahoma. **Andrea Contina** and Jeff Kelly, Univ. Oklahoma, Oklahoma Biological Survey, Norman, 73019 OK	Temperature effects on daily survival rates of nesting Lewis's Woodpeckers *Melanerpes lewis* in the past, present, and future. **Victoria Saab**, USFS Rocky Mt. Research Station, Bozeman, MT 59717, Erin Towler, National Center for Atmospheric Research, Boulder, CO 80307, and Karen Newlon, Montana Natural Heritage Program, Helena, MT 59620
11:30	The Hardwood Ecosystem Experiment: do silvicultural treatments affect Cerulean Warbler relative abundance and territory size and placement in southern Indiana? **Kamal Islam**, Ryan Dibala, Kyle Kaminski, Margaret MacNeil, Jennifer Wagner, and Lila (Prichard) Young, Dept. Biology, Ball State Univ., Muncie, IN 47306	Discussion	[S]A tale of two seabirds: population genetics of Galapagos Great Frigatebirds (*Fregata minor*) and Nazca Boobies (*Sula granti*). **Iris I. Levin** and Patricia G. Parker, Dept. Biology, Univ. Missouri - St. Louis and Whitney R. Harris World Ecology Center, St. Louis, MO 63121 and the WildCare Center, St. Louis Zoo, St. Louis, MO 63110	[S]Breeding biology of a newly-established population of House Wrens. **Catherine Alsford**, Brynne Stumpe, and Sara Morris, Dept. Biology, Canisius Coll., Buffalo, NY 14208, and Lindsey Walters, Dept. Biological Sciences, Northern Kentucky Univ., Highland Heights, KY 41099
11:45			Migratory connectivity in the age of genomics. **Kristen Ruegg**, Center For Tropical Research, UCLA Inst. Environment and Sustainability, Los Angeles, CA 90095	Starting over: nest relocation and nestling provisioning in House Wrens after nest predation. **Lindsey A. Walters**, Dept. Biological Sciences, Northern Kentucky Univ., Highland Heights, KY 41099, and Nathan Olszewski and Kevin Sobol, Dept. Biology, Canisius Coll., Buffalo, NY 14208
12:00-13:00	**Ballroom**: Lunch and WOS Business Meeting			
13:00-14:00	**Ballroom:** WOS Plenary (Margaret Morse Nice Award Lecture): The ecology of the Red-cockaded Woodpecker, by necessity a multidiscipline study. **Richard N. Conner**, USDA Forest Service Southern Research Station, Stoneville, MS 38776			

Time	Auditorium 1	Auditorium 2	Auditorium 3	Auditorium 4
	SY1: Cerulean Warbler (cont.)	CO5: Breeding biology	CO6: Paleontology	CO7: Waterbird habitat ecology
14:30	A decade of Cerulean Warbler (*Dendroica cerulea*) research at Fort Custer Training Center, Michigan. **Jennifer Baldy**, Raymond J. Adams, John Brenneman, Mark E. Miller, and Torrey Wenger, Kalamazoo Nature Center, Kalamazoo, MI 49009	[S]Fitness consequences and selective mechanisms favoring local nest morphologies in Yellow Warblers: nest transplant experiments between subarctic and temperate populations. **Vanya G. Rohwer** and Paul R. Martin, Dept. Biology, Queen's Univ., Kingston, ON K7L 3N6, Canada	[S]Late Pleistocene passerines of the Talara Tar Seeps in northwest Peru: indicators of climate change. **Jessica A. Oswald**, Dept. Biology, Florida Museum of Natural History, Univ. Florida, Gainesville, FL 32611	A synthesis of recent studies showing how prey availability affects wading bird habitat selection, physiology, and reproduction. **Dale E. Gawlik** Environmental Sciences Program, Florida Atlantic Univ., Boca Raton, FL 33431, Garth Herring, USGS Western Ecological Research Center, Univ. California Davis, Davis, CA 95616, James M. Beerens, Samantha M. Lantz, and Bryan Botson, Dept. Biological Sciences, Florida Atlantic Univ., Boca Raton, FL 33431, Mark I. Cook, Everglades Division, South Florida Water Management District, West Palm Beach, FL 33406, and Rachael Pierce, Okeechobee Division, South Florida Water Management District, West Palm Beach, FL 33406
14:45		[S]Extra-pair paternity and morphological correlates in the Scissor-tailed Flycatcher (*Tyrannus forficatus*) in southwestern Oklahoma. **Diane V. Landoll**, Michael S. Husak, Michael T. Murphy, Dept. Biology, Portland State Univ., Portland, OR 97207; and Jeff Kelly; Dept. Zoology, Univ. Oklahoma, Oklahoma Biological Survey, Norman, OK 73019; Dept. Biological Sciences, Cameron Univ., Lawton, OK 73505; Dept. Zoology, Univ. Oklahoma, Oklahoma Biological Survey, Norman, OK 73019	Character support for the hypothesis that birds are maniraptoran theropod dinosaurs. **Frances C. James** and John A. Pourtless IV, Dept. Biological Science, Florida State Univ., Tallahassee, FL 32306	[S]The avian community response to constructed treatment wetlands for Everglades restoration. **Tyler J. Beck** and Dale E. Gawlik Dept. Biological Sciences, Florida Atlantic Univ., Boca Raton, FL 33431, and Elise V. Pearlstine, Everglades Research and Education Center, Univ. Florida, IFAS, Belle Glade, FL

Time	Auditorium 1	Auditorium 2	Auditorium 3	Auditorium 4
15:00	Season-long fecundity, brood parasitism and nest predation in the Cerulean Warbler in southwestern Michigan. **Christopher M. Rogers**, Dept. Biological Sciences, Wichita State Univ., Wichita, KS 67260	[s]An experimental test of density-dependent reproduction in Prothonotary Warblers, *Protonotaria citrea*. **Nicole M. Davros**, Program in Ecology, Evolution, & Conservation Biology, Univ. Illinois at Urbana-Champaign, Urbana, IL 61801, Jeffrey D. Brawn, Dept. Natural Resources and Environmental Sciences, Univ. Illinois at Urbana-Champaign, Urbana, IL 61801, and Jeffrey P. Hoover, Illinois Natural History Survey, Institute of Natural Resource Sustainability, Univ. Illinois at Urbana-Champaign, Champaign, IL 61820	[s]An interpretation of the tenth skeletal specimen of *Archaeopteryx*. **John A. Pourtless IV** and Frances C. James, Dept. Biological Science, Florida State Univ., Tallahassee, FL 32306	Modeling trophic linkages with wading bird prey concentrations: turning ecosystem attributes into wading bird food. **Bryan A. Botson**, Dale E. Gawlik, and Joel C. Trexler, Biological Sciences, Florida Atlantic University, Boca Raton FL 33458
15:15		Time of fledging in House Wrens, *Troglodytes aedon*, derived from temperature loggers. **Douglas W. White** and E. Dale Kennedy, Biology Department, Albion Coll., Albion, MI 49224	A new interpretation for the classical avian fossil locality at Fossil Lake, Oregon. **Katherine McCarville**, Upper Iowa Univ., Fayette, IA 52142	Modeling flexible habitat selection of wading birds in dynamic wetlands. **James M. Beerens**, Dale E. Gawlik, and Erik Noonburg, Dept. Biological Sciences, Florida Atlantic Univ., Boca Raton, FL 33431
15:30	Break			
	SY1: Cerulean Warbler (cont.)	CO8: Life history	CO9: Physiology & immunology	CO10 Habitat ecology
15:45	Migration distribution and risks: the next frontier. **Melinda J. Welton**, Gulf Coast Bird Observatory, Franklin, TN 37064, D. L. Anderson, Museum of Natural Science, Louisiana State Univ., Baton Rouge, LA 70803, G. Colorado, School of Environment and Natural Resources, Ohio State Univ., Columbus, OH 43210, E. M. Carman, San Jose, Costa Rica, T. Beachy, Dept. Forestry, Wildlife, and Fisheries, Univ. Tennessee, Knoxville, TN 37996, E. S. Perez,	[s]Can nestling songbirds reveal adult breeding site fidelity? **Sarah E. Rehme**, Nebraska Cooperative Fish and Wildlife Research Unit, School of Natural Resources, Univ. Nebraska-Lincoln, Lincoln, NE 68583, Craig R. Allen, USGS Nebraska Cooperative Fish and Wildlife Research Unit, School of Natural Resources, Univ. Nebraska-Lincoln, Lincoln, NE 68583, Keith A. Hobson, Environment Canada, Saskatoon, SK S7N 3H5, Canada, and Larkin A. Powell, School of	[s]Seroprevalence of malarial antibodies in Galapagos Penguins (*Spheniscus mendiculus*). **Jamie L. Palmer**, Thomas F. McCutchan, Sharon L. Deem, Dan Hartman, Patricia G. Parker, Dept. Biology, Univ. Missouri - St. Louis, St. Louis, MO 63121	[s]Are wintering grounds for grassland birds threatened by a native invasive grass? **Brian J. Bielfelt**, Caesar Kleberg Wildlife Research Institute, Texas A&M Univ.-Kingsville, Kingsville, TX 78363, Andrea R. Litt, Dept. Ecology, Montana State Univ., Bozeman, MT 59717, and Fred C. Bryant, Leonard A. Brennen, and Tom Langschied, Caesar Kleberg Wildlife Research Institute, Texas A&M Univ.-Kingsville, Kingsville, TX 78363

Time	Auditorium 1	Auditorium 2	Auditorium 3	Auditorium 4
	Fundación Defensores de la Naturaleza, Guatemala Ciudad, Guatemala, D. Mehlman, Migratory Bird Program, The Nature Conservancy, Santa Fe, NM 87501, J. D. Vargas, San Jose, Costa Rica, and L. D. Chavarría, Reserva El Jaguar, Jinotega, Nicaragua	Natural Resources, Univ. Nebraska-Lincoln, Lincoln, NE 68583		
16:00		[S]Reproductive decisions by the American Kestrel: experimental evidence that female kestrels exhibit a fixed level of investment in offspring. **Jessi L. Brown**, Program in Ecology, Evolution, and Conservation Biology, Univ. Nevada-Reno, Reno, NV 89512, and Michael W. Collopy, Academy for the Environment, Univ. Nevada-Reno, Reno, NV 89557	[S]Phenotypic flexibility in African waterfowl. **Mduduzi Ndlovu**, Cumming Graeme and Hockey Phil, Percy FitzPatrick Institute, Univ. Cape Town, South Africa	[S]Changes in the songbird community since time burned in grazed and ungrazed pastures. **Alexis Richardson** and Nicola Koper, Natural Resources Institute, Univ. Manitoba, Winnipeg, MB R3T 2N2, Canada
16:15	Panel discussion	**Cancelled:** [S]Timing and proximate causes of mortality in wild bird populations: testing Ashmole's Hypothesis. **Daniel C. Barton** and Thomas E. Martin, Montana Cooperative Wildlife Research, Univ. Montana, Missoula, MT 59812	Ultrasonographic detection of seasonal changes in flight muscle size in small birds. **David L. Swanson**, Dept. Biology, Univ. South Dakota, Vermillion, SD 57069	[S]Assessing landscape and habitat attributes at multiple scales: what drives avian abundance and distribution in grasslands? **Christopher F. Jorgensen**, Nebraska Cooperative Fish and Wildlife Research Unit, School of Natural Resources, Univ. Nebraska-Lincoln, Lincoln, NE 68583, Joseph J Fontaine, USGS Nebraska Cooperative Fish and Wildlife Research Unit, Lincoln, NE 68583, and Larkin Powell, School of Natural Resources, Univ. Nebraska-Lincoln, Lincoln, NE 68583
16:30		[S]Density dependence in two seasons: demographic effects of competition and climate. **Helen R. Sofaer** and Kathryn M. Langin, Graduate Degree Program in Ecology, Colorado State Univ., Fort Collins CO 80523; T. Scott Sillett, Migratory Bird Center, Smithsonian Conservation Biology Inst., National Zoological Park, Washington, DC 20013; and Cameron K. Ghalambor,	[S]Thermal tolerances of nesting Lesser Prairie-Chickens and the potential population level influence of climate change. **Blake Grisham** and Clint Boal, USGS, Texas Cooperative Fish and Wildlife Research Unit and Dept. Natural Resources Management, Texas Tech Univ., Lubbock, TX 79409, and David Haukos, US Fish and Wildlife Service, Texas Tech Univ., Lubbock,	[S]Occupancy modeling of marsh bird habitat associations in Ohio. **Karen Willard**, Paul Rodewald, and Robert Gates, Ohio State Univ., Columbus, OH 43212

Time	Auditorium 1	Auditorium 2	Auditorium 3	Auditorium 4
		Graduate Degree Program in Ecology, Colorado State Univ., Fort Collins CO 80523	TX 79409	
16:45		**Cancelled:** Life history variation in the Orange-crowned Warbler. **T. Scott Sillett**, Migratory Bird Center, Smithsonian Conservation Biology Inst., Washington, DC 20013, Jongmin Yoon, Helen R. Sofaer, Kathryn M. Langin, Cameron K. Ghalambor, Dept. Biology, Colorado State Univ., Fort Collins, CO 80523, and Thomas E. Martin, Montana Cooperative Wildlife Research Unit, Univ. Montana, Missoula, MT 59812	The dynamics of physiology-trait relationships: implications for honest signal theory. **Rebecca Jo Safran**, Dept. Ecology and Evolutionary Biology, Univ. Colorado, Boulder, CO 80309	Foraging habitat parameters: preferences of Everglades wading birds. **Michelle L. Petersen**, Dept. Biological Sciences, Florida Atlantic Univ., Boca Raton, FL 33431, Dale E. Gawlik, Dept. Biological Sciences, Florida Atlantic Univ., Boca Raton, FL 33431, and Mark I. Cook, Everglades Division, South Florida Water Management District, West Palm Beach, FL 33406

Time	Auditorium 1	Auditorium 2	Auditorium 3	Auditorium 4
Friday	SY3: **Avian Conservation and Ecosystem Services in Agricultural Landscapes**. Organizers: John Quinn, School of Natural Resources, Univ. Nebraska□Lincoln, and Julie Jedlicka, Environmental Studies, Univ. California Santa Cruz	CO11: Systematics	C012: Habitat selection	C013: Conservation
8:45	Avian conservation in temperate agroecosystems: consideration of spatial scale and management outcomes. **John E. Quinn**, Univ. Nebraska-Lincoln, School of Natural Resources. Lincoln, NE 68583, Ron J. Johnson, Clemson Univ., Dept. Forestry & Natural Resources. Clemson, SC 29634, and James R. Brandle, Univ. Nebraska-Lincoln, School of Natural Resources. Lincoln, NE 68583	vacant	Breeding habitat of the rare Connecticut Warbler (*Oporornis agilis*) is related to patch size. **Carly N. Lapin**, Matthew A. Etterson, and Gerald J. Niemi, Depts. Biology and Integrated Biosciences and Natural Resources Research Inst., Univ. Minnesota, Duluth, MN 55812	Conservation genetics of the White-tailed Sabrewing (*Campylopterus ensipennis*) on Tobago, West Indies. **Rebecca Kirby**, Dept. Forest and Wildlife Ecology , Univ. Wisconsin, Madison, WI 53706, and Mark E. Berres, Dept. Animal Sciences, Univ. Wisconsin, Madison, WI 53706
9:00		Harlan's Hawks differ in adult plumage and a leg measure from Red-tailed Hawks. **William S. Clark**, Harlingen, TX 78550	[S]Breeding Smith's Longspur habitat associations and predicted distribution in the Brooks Range, Alaska. **Teri Wild**, Dept. Biology and Wildlife, Univ. Alaska, Fairbanks, AK 99775, Steve Kendall, U.S. Fish and Wildlife Service, Yukon Flats National Wildlife Refuge, Fairbanks, AK 99701, Nikki Guldager, U.S. Fish and Wildlife Service, Arctic National Wildlife Refuge, Fairbanks, AK 99701, and Abby Powell, USGS Alaska Cooperative Fish and Wildlife Research Unit, Univ. Alaska, Fairbanks, AK 99775	[S]Monitoring the population of the Calayan Rail. **Carl H. Oliveros**, Isla Biodiversity Conservation, Las Pinas City, Philippines, Dept. Ecology and Evolutionary Biology, Univ. Kansas, Lawrence, KS 66045, and Cynthia Adeline A. Layusa and Jameson B. Reynon, Isla Biodiversity Conservation, Las Pinas City, Philippines
9:15	Cross-property agreements on ranch lands provide scale for avian conservation. Larkin A. Powell, School of Natural Resources, Univ. Nebraska-Lincoln, Lincoln, NE 68583	[S]Morphological and genetic divergence in the Island Scrub-Jay: local adaptation within a single-island endemic?. **K. M. Langin**, Dept. Biology, Colorado State Univ., Fort Collins, CO 80523, T. S. Sillett, Smithsonian Migratory Bird Center, National Zoological Park,	[S]Habitat associations of secretive marsh-birds in Iowa. **Tyler M. Harms** and Stephen J. Dinsmore, Dept. Natural Resource Ecology & Management, Iowa State Univ., Ames, IA 50010	Integrating climate vulnerability into the California Bird Species of Special Concern list. **Thomas Gardali**, Nathaniel E. Seavy, and Ryan T. DiGaudio, PRBO Conservation Science, Petaluma, CA 94954, and Lyann A. Comrack, California Dept. Fish and Game,

Time	Auditorium 1	Auditorium 2	Auditorium 3	Auditorium 4
		Washington, DC 20013, W. C. Funk, Dept. Biology, Colorado State Univ., Fort Collins, CO 80523, S. A. Morrison, The Nature Conservancy, San Francisco, CA 94105, and C. K. Ghalambor, Dept. Biology, Colorado State Univ., Fort Collins, CO 80523		Sacramento, CA 95811
9:30		[S]A Bayesian model of island colonization based on Song Sparrow (*Melospiza melodia*) populations in the Aleutian Islands of Alaska. **Jason F. Smyth** and Christin L. Pruett, Dept. Biological Sciences, Florida Inst. Technology, Melbourne, FL 32901 and Kevin Winker, Univ. Alaska Museum, Fairbanks, AK 99775	[S]Effects of multiple habitat management practices on breeding habitat usage by Eastern Black Rail. **Stephanie A. Kane**, Fort Hays State Univ., Hays, KS 67601	Demography and predicted population trends of the Whooping Crane. **Karine C. Gil-Weir**, The Crane Trust, Inc., Wood River, NE 68883, and William. E. Grant, and R. Douglas Slack, Dept. Wildlife and Fisheries Sciences, Texas A&M Univ., College Station, TX 77843
9:45	Buff-breasted Sandpiper (*Tryngites subruficollis*) use of agricultural fields in the Rainwater Basin, Nebraska, and implications for conservation. John P. McCarty, Dept. Biology, Univ. Nebraska at Omaha, Omaha, NE 68182, Joel G. Jorgensen, Nebraska Game and Parks Commission, Lincoln, NE 68503, and L. LaReesa Wolfenbarger, , Univ. Nebraska at Omaha, Omaha, NE 68182	[S]The challenge of delimiting recent lineages: the Chinese/Taiwan Bulbul (*Pycnonotus sinensis/taivanus*) complex as a case study. **Bailey D. McKay**, Herman L. Mays, Yuchun Wu, Hui Li, Yao Cheng-te, Isao Nishiumi, and Fasheng Zou, Univ. Minnesota and Bell Museum, Saint Paul, MN 55108	[S]Testing a long-standing ecological principle: the hemi-marsh condition hypothesis. **Alexander L. Galt**, Minnesota Private Lands Office, US Fish and Wildlife Service, Waite Park, MN 56387, and Elmer J. Finck, Dept. Biological Sciences, Fort Hays State Univ., Hays, KS 67601	Using species vulnerability assessment to reduce uncertainty in setting bird conservation priorities in North America. **Terrell D. Rich**, U.S Fish and Wildlife Service, Boise, ID 83709
10:00		Functional morphology of the bill in the Anhingidae: an adaptation that can be maladaptive in the modern world. **Jerome A. Jackson**, Dept. Marine and Ecological Sciences, Florida Gulf Coast Univ., Ft. Myers, FL 33965, and Bette J. S. Jackson, Dept. Biological Sciences, Florida Gulf Coast Univ., Ft. Myers, FL 33965	Long term changes in Saltmarsh *Ammodramus caudacutus* and Nelson *Ammodramus nelsoni* sparrow abundance at Rachel Carson National Wildlife Refuge, Maine, USA. **W. Gregory Shriver**, Dept. Entomology and Wildlife Ecology, Univ. Delaware, Newark, DE 19717, Kathleen M. O'Brien, USFWS - Rachel Carson National Wildlife Refuge, Wells, ME 04090, Mark Ducey, Dept. Natural Resources and the Environment,	Conservation science for conservation outcomes in Arctic Alaska. **Steve Zack** and Joe Liebezeit, Wildlife Conservation Society, Portland, OR 97205

Time	Auditorium 1	Auditorium 2	Auditorium 3	Auditorium 4
			Univ. New Hampshire, Durham NH, 03824, and Thomas P. Hodgman, Maine Dept. Inland Fisheries and Wildlife, Bangor, ME 04401	
10:15	Break			
	SY3: Birds & Agriculture (cont.)	CO14: Song	CO15: Habitat ecology	CO16: Demography
10:30	Climate change, agriculture and wetlands: Implications for waterfowl conservation in the Prairie Pothole Region. **Benjamin S. Rashford** and Eric Cropper, Agricultural and Applied Economics, Univ. Wyoming, Laramie, WY 82071, and Richard Voldseth, School of Natural Resource Sciences, North Dakota State Univ., Fargo, ND 58108	[S]Geographic structure of song sharing in the Dickcissel (*Spiza americana*) determined by cross correlation. **Eric J. Ross**, Dept. Science and Environmental Policy, California State Univ., Monterey Bay, Seaside, CA 93955, Derek M. Schook, Dept. Forest, Rangeland & Watershed Stewardship, Colorado State Univ., Fort Collins, CO 80521, Susan E. Alexander and Fred G. R. Watson, Dept. Science and Environmental Policy, California State Univ., Monterey Bay, Seaside, CA 93955, Timothy H. Parker, Biology Department, Whitman Coll., Walla Walla, WA 99362	The response of breeding passerines to rangeland alteration. **Kimberly A. Sullivan** and Leslie J. Brown, Dept. Biology, Utah State Univ., Logan UT 84322	Trade-offs in vital rates of Mourning Doves, *Zenaida macroura*. **David L. Otis**, USGS Iowa Cooperative Fish and Wildlife Research Unit, Iowa State Univ., Ames, IA 50011, and David A. Miller, USGS Patuxent Wildlife Research Center, Laurel, MD 20708
10:45		[S]Geographic variation in the song of the Barn Swallow, *Hirundo rustica*. **Matthew Wilkins,** Dept. Ecology and Evolutionary Biology, Univ. Colorado, Boulder, CO, Karaardıç, Ali Erdoğan, Dept. Biology, Akdeniz Univ., Antalya, Turkey, and Rebecca Safran, Dept. Ecology and Evolutionary Biology, Univ. Colorado, Boulder, CO 80309	[S]Distribution and habitat selection of the Western Burrowing Owl (*Athene cunicularia hypugaea*) in western South Dakota. **Jason Thiele** and Charles Dieter, Dept. Biology and Microbiology, South Dakota State Univ., Brookings, SD 57007, and Kristel Bakker, Coll. of Arts and Sciences, Dakota State Univ., Madison, SD 57042	Precipitation and temperature influence nest survival of shortgrass prairie birds. **Reesa Yale Conrey** and Susan K. Skagen, USGS Fort Collins Science Center, Fort Collins, CO 80526, and Victoria J. Dreitz, Colorado Division of Wildlife, Fort Collins, CO 80526
11:00	Conservation of avian species strengthens ecosystem services in California vineyards. **Julie A. Jedlicka**, Dept. Environmental Studies, Univ. California, Santa Cruz, CA and Russell Greenberg,	[S]Does House Wren singing rate change with stage in breeding cycle? **Brynne A. Stumpe**, Catherine C. Alsford, and Sara R. Morris, Canisius Coll., Buffalo, NY 14208	Estimating the abundance of Long-billed Curlews in Nebraska. **Cory Gregory** and Stephen Dinsmore, Dept. Natural Resource Ecology and Management, Iowa State Univ., Ames, IA 50011, Larkin A. Powell,	[S]Long-term trends in survival and population growth of White-tailed Ptarmigan in Colorado. **Gregory T. Wann** and Cameron L. Aldridge, Natural Resource Ecology Laboratory, Colorado State Univ.,

Time	Auditorium 1	Auditorium 2	Auditorium 3	Auditorium 4
	Smithsonian Migratory Bird Center, National Zoological Park, Washington, DC and Deborah K. Letourneau, Dept. Environmental Studies, Univ. California, Santa Cruz, CA		School of Natural Resources, Univ. Nebraska, Lincoln, NE 68583, and Joel G. Jorgensen, Nebraska Game and Parks Commission, Lincoln, NE 68503	Fort Collins, CO 80523, and Clait E. Braun, Grouse Inc., Tucson, AZ 85750
11:15		[S]Song dialects in alpine-breeding birds of the Rocky Mountains. **Anthony C. Dalisio** and William E. Jensen, Dept. Biological Sciences, Emporia State Univ., Emporia, KS 66801, and Timothy H. Parker, Dept. Biology, Whitman Coll., Walla Walla, WA 99362	[S]Effects of cattle stocking rate and duration of grazing on songbirds of the mixed-grass prairie. **Maggi Sliwinski**, and Nicola Koper, Natural Resources Institute, Univ. Manitoba, Winnipeg, MB, R3T 2M6, Canada	Mortality of migrant Sandhill Cranes at power lines over the Platte River, central Nebraska. **Robert K. Murphy** and Gregory W. Wright, Dept. Biology, Univ. Nebraska-Kearney, Kearney, NE 68845, and Arun K. Pandey, EDM International, Ft. Collins, CO 80525
11:30	Vacant	[S]Song varies across older and younger hybrid zones in Black-crested (*Baeolophus atricristatus*) and Tufted (*B. bicolor*) titmice. **C. M. Curry** and M. A. Patten, Dept. Zoology and Oklahoma Biological Survey, Univ. Oklahoma, Norman, OK 73019	[S]Selection for anthropogenic structures and vegetation characteristics by Common Ravens (*Corvus corax*) within a sagebrush-steppe ecosystem. **Kristy B. Howe** and David J. Delehanty, Dept. Biological Sciences, Idaho State Univ., Pocatello, ID, and Peter S. Coates, USGS Western Ecological Research Center, Dixon, CA 95616	[S]Wind turbine development and conservation of airspace in a major migration corridor. **Anna C Peterson** and Gerald J Niemi, Natural Resources Research Inst., Univ. Minnesota Duluth, Duluth, MN 55811
11:45		Song repertoire size and composition in Carolina Chickadees in southeastern Pennsylvania. **Robert L. Curry** and Karen E. Zusi, Dept. Biology, Villanova Univ., Villanova, PA 19085	**Cancelled:** Home range and habitat use of breeding Common Ravens in Redwood National and State Parks, California. **Amy Scarpignato** and T. Luke George, Dept. Wildlife, Humboldt State Univ., Arcata, CA 95521	Dispersal decisions recalibrate annual adult survival estimates in a migratory songbird. **Jeffrey P. Hoover**, Wendy M. Schelsky, and Thomas J. Benson, Illinois Natural History Survey, Univ. Illinois, Champaign, IL 61820, and Scott K. Robinson, Florida Museum of Natural History, Gainesville, FL 32611
12:00-13:00	**Ballroom:** Lunch + AFO Business Meeting			
13:00-14:00	**Ballroom:** AFO Plenary: Sandhill Cranes and the Platte River: a local and global perspective. **Gary L. Krapu**, USGS Northern Prairie Wildlife Research Center, Jamestown, ND 58401			

Time	Auditorium 1	Auditorium 2	Auditorium 3	Auditorium 4
	CO17: Demography	CO18: Parasites & plumage	CO19: Nutcracker biology	CO20: Habitat ecology
14:30	[S]Gimme' Shelter: a tropical bird's dissimilar response to global climatic phenomenon in an uneven aged forest. **Jared D. Wolfe**, School of Renewable Natural Resources, Louisiana State Univ., Baton Rouge, LA 70803, and C. John Ralph, USDA Forest Service, Pacific Southwest Research Station, Redwood Sciences Laboratory, Arcata, CA 95521 and Klamath Bird Observatory, Ashland, OR 97520	[s]Effects of habitat fragmentation on the community of pathogens of the Harris' Hawk in the desert of Baja California Sur, México. **Romeo Tinajero** and Ricardo Rodríguez-Estrella Centro de Investigaciones Biológicas de Noroeste (CIBNOR), La Paz, Baja California Sur, México, and Jesús A. Lemus and G. Blanco Dept. Evolutionary Ecology, Museo Nacional de Ciencias Naturales (CSIC), c/ José Gutiérrez Abascal 2, 28006 Madrid, Spain	[s]Cascading trait-mediated indirect effects across the boreal forest. **Jeff Garcia** and Craig W. Benkman, Dept. Zoology and Physiology, Univ. Wyoming, Laramie WY 82071	[s]Diversity pattern and significant upward shifts in birds along a complete altitudinal rainforest gradient in New Guinea. **Katerina Tvardikova** and Vojtech Novotny, Dept. Zoology, Faculty of Science, Univ. South Bohemia in Ceske Budejovice, Czech Republic, and Inst. Entomology, Biology Centre AS CR, Ceske Budejovice, Czech Republic
14:45	Modeling fecundity in birds: conceptual overview and significance in avian biology. **Joseph A. Grzybowski**, Coll. of Mathematics and Science, Univ. Central Oklahoma, Edmond, OK 73034, and Matthew A. Etterson, Mid-Continental Ecology Division, US Environmental Protection Agency, Duluth, MN 55803	[s]Ectoparasites reduce feather growth in an Amazonian forest bird, *Willisornis poecilinota*. **Erik I. Johnson** and Philip C. Stouffer, Dept. Renewable Natural Resources, Louisiana State Univ., Baton Rouge, LA 70803	[s]Spring-summer space use by Clark's Nutcrackers in Washington State. **Teresa J. Lorenz**, Coll. of Natural Resources, Univ. Idaho, Moscow, ID 83844, and Kimberly A. Sullivan and Amanda V. Bakian, Dept. Biology, Utah State Univ., Logan, UT 84322	[s]The effects of selection harvesting on Black-throated Blue Warbler reproduction. **Melissa Creasey** and Erica Nol, Trent Univ., Peterborough, ON K9J 5G8, Canada, and Dawn Burke, Ministry of Natural Resources, London, ON, Canada
15:00	[s]Natal dispersal of Swainson's Hawks in Butte Valley, California. **Christopher W. Briggs**, Dept. Natural Resources and Environmental Science, Univ. Nevada-Reno, Reno, NV 89512, Michael W. Collopy, Acad. Environment, Univ. Nevada-Reno, Reno, NV 89557, and Brian Woodbridge, U.S. Fish and Wildlife Service, Yreka, CA 96097	[s]Seasonal variation in the maintenance behavior of House Sparrows, *Passer domesticus*. **Aubrey Alamshah** and Edward H. Burtt, Jr., Dept. Zoology, Ohio Wesleyan Univ., Delaware, OH 43015	[s]Not just a walk in the park: Clark's Nutcracker in declining habitat. **Monika Maier** and Kimberly Sullivan, Dept. Biology, Utah State Univ., Logan, UT 84322	Spatial analysis of Northern Goshawk territories in the Black Hills, South Dakota. **Robert W. Klaver**, USGS/EROS, Sioux Falls, SD, Douglas Backlund, South Dakota Game, Fish, and Parks, Pierre, SD, Paul E. Bartelt, Waldorf Coll., Forest City, IA, Michael G. Eriscksson, South Dakota Dept. Environment and Natural Resources, Pierre, SD, Craig J. Knowles and Pamela R. Knowles, Fauna West Wildlife Consultants, Townsend, MT, and Michael C. Wimberly, South Dakota State Univ., Brookings, SD

Time	Auditorium 1	Auditorium 2	Auditorium 3	Auditorium 4
15:15	Estimating adult breeding dispersal/fidelity at different geographic scales to evaluate restoration efforts for Roseate Terns. **Jeffrey A. Spendelow**, James E. Hines & James D. Nichols, USGS Patuxent Wildlife Research Center, Laurel, MD 20708, Ian C.T. Nisbet, I.C.T. Nisbet & Company, North Falmouth, MA 02556, Carolyn S. Mostello, Massachusetts Div. Fisheries and Wildlife, Westborough, MA 01591, Grace Cormons, Great Gull Island Project, Parksley, VA 23421, Helen Hays, Great Gull Island Project, American Museum of Natural History, New York, NY 10024, and Jeremy J. Hatch, Dept. Biology, Univ. Massachusetts, Boston, MA 02125	Dark plumage to resist bacterial degradation: facultative or evolutionary response? **Edward H. Burtt, Jr.**, Dept. Zoology, Ohio Wesleyan Univ., Delaware, OH 43015, and George S. Hamaoui and Max R. Schroeder, Dept. Botany/Microbiology, Ohio Wesleyan Univ., Delaware, OH 43015	[S]Evidence for Allee effects? How variation in local tree density influences the mutualism between limber pine (*Pinus flexilis*) and the Clark's Nutcracker (*Nucifraga columbiana*). **Lauren E. Throop** and Craig W. Benkman, Dept. Zoology and Physiology, Univ. Wyoming, Laramie, WY 82070	Summary and results of the Milan Bottoms Bald Eagle night roost survey project. **Cathleen D. Monson**, Kelly J. McKay, Robert R. Bryant, Richard A. Sayles, Walter M. Zuurdeeg, Brian P. Ritter, Shirley A. VanMeter, Jason L. Monson and Brian L. Blevins, BioEco Research and Monitoring Center, Hampton, IL 61256
15:30	Break			
	CO21: Habitat Ecol (Jackson?)	CO22: Brood parasitism	CO23: Stopover ecology	CO24: Genetics
15:45	[S]Impacts of wildfire on avian communities. **Michele de Verteuil**, William P. Kuvlesky, Jr., Caesar Kleberg Wildlife Research Institute, Texas A&M Univ.-Kingsville, Kingsville, TX 78363, Andrea R. Litt, Dept. Ecology, Montana State Univ., Bozeman, MT 59717, Leonard A. Brennan, Caesar Kleberg Wildlife Research Institute, Texas A&M Univ.-Kingsville, Kingsville, TX 78363, James F. Gallagher, Texas AgriLife Extension, Uvalde, TX 78801, and Daniel P. Walker, Chaparral Wildlife Management Area, Texas Parks and Wildlife Dept., Artesia Wells, TX 78001	[S]Cowbird parasitism increases after high fledging success of cowbird, but not host, nestlings. **Amber Albores** and Jeffery P. Hoover, Dept. Natural Resources and Environmental Science, Univ. Illinois, Champaign, IL, and Institute of Natural Resource Sustainability, Illinois Natural History Survey, Champaign, IL	[S]Long-term changes in the stopover dynamics of migratory songbirds in northern California. **Gina Barton** and Brett K. Sandercock, Div. Biology, Kansas State Univ., Manhattan, KS 66506	*Clock* gene variation in swallows. **Roi Dor** and Caren B. Cooper, Cornell Lab of Ornithology, Cornell Univ., Ithaca, NY 14850, Irby J. Lovette and David W. Winkler, Cornell Lab. Ornithology, Cornell Univ., Ithaca, NY 14850 and Dept. Ecology and Evolutionary Biology, Cornell Univ., Ithaca, NY 14950

Time	Auditorium 1	Auditorium 2	Auditorium 3	Auditorium 4
16:00	[S]Canopy characteristics affecting avian reproductive success: the Golden-cheeked Warbler. **Jessica A. Klassen**, Florida Atlantic Univ., Pembroke Pines, FL 33026	[S]The effect of host to parasite egg ratio on cowbird egg ejection by American Robins. **Allison Karlien Lang** and Eric K. Bollinger, Biological Sciences Dept, Eastern Illinois Univ., Charleston, IL 61920	[S]Migrant landbird use of natural and restored riparian forest habitats in agricultural landscapes during stopover. **Erin B. Cashion** and Paul G. Rodewald, Ohio State Univ., Columbus, OH 43212	[S]Heritability of a sexually selected melanin-based trait in North American Barn Swallows, *Hirundo rustica erythrogster*. **Joanna K. Hubbard**, Brittany R. Jenkins, and Rebecca J. Safran, Dept. Ecology and Evolutionary Biology, Univ. Colorado, CO 80309
16:15	[S]Impact of disturbance on the roosting behavior of Western Snowy Plovers, (*Charadrius alexandrinus nivosus*). **Lauren F. Tingco**, California State Univ. Los Angeles, CA	[S]Assessing the effects of season, brood parasitism, and individual quality on first-year apparent survival in a Neotropical migratory songbird. **Matt McKim-Louder** and Jeffrey P. Hoover, Dept. Natural Resources and Environmental Sciences, Univ. Illinois, Champaign, IL, and Inst. Natural Resource Sustainability, Illinois Natural History Survey, Champaign, IL	Bird migration and stopover habitat use in the Southwest. **Janet M. Ruth**, USGS Fort Collins Science Center, Arid Lands Field Station, Albuquerque, NM 87131, and Robert H. Diehl and Rodney K. Felix, Jr., Univ. Southern Mississippi, Hattiesburg, MS 39406	[S]Environmental and parental effects explain among-brood differences in ornamental mouth coloration of nestling House Sparrows, *Passer domesticus*. **Matthew B. Dugas**, Dept. Zoology, Univ. Oklahoma, Norman OK 73019
16:30	**Cancelled:** [S]A bird-caused trophic cascade in the context of riparian habitat restoration: does it exist and does it represent an ecosystem service?. **Sacha K. Heath** and Matthew D. Johnson, Dept. Wildlife, Humboldt State Univ., Arcata, CA 95521	Adaptive modulation of cowbird host defensive behavior in relation to its cost and the likelihood of parasitism. **Brian D. Peer**, Dept. of Biological Sciences, Western Illinois Univ., and Robert A. McCleery, Dept. of Wildlife Ecology and Conservation, Univ. Florida	[S]The importance of oak trees as foraging habitat for neotropical migrant songbirds during spring migration. **Eric M. Wood** and Anna M. Pidgeon, Dept. Forest and Wildlife Ecology, Univ. Wisconsin-Madison, Madison, WI 53706	Telomere length is linked to early life conditions and survival in long-lived seabirds. **Chris Foote**, Lubna Nasir, and Pat Monaghan, Ecology & Evolutionary Biology, Univ. Glasgow, Glasgow G12 8QQ UK
16:45	Mercury footprint extends far downstream for songbirds along the South Fork Shenandoah River. **Allyson K. Jackson**, Sarah B. Folsom, and David C. Evers, BioDiversity Research Institute, Gorham, ME 04038, Anne M. Condon and John Schmerfeld, US Fish and Wildlife Service, Gloucestor, VA 23061, and Daniel A. Cristol, Dept. Biology, Coll. William and Mary, Williamsburg, VA 23187	[S]Female Northern Flickers increase parental care but males don't during temporary brood enlargements. **Elizabeth A. Gow** and Karen L. Wiebe, Dept. Biology, Univ. Saskatchewan, Saskatoon, SK S7N 5E2, Canada	[S]Avian migration in the face of an altered landscape. **Ryan J. Stutzman**, Susan K. Skagen, and Joseph J. Fontaine, Nebraska Cooperative Fish and Wildlife Research Unit, Univ. Nebraska-Lincoln, Lincoln, NE, USGS Fort Collins Science Center, Fort Collins, CO, USGS Nebraska Cooperative Fish and Wildlife Research Unit, Univ. Nebraska-Lincoln, Lincoln, NE	Effects of carrying an instrument package on telomere length and innate immune function in Tree Swallows. **Carol Vleck**, David Vleck, and Christopher Foote, Dept. Ecology, Evolution & Organismal Biology, Iowa State Univ., Ames, IA 50011, and David Winkler, Dept. Ecology & Evolutionary Biology, Cornell Univ., Ithaca NY 14853

Time	Auditorium 1	Auditorium 2	Auditorium 3	Auditorium 4
Saturday	SY4: **Long-term Population Effects of Piping Plover and Least Tern Management on the Great Plains**. Organizer: Dan Catlin, Dept. Fisheries and Wildlife, Virginia Polytechnic Inst. and State Univ.	CO25: Habitat ecology	CO26: Conservation	CO27: Migration
8:45		Hierarchical distance sampling models. **Robert. A. Sparks** and David. J. Hanni, Rocky Mountain Bird Observatory, Fort Collins, CO	Tracking movements of the endangered Hawaiian Goose with satellite telemetry. **Steven C. Hess**, USGS Pacific Island Ecosystems Research Center, Hawai`i National Park, HI 96718, Christina Cornett, Hawai`i Cooperative Studies Unit, Univ. Hawai`i, Hilo, Hawai`i National Park, HI 96718, Kathleen Misajon, US National Park Service, Division of Resources Management, Hawai'i National Park, HI 96718, and John J. Jeffrey, Pepeekeo, HI 96783	Waterbird diversity at a man-made stopover wetland in an urban environment. **Kristin Wakeland**, Patrick Mathews, and Alan Maccarone, Friends University, Wichita, KS 67213
9:00	Introduction	Hierarchical occupancy estimation and multi-scale habitat use of Brewer's Sparrows in the Southern Rockies / Colorado Plateau Bird Conservation Region. **David C. Pavlacky, Jr.**, Jennifer A. Blakesley and David J. Hanni, Rocky Mountain Bird Observatory, Brighton, CO 80603	[S]Survival probability and morphological adaptation of captive-reared Mallard *Anas platyrhynchos* after release into the wild. **Jocelyn Champagnon** and Matthieu Guillemain, French Hunting and Wildlife Agency, Le Sambuc, F - 13200 Arles, France, Johan Elmberg, Aquatic biology and chemistry, Kristianstad Univ., Kristianstad, Sweden, Grégoire Massez, Marais du Vigueirat, Mas Thibert, Arles, France, and Michel Gauthier-Clerc, Tour du Valat Research Center, Le Sambuc, Arles, France	[S]Movement ecology of Northern Waterthrush (*Parkesia noveboracensis*) during spring migratory stopover along the Upper Mississippi River. **David L. Slager** and Paul G. Rodewald, School of Environment and Natural Resources, Ohio State Univ., Columbus, OH 43210, and Patricia J. Heglund, U.S. Fish and Wildlife Service, La Crosse, WI 54603
9:15	Interior Least Terns and Northern Great Plains Piping Plover nesting on natural and human-created	[S]Modeling the effect of landscape and environmental factors on Sandhill Crane distribution in the	[S]How widespread are "common and widespread" species in the Gangetic floodplains, India? **K. S. Gopi**	[S]The Gulf of Maine migration mystery: filling in the gaps. **Adrienne J. Leppold** and Rebecca L.

Time	Auditorium 1	Auditorium 2	Auditorium 3	Auditorium 4
	habitat in the Lower Platte River: implication for species and river management. **Joel G. Jorgensen**, Nongame Bird Program, Nebraska Game and Parks Commission, Lincoln, NE 68503, and Mary Bomberger Brown, Tern and Plover Conservation Partnership, Lincoln, NE 68583.	Central Platte River Valley of Nebraska. **Todd J. Buckley**, Felipe Chavez-Ramirez, Larkin A. Powell, and Andrew J. Tyre, School of Natural Resources, Univ. Nebraska-Lincoln, Lincoln, NE 68538	**Sundar**, Conservation Biology Graduate Program, Univ. Minnesota, St. Paul, MN 55108	Holberton, PhD. Univ. Maine, Orono, ME 04469
9:30		[S]Past and present impacts of habitat degradation by Lesser Snow Geese on avian biodiversity along the Hudson Bay Lowlands. **Stephen L. Peterson** and David N. Koons, and Robert F. Rockwell, Utah State Univ., Logan, UT 84321	[S]Effect of oil and gas development on songbird abundance in the Eastern United States. **Emily H. Thomas**, Margaret C. Brittingham, and Walter M. Tzilkowski, School of Forest Resources, Pennsylvania State Univ., Univ. Park, PA 16802, and Scott H. Stoleson, USFS Northern Research Station, Irvine, PA 16329	A novel method to study inter- and intraspecific variation of flight-calls in captivity. **Amy K. Amones** and Michael J. Lanzone, Carnegie Museum of Natural History, Powdermill Avian Research Center, Rector, PA 15677, and Andrew J. Farnsworth, Conservation Science Program, Cornell Laboratory of Ornithology, Ithaca, NY 14850
9:45	Habitat selection and breeding success of Piping Plovers on a dynamic reservoir. **Michael J. Anteau**, Mark H. Sherfy, Terry L. Shaffer, Jennifer H. Stucker, and Mark T. Wiltermuth, USGS Northern Prairie Wildlife Research Center, Jamestown, ND 58401.	[S]Avian community dynamics in managed and unmanaged boreal forests. **Edmund Zlonis** and Gerald Niemi Dept. Biology, Univ. Minnesota Duluth, Duluth, MN, 55812		[S]Flight calls in wood-warblers: do migrants respond to conspecific calls? **Kyle G. Horton** and Sara R. Morris, Dept. Biology, Canisius Coll., Buffalo, NY 14208, and Amy Amones and Michael Lanzone, Carnegie Museum of Natural History, Powdermill Avian Research Center, Rector, PA 15677
10:00		[S]Habitat effects on nesting success of Gunnison Sage-grouse, *Centrocercus minimus*, in Gunnison, Colorado. **Amy J. Davis**, Phillip Street, and Paul Doherty, Dept. Fish, Wildlife, and Conservation Biology, Colorado State Univ., Ft. Collins, CO 80523, and Mike Phillips, Colorado Division of Wildlife, Ft. Collins, CO 80526	Tracking avian influenza with stable isotopes. **Eli S. Bridge**, Center for Spatial Analysis, Univ. Oklahoma, Norman, OK 73019, Jeffrey F. Kelly, Dept. Zoology, Univ. Oklahoma, Norman, OK 73019, Nyambayar Batbayar and Xiangming Xiao, Center for Spatial Analysis, Univ. Oklahoma, Norman, OK 73019, and John Y. Takekawa, Kyle A. Spragens, and Nichola J. Hill, SFB Estuary Field Station, USGS Western Ecological Research Center, Vallejo, CA 94592	Veery wintering locations and intratropical migration: results from geolocator tracking. **Christopher M. Heckscher** and Syrena M. Taylor, Delaware State Univ., Dept. Agriculture and Natural Resources, Dover, Delaware, and James W. Fox and Vsevolod Afanasyev, British Antarctic Survey, Natural Environment Research Council, Cambridge, CB3 0ET, UK
10:15	Break			

Time	Auditorium 1	Auditorium 2	Auditorium 3	Auditorium 4
	SY4: Plovers & Terns (cont.)	CO28: Habitat ecology	CO29: Social biology	CO30: Breeding biology; field methods
10:30	Least Tern foraging habitats on the Missouri River, a multi-scale assessment. **Jennifer H. Stucker**, Deborah A. Buhl, Mark H. Sherfy, and Laurence L. Strong, USGS Northern Prairie Wildlife Research Center, Jamestown, ND 58401.	[S]Ecology of Nelson's, Seaside and Saltmarsh sparrows (*Ammodramus nelsoni*, *A. maritimus,* and *A. caudacutus*, respectively) and mercury availability at breeding versus non-breeding sites. **Virginia L. Winder** and Steven D. Emslie, Dept. Biology and Marine Biology, Univ. North Carolina at Wilmington, Wilmington, NC 28403	[S]Facial markings may serve as a kin recognition cue in juvenile Cliff Swallows (*Petrochelidon pyrrhonota*). **Allison E. Johnson**, Dept. Ecology and Evolutionary Biology, Univ. Chicago, IL 60615, and Steve Freedberg, Dept. Biology, St. Olaf Coll., Northfield, MN 55057	Effects of severe weather to reproductive success of hosts and brood parasites. **Daniel Kim**, Portland State University, Portland, OR 97210
10:45		[S]Resource selection of Ruffed Grouse in the Black Hills National Forest of South Dakota and Wyoming. **Cassandra L. Mehls** and Kent C. Jensen, Dept. Wildlife and Fisheries Sciences, South Dakota State Univ., Brookings, SD, Mark A. Rumble, Rocky Mountain Research Station, Rapid City, SD, and Michael C. Wimberly, GISc Center of Excellence, Brookings, SD	[S]Mate and site fidelity of breeding Sandhill Cranes in a dense population in Wisconsin. **Matthew A. Hayes**, Univ. Wisconsin, Madison, WI 53706, and Jeb A. Barzen, International Crane Foundation, Baraboo, WI 53913	Contributing variables to nest survival, and the breeding biology, of the Western Wood-pewee (*Contopus sordidulus*), a habitat generalist, in southwest Colorado. **Joseph C. Ortega** and Catherine P. Ortega, Dept. Biology, Fort Lewis Coll., Durango, CO 81301
11:00	Colonization and abandonment of Missouri River sandbars by breeding piping plovers. **Joy Felio**, Daniel Catlin, and James Fraser, Dept. Fisheries and Wildlife, Virginia Tech., Blacksburg, VA, 24061.	Wet meadows distribution, use by cranes and other migratory birds, and hydrological influence at South Central Nebraska: a literature and information summary and evaluation. **Enrique Weir**, The Crane Trust, Wood River, NE 68883	Sex differences in parental anti-predator responses during the nestling period in Tree Swallows. **M. P. Lombardo**, M. Baiz, K. Bibby, L. Bol, L. Hightower, R. McLaughlin, D. Near, and L. Spadacene, Dept. Biology, Grand Valley State Univ., Allendale, MI 49401	Effects of periodic cicada emergence on House Sparrow breeding success. **Peter E. Lowther**, Field Museum, Chicago, IL 60605
11:15		Exotic vegetation and altered disturbance regimes in New Mexico riparian forests: response by Black-chinned Hummingbirds. **D. Max Smith** and Deborah M. Finch, USDA Forest Service Rocky Mountain Research Station, Albuquerque, NM, Scott H. Stoleson, USDA Forest	Assortative flocking in crossbills and implications for ecological speciation. Julie W. Smith, Stephanie M. Sjoberg, Matthew C. Mueller, and **Craig W. Benkman**, Dept. Zoology and Physiology, Univ. Wyoming, Laramie WY 82071	Using auditory detections to assess habitat use in the Eastern Whip-poor-will (*Caprimulgus vociferus*). **Pamela Hunt**, NH Audubon, Concord, NH 03301

Time	Auditorium 1	Auditorium 2	Auditorium 3	Auditorium 4
		Service Northern Research Station Irvine, PA, 16329, Katherine Brodhead, Centre for Wildlife Ecology, Simon Fraser Univ., Burnaby, BC V5A 1S6, Canada		
11:30	Do you see what I see? Detecting Least Tern and Piping Plover fledglings on the Missouri River. **Erin A. Roche**, Dept. Biology, Univ. Tulsa, Tulsa, OK, Terry L. Shaffer, Michael J. Anteau, Mark H. Sherfy, Marsha A. Sovada, Jennifer H. Stucker, and Mark T. Wiltermuth, USGS Northern Prairie Wildlife Research Center, Jamestown, ND 58401	Preliminary effects of Marcellus shale drilling on Louisiana Waterthrush in West Virginia. **Doug Becker** and James Sheehan, WV Cooperative Fish and Wildlife Research Unit, West Virginia Univ., Morgantown, WV 26506, Petra Bohall Wood, U.S. Geological Survey, WV Cooperative Fish and Wildlife Research Unit, West Virginia Univ., Morgantown, WV 26506, and Harry Edenborn, National Energy Technology Laboratory, U.S. Dept. Energy, Pittsburgh, PA 15236	Social structure of wintering migrant sparrows: a social network approach. **Daizaburo Shizuka**, Dept. Ecology and Evolution, Univ. Chicago, Chicago, IL 60637, Oscar Johnson and David Moldoff, Dept. Ecology and Evolutionary Biology, Univ. California, Santa Cruz, CA 95064, Alexis Chaine, Station d'Ecologie Experimentale du CNRS - Moulis USR 2936, 09200 Moulis, France, and Bruce E. Lyon, Dept. Ecology and Evolutionary Biology, Univ. California, Santa Cruz, CA 95064	Effects of habitat structure and song playbacks on detection probability of Swainson's Warblers: implications for survey design. **Thomas J. Benson**, Illinois Natural History Survey, Univ. Illinois, Champaign, IL 61820, Nicholas M. Anich, Wisconsin Dept. Natural Resources, Ashland, WI 54806, and James C. Bednarz, Dept. Biological Sciences and Environmental Sciences Program, Arkansas State Univ., Jonesboro, AR 72467
11:45		Collisions with buildings and towers do not affect long-term avian population trends. **Todd W. Arnold**, Dept. Fisheries, Wildlife, & Conservation Biology, Univ. Minnesota, St. Paul, MN 55108, and Robert M. Zink, Dept. Ecology, Evolution, & Behavior, Univ. Minnesota, St. Paul, MN 55108	A social network approach to dominance. **David B. McDonald** and Dai Shizuka, Dept. Zoology, Univ. Wyoming, Laramie WY 82071	Interannual winter site fidelity evident among most Pacific Common Eiders breeding in northwest Alaska. **Margaret R. Petersen**, David C. Douglas, and Sarah McCloskey, USGS Alaska Science Center, Anchorage, AK 99508, and Heather Wilson, US Fish and Wildlife Service, Migratory Bird Management, Anchorage, AK 99503
12:00-13:00	**Ballroom:** Lunch + COS Business Meeting			
13:00-14:00	**Ballroom:** COS Plenary: Diversification along ecological gradients in the Tropics. **Thomas B. Smith**, Center for Tropical Research, University of California, Los Angeles, CA 90095			
	SY4: Plovers & Terns (cont.)	CO31: Habitat management	CO32: Migration	CO33: Mating systems
14:30	Status and trends of Missouri River Least Terns and Piping Plovers: How much do we know? **Terry L. Shaffer**,	Possible effects of an invasive plant, reed canary grass (*Phalaris arundinacea*), on the breeding bird	Weather radar analysis of landbird stopover sites during fall migration in the northeastern U.S. **Jeffrey J.**	Selection on female preference maintains extra-pair paternity in the absence of consistent indirect

Time	Auditorium 1	Auditorium 2	Auditorium 3	Auditorium 4
	Mark H. Sherfy, Michael J. Anteau, Jennifer H. Stucker, and Marsha A. Sovada, USGS Northern Prairie Wildlife Research Center, Jamestown, ND 58401, and Erin A. Roche, Univ. Tulsa, Dept. Biology, Tulsa, OK 74101	assemblage in Upper Mississippi River floodplain forest. **Eileen M. Kirsch** and Brian R. Gray, USGS Upper Midwest Environmental Sciences Center, La Crosse, WI 54603, and Sherwin Toribio, Mathematics Dept., Univ. Wisconsin-La Crosse, La Crosse, WI 54601	**Buler**, Dept. Entomology and Wildlife Ecology, Univ. Delaware, Newark, DE 19716, and Deanna K. Dawson, USGS Patuxent Wildlife Research Center, Laurel, MD 20708	benefits. **Erin L. O'Brien**, Edward Grey Institute of Field Ornithology, Univ. Oxford, Oxford, UK, and Russell D. Dawson, Univ. Northern British Columbia, Prince George, BC V2N 4Z9, Canada
14:45		Site occupancy by Flammulated Owls: a pilot study in three states. **Jennifer A. Blakesley**, Rocky Mountain Bird Observatory, Brighton, CO 80601, Jay D. Carlisle, Idaho Bird Observatory, Boise, ID 83725, and Steven J. Slater, HawkWatch International, Salt Lake City, UT 84106	Using avian radar to examine time-dependent effects on avian activity and relationships with meteorological factors. **Peter S. Coates**, Michael L. Casazza, Brian J. Halstead, and Joseph P. Fleskes, USGS Western Ecological Research Center, Dixon, CA 95620, and James A. Laughlin, USDA California Wildlife Services, Beale Air Force Base	Female relatedness to social mate increases cuckoldry and between-year breeding dispersal in a wild bird population. **Wendy M. Schelsky** and Jeffrey P. Hoover, Illinois Natural History Survey, Univ. Illinois, Champaign, IL 61820, and Scott K. Robinson, Univ. Florida, Gainesville, FL
15:00	Movements and foraging by Least Terns and Piping Plovers nesting on Central Platte River sandpits. **Mark H. Sherfy**, Michael J. Anteau, Terry L. Shaffer, Marsha A. Sovada, Jennifer H. Stucker, Colin M. Dovichin, and Megan L. Ring, USGS Northern Prairie Wildlife Research Center, Jamestown, ND 58401	Bird community response to vegetation cover and composition in riparian habitats dominated by Russian olive (*Elaeagnus angustifolia*). **Jonathon J. Valente**, Richard A. Fischer, Michael P. Guilfoyle, and Sam S. Jackson, U.S. Army Engineer Research and Development Center, Environmental Laboratory, Vicksburg, MS 39180, Michael D. Kaller, School of Renewable Natural Resources, Louisiana State Univ. Agricultural Center, Baton Rouge, LA 70803, and John T. Ratti, Dept. Fish and Wildlife Resources, Univ. Idaho, Moscow, ID 83844	The temporal and spatial dynamics of swallow roosts found in the eastern and central United States. **Curtis W. Burney**, Air Force Research Laboratory, Brooks City-Base, TX 78235, and David W. Winkler, Dept. Ecology and Evolutionary Biology, Cornell Univ., Ithaca, NY 14853	Meta-analysis in a model species suggests plumage color may not be a signal of individual quality influencing mate choice. **Timothy H. Parker**, Biology Department, Whitman Coll., Walla Walla, WA 99362
15:15		Variation in population density and territory size across a spatio-temporal urban gradient. **Reed**	A national scale analysis of purple martin pre migratory roost formation using weather	vacant

Time	Auditorium 1	Auditorium 2	Auditorium 3	Auditorium 4
		Bowman, Archbold Biological Station, Venus, FL 33960	surveillance radar. **Jeff Kelly**, Ryan Shipley, Ken Howard, Phil Chilson, Winifred F. Frick, and Thomas H. Kunz, Oklahoma Biological Survey, Univ. Oklahoma, Norman, OK 73019	
15:30	Break			
15:45 16:00	Vertical transmission of vocal memes in wild parrots. **Karl S. Berg**, Soraya Delgado, and Kathryn A. Cortopassi, Cornell Lab. Ornithology, Ithaca, NY 14850, Virginia Sanz D'Angelo, Inst. Venezolano de Investigaciones Científicas, Caracas, Venezuela, Steve R. Beissinger, Environmental Science, Policy & Management, Univ. California, Berkeley, CA, 94720, and Jack W. Bradbury, Neurobiology & Behavior, Cornell Univ., Ithaca, NY 14850. **(COS Young Professional Award)**			
16:15 16:30	Genetics of speciation: insights from *Passerina* buntings. **Matthew D. Carling**, Berry Biodiversity Conservation Center, Depts. Zoology and Physiology, Univ. Wyoming, Laramie, WY 82071. **(COS Young Professional Award)**			

Posters are organized into related groupings (P01, P02, etc.). The number preceding each poster refers to its physical position in the poster session. Name of the presenting author is indicated in **bold**. Superscript "S" preceding the title indicates a poster eligible for a student presentation award.

P01 Habitat ecology

01. A method of adjusting for area overlap when using the unlimited distance method to estimate population. **Jennifer Baldy**, Kalamazoo Nature Center, Kalamazoo, MI 49009

02. [S]Effects of lake stage and marsh elevation on wading bird nesting effort at Lake Okeechobee, FL. **Richard A Botta**, Environmental Sciences Program, Florida Atlantic Univ., Boca Raton, FL 33431, and Dale E Gawlik, Dept. Biological Science, Florida Atlantic Univ., Boca Raton, FL 33431

02. [S]Rainwater Basin wetland seed availability in annual and perennial plant communities prior to spring migration. **Jeff Drahota** and Letitia Reichart, Biology Dept., Univ. Nebraska at Kearney, Kearney, NE 68849, and Mark Vrtiska, Nebraska Game and Parks Commission, Lincoln, NE 68503

04. [S]Bird community distribution on golf courses in coastal Beaufort County, SC. **Jessica M. Gorzo** and Patrick G.R. Jodice, USGS South Carolina Cooperative Fish and Wildlife Research Unit, Clemson Univ., Clemson, SC 29630

05. Effects of productivity on productivity: shrike nesting effort related to regional photosynthetic output 1994-2009. **Jeremy E. Guinn**, Environmental Science Dept., Sitting Bull Coll., Ft. Yates, ND 58538

06. Post-breeding public information use in a ground-nesting songbird community. **Janice K. Kelly** and Kenneth A. Schmidt, Dept. Biological Sciences, Texas Tech University, Lubbock, TX 79409

07. Variation in bird communities within a *Brachsytegia* woodland: a comparative study of disturbed and undisturbed forest patches. **Joseph Oyugi**, Biology Dept., Wright Coll., Chicago, IL 60630

08. Nest-site selection by Sharp-shinned Hawks in Kentucky. **Gary Ritchison** and Tyler Rankin, Dept. Biological Sciences, Eastern Kentucky Univ., Richmond, KY 40475

09. Gimme' Shelter: a tropical bird's dissimilar response to global climatic phenomenon in an uneven aged forest. **Jared D. Wolfe**, School of Renewable Natural Resources, Louisiana State Univ., Baton Rouge, LA 70803, and C. John Ralph, USDA Forest Service, Pacific Southwest Research Station, Redwood Sciences Laboratory, Arcata, CA 95521 and Klamath Bird Observatory, Ashland, OR 97520

10. Effect of climate change and urbanization on geographical range shifts of Light-Vented Bulbul *Pycnonotus sinensis* in China. **Hongfeng Zhao**, Jinwei Dong, Youmin Chen, Delong Zhao, Xiangming Xiao, Center for Spatial Analysis, Univ. Oklahoma, Norman, OK 73019

P02 Conservation biology

11. [S]Hormonal correlates of West Nile virus seropositivity in House Finches. **A. B. Anderson**, P. M. Nolan, and K. Y. Johnson, Dept.Biology, The Citadel, Charleston, SC 29409

12. [S]Does conspecific attraction explain area sensitivity of songbirds in tall-grass prairie?. **David R. W. Bruinsma** and Nicola Koper, Natural Resources Institute, Univ. Manitoba, Winnipeg, MB R3T 2N2, Canada

13. Assessing the vulnerability of birds to climate change using a decision-support tool. **Sharon Coe**, Deborah Finch, and Megan Friggens, U.S. Forest Service, Rocky Mountain Research Station, Albuquerque, NM 87102

14. Using grassland birds to guide an ecological restoration of bison. **Kevin Ellison** and Steve Zack, Wildlife Conservation Society, Bozeman MT 59715

15. [S]Rapid spread of the tamarisk leaf beetle (*Diorhabda carinulata*). **Levi R. Jamison**, School of Natural Resources and the Environment and USGS Southwest Biological Science Center, Sonoran Desert

Research Station, Univ. Arizona, Tucson, AZ 85721, and Charles van Riper, III, School of Natural Resources and the Environment, Univ. Arizona, Tucson, AZ 85721

16. [S]To assess avian assemblage responses to 100-year lowland forest isolation in Taiwan. **Fang-Yee Lin**, Dept. Fisheries and Wildlife Science, Virginia Polytechnic Inst. and State Univ., VA 24040, Pei-Fen Lee, Dept. Ecology and Evolutionary Biology, National Taiwan Univ., Taiwan 100, and Dean Stauffer, Dept. Fisheries and Wildlife Science, Virginia Polytechnic Inst. and State Univ., VA 24040

17. [S]Do site preparations in Louisiana loblolly clearcuts impact breeding disturbance-dependent birds? **Falyn Owens** and Philip Stouffer, School of Renewable Natural Resources, Louisiana State Univ. Ag Center, Baton Rouge, LA 70803

18. Measuring fecal corticosterone in wild Whooping Cranes (*Grus americana*). Mery Casady and **Letitia M. Reichart**, Dept. Biology, Univ. Nebraska at Kearney, Kearney, NE 68849, and Andrew K. Birnie and Jeffrey A. French, Dept. Psychology, Univ. Nebraska at Omaha, Omaha, NE 68182

19. [S]Evaluating Clark's Nutcracker, *Nucifraga columbiana*, population status, habitat use and detectability with occupancy surveys. **Taza Schaming**, Dept. Natural Resources and Cornell Lab of Ornithology, Cornell Univ., Ithaca, NY 14853

20. [S]Potential effects of climate change on the distribution of wetland-associated birds in the Prairie Pothole Region, U.S.A. **Valerie Steen** and Abby N. Powell, USGS Alaska Cooperative Fish and Wildlife Research Unit and Inst. Arctic Biology, Univ. Fairbanks, Fairbanks, AK 99775, and Susan Skagen, USGS Fort Collins Science Center, Fort Collins, CO 80526

21. The contemporary feather trade: exploitation of North American birds for the construction of Native American-style regalia. **Pepper W. Trail**, U.S. Fish and Wildlife Service National Fish and Wildlife Forensics Lab, Ashland, OR 97520

22. [S]Habitat use by grassland obligate birds in South Central Pennsylvania. **Andrew Weber** and Margaret Brittingham, School of Forest Resources, Pennsylvania State Univ., Univ. Park, PA 16802

23. Using satellite telemetry to gain new insights into Whooping Crane (*Grus americana*) stopover locations and migration behavior. **Walter Wehtje**, The Crane Trust, Wood River, NE, 68883, Felipe Chavez-Ramirez, Gulf Coast Bird Observatory, Lake Jackson, TX 77566, David Brandt, Gary Krapu and Aaron Pierce, USGS Northern Prairie Wildlife Research Center, Jamestown, ND 58401

24. [S]Window related avian mortality on Minnesota Point, MN, USA. **Annie M. Bracey**, Dept. Biological Science, Univ. Minnesota Duluth, Duluth, MN 55812

P03 Demography and population biology

25. Impact of harvest on survival of captive-reared Mallard released for hunting purposes. **Jocelyn Champagnon**, Matthieu Guillemain, French Hunting and Wildlife Agency, Le Sambuc, F - 13200 Arles, France, Grégoire Massez, Marais du Vigueirat, Mas Thibert, F-13200 Arles, France, Michel Gauthier-Clerc, Tour du Valat Research Center, Le Sambuc, F-13200 Arles, France, and Jean-Dominique Lebreton, UMR 5175, Centre d'Ecologie Fonctionnelle et Evolutive, Centre National de la Recherche Scientifique, F-34 293 Montpellier, France

26. To breed or not to breed: seabirds response to extreme climatic events. **Sarah Cubaynes**, Centre d'Ecologie Fonctionnelle et Evolutive, UMR 5175, Campus CNRS, F-34293 Montpellier Cedex 5, France, E. A. Schreiber, National Museum of Natural History, Division of Birds, Smithsonian Institution, Washington, DC 20560., Paul F. Doherty, Jr., Dept. Fish, Wildlife, and Conservation Biology, Colorado State Univ., Fort Collins CO 80523, Ralph W. Schreiber, deceased, and Olivier Gimenez, Centre d'Ecologie Fonctionnelle et Evolutive, UMR 5175, Campus CNRS, F-34293 Montpellier Cedex 5, France

27. [S]Predictors of nest predation in North American Barn Swallows *Hirundo rustica*. **Andrew Flynn** and Rebecca J. Safran, Dept. Ecology and Evolutionary Biology, Univ. Colorado, Boulder, CO 80309

28. [S]Testing assumptions underlying estimates of breeding productivity derived from mist netting data. **Mary E. Kornegay** and Jaime A. Collazo, USGS North Carolina Cooperative Fish and Wildlife Research Unit, North Carolina State Univ., Raleigh, NC 27695, Stephen J. Dinsmore, Dept. Natural Resource Ecology & Management, Iowa State Univ., Ames, IA 50011, and James F. Saracco, Inst. Bird Populations, Point Reyes Station, CA 94956

29. [S]Age-specific demography and population dynamics of the Western Sandpiper, *Calidris mauri*. **Eunbi Kwon** and Brett K. Sandercock, Division of Biology, Kansas State Univ., Manhattan, KS 66506

30. [S]Winter abundance of Red-tailed Hawks (*Buteo jamaicensis*) and American Kestrels (*Falco sparverius*) in human-altered landscapes in northeastern and central Illinois. **A. Groves**, Dept. Environmental Studies, Illinois Wesleyan Univ., Bloomington, IL 61701, V. Berardi, Hawk Migration Association of North America, Illinois Beach State Park Hawk Watch, Zion, Illinois 60099, P. Sweet and J. Sweet, Illinois Beach State Park Hawk Watch, Zion, Illinois 60099, A. P. Capparella and G. Knapp, School of Biological Sciences, Illinois State Univ., Normal, IL 61790, and R. G. Harper, Dept. Biology, Illinois Wesleyan Univ., Bloomington, IL 61701

31. Comparison of eggshell porosity and estimated gas flux between the Brown-headed Cowbird (*Molothrus ater*) and its hosts: the Dickcissel (*Spiza americana*) and the Red-winged Blackbird (*Agelaius phoeniceus*). William Jaeckle, **Miranda Kiefer**, **Brittany Childs**, R. Given Harper, Dept. Biology, Illinois Wesleyan Univ., Bloomington, IL 61701, and Brian Peer, Dept. Biological Sciences, Western Illinois Univ., Macomb, IL 61455

P04 Breeding biology

32. Egg shape and its effect on incubation temperature in the Brown-headed Cowbird. **Lyndon R. Hawkins** and Brian D. Peer, Dept. of Biological Sciences, Dept. Biological Sciences, Western Illinois Univ, Macomb, IL 61455

33. Platte River Recovery Implementation Program: a basin-wide approach toward recovery and ESA compliance for four listed species including Interior Least Terns and Piping Plovers. **David Baasch**, Platte River Recovery Implementation Program, Kearney, NE 68845

34. [S]Fecal testosterone metabolites, begging behavior, and growth of Eastern Bluebird nestlings. **Melissa Meierhofer**, Dept. Biology, Ripon Coll., Ripon, WI 54971

35. [S]Variation in nestling provisioning behavior of urban and rural Northern Cardinals (*Cardinalis cardinalis*). **Desiree L. Narango** and Amanda D. Rodewald, School of Environment and Natural Resources, Ohio State Univ., Columbus, OH

36. Differences in breeding ecology of Seaside Sparrows in Gulf and Atlantic coastal marsh habitats. Anna Joy Lehmicke, D. B. Warnell School of Forestry and Natural Resources, Univ. Georgia, Athens, GA 30602, **Mark Woodrey**, Coastal Research and Extension Center, Mississippi State Univ., Biloxi MS 39532, and Bob Cooper, D. B. Warnell School of Forestry and Natural Resources, Univ. Georgia, Athens, GA 30602

P05 Life history

37. [S]Factors in Barn Owl (*Tyto alba*) natal dispersal, is it density dependence? **Nicholas P. Huffeldt** Dept. Arctic Environment, National Environmental Research Institute, Aarhus Univ., Roskilde, Denmark and Animal Behaviour Group, Dept. Biology, Univ. Copenhagen, Copenhagen, Denmark, and Iben N. Aggerholm, Nathia H. Brandtberg and Jacob H. Jørgensen, Dept. Biology, Univ. Copenhagen, 2200 Copenhagen N, Denmark, and Klaus Dichmann and Peter Sunde Dept. Wildlife Ecology and Biodiversity, National Environmental Research Institute, Aarhus Univ., 8410 Rønde, Denmark

38. Roost site of Vervain Hummingbird (*Mellisuga minima*) discovered. **David Mehlman**, USFS Center for Bottomland Hardwoods Research, Stoneville, MS 38776

39. [S]Ecological predictors of age-related increases in reproduction in Barn Swallows. **Rachel Wildrick** and Rebecca Safran, Univ. Colorado at Boulder, Boulder, CO 80305

40. [S]Parental investment in the cooperative-breeding Acorn Woodpecker (*Melanerpes formicivorus*). **Lauren Wilkerson** and Michael Patten, Dept. Zoology, Univ. Oklahoma, Norman, OK 73019

P06 Behavior

41. [S]Nest defense behavior by Carolina Wrens (*Thryothorus ludovicianus*) in an urban environment. **Ashley Bogrand** and Diane L.H. Neudorf, Dept. Biological Sciences, Sam Houston State Univ., Huntsville, TX

42. [S]Song similarity in Dickcissels (*Spiza americana*) is not well described by cross-correlation. **Cecily F. Foo** and Timothy H. Parker, Whitman Coll., Walla Walla, WA 99362

43. [S]Effect of age on Veery song repertoire size. **Syrena M. Taylor** and Christopher M. Heckscher, Dept. Agriculture and Natural Resources, Delaware State Univ., Dover, DE 19901

44. The effects of temperature, light, and sugar concentration on hummingbird feeder solutions. **Son Nguyen**, Katrina Hucks, Chris Butler, and Erica Becker, Univ. Central Oklahoma, Oklahoma City, OK 73120

45. Black-capped Chickadee (*Poecile atricapillus*) foraging behavior in mixed needle/broad-leaved forest and on a barrier beach in Massachusetts. **Timothy Olson** and John Kricher, Biology Department, Wheaton Coll., Norton, MA 02766

P07 Physiology, immunology, and anatomy

46. The effect of Brown-headed Cowbirds on nestling condition of hosts. **Nathan Banet**, Kathleen O'Reilly, Kathleen Hunt, and Dan Kim, Dept. Biology, Portland State Univ., Portland, OR 97207

47. Are wild birds important in the movement of arthropod-borne viruses? **Charles R. Brown**, Dept. Biological Sciences, Univ. Tulsa, Tulsa, OK. 74012, and Valerie A. O'Brien, Dept. Entomology and Plant Pathology, Oklahoma State Univ., Stillwater, OK. 74078

48. The energetic cost of an immune challenge in Black-capped Chickadees. **Sheldon J. Cooper** and Andrea Holzbauer, Dept. Biology, Univ. Wisconsin Oshkosh, Oshkosh, WI 54901

49. Enzyme immunoassay quantification of heat shock proteins to evaluate chronic stress in birds. **Andrew S. Dolby**, D. A. O'Dell, and W. Humayon, Dept. Biological Sciences, Univ. Mary Washington, Fredericksburg, VA 22401

50. [S]How is plumage used to determine age and sex of birds? **Dorothy A. Fatunmbi** and Sara R. Morris, Dept. Biology, Canisius Coll., Buffalo, NY 14208

51. Intra- and inter-specific variations in cone photoreceptor abundances among waterfowl. **Jodi A. Gullicksrud** and Muir D. Eaton, Dept. Biology, Drake Univ., Des Moines, IA 50311

52. Male and female differences in morphology including plumage coloration in a "monomorphic' species," the Gray Catbird. **Margret I. Hatch**, Penn State Worthington Scranton, Dunmore, PA 18512, and Robert J. Smith and T. J. Zenzal, Dept. Biology, Univ. Scranton, Scranton, PA 18510

53. [S]Information content of sexual signals: a temporal investigation of stress resistance. **Brittany Jenkins**, Dept. Ecology and Evolutionary Biology, Univ. Colorado at Boulder, Boulder, CO 80303

54. Effect of sex and condition on immune function in nestling House Wrens, *Troglodytes aedon*. C. F. Thompson, S. K. Sakaluk, B. G. P. Johnson, L. A. Vogel, B. S. Masters, **L. S. Johnson**, and A. M. Forsman, Dept. Biological Sciences, Towson Univ., Towson, MD and Illinois State Univ., Normal, IL

55. Intraspecific correlations between minimum and maximum metabolic output in birds: Do intraspecific data support the aerobic capacity model for the evolution of endothermy? **Nathan E. Thomas**, Biology Dept., Shippensburg Univ., Shippensburg, PA, and David L. Swanson, Dept. Biology, Univ. South Dakota, Vermillion, SD

56. [S]Metabolic rates in swallows: do energetically expensive lifestyles affect thermogenic capacities in birds? **Yufeng Zhang** and David Swanson, Dept. Biology, Univ. South Dakota, Vermillion, SD 57069

P08 Migration and navigation

57. Establishing the breeding provenance of a temperate-wintering sparrow with light-level geolocation. **Thomas Gardali**, Diana Humple, Ren?e Cormier, and Nathaniel E. Seavy, PRBO Conservation Science, Petaluma, CA 94954

58. [S]Differential migration of passerines during spring and fall in the Gulf of Maine (USA). **Tyler W. Moore**, Dept. Biology, Hampden-Sydney Coll., Hampden-Sydney, VA 23943, Michael D. Collins, Dept. Biology, Rhodes Coll., Memphis, TN 38112, and Adrienne J. Leppold and Rebecca L. Holberton, School of Biology and Ecology, Univ. Maine, Orono, ME 04473

59. [S]Morphological, physiological, and behavioral differences characterizing two migratory populations of Swainson's Thrushes *Catharus ustulatus* with distinctly different migratory journeys. **Kristina L. Paxton** and Frank R. Moore, Dept. Biological Sciences, Univ. Southern Mississippi, Hattiesburg, MS 39406, and Matthew D. Johnson, Dept. Wildlife, Humboldt State Univ., Arcata, CA 95521

60. [S]Energetics and orientation of Black-capped Chickadees (*Poecile atricapillus*) during irruptive migrations. **Robert D. Taylor** and Mark Deutschlander, Dept. Biology, Hobart and William Smith Coll.s, Geneva, NY 14456

61. [S]The effect of radio telemetry devices on the flight behavior of Ruby-throated Hummingbirds (*Archilochus colubris*): a pilot study. **Theodore J. Zenzal, Jr**., Robert Diehl, and Frank R. Moore, Dept. Biological Sciences, Univ. Southern Mississippi, Hattiesburg, MS, 39406

P09 Phylogeography and distribution

62. Ecological niche modeling as a method for mapping distribution of hummingbird hybrids. **Erica Judd**, Chris Butler, and Eric Judd, Univ. Central Oklahoma, Edmond, OK 73034

63. Postglacial recolonisation patterns of the Chestnut-Backed Chickadee (*Poecile rufescens*). **Linda A. Lait** and Theresa M. Burg, Dept. Biology, Univ. Lethbridge, Lethbridge, AB T1K 3M4, Canada

64. [S]Why is there a gap in the breeding range of the Painted Bunting *Passerina ciris*? **Ryan Shipley**, Andrea Contina, Nyambar Batbayar, Eli Bridge and Jeff Kelly, Oklahoma Biological Survey, Univ. Oklahoma, Norman, OK 73019

65. [S]Modeling spatial distribution of Swan Goose (*Anser cygnoides*) in East Asia. **Nyambayar Batbayar**, Xiangming Xiao, John Y. Takekawa, Delong Zhao, Hongfeng Zhao; Tseveenmyadag Natsagdorj, Dept. Botany and Microbiology, and Center for Spatial, Univ. Oklahoma, Norman, OK 73019

P10 Community ecology

66. Does a native invasive grass affect breeding birds in grasslands? **Brian J. Bielfelt**, Caesar Kleberg Wildlife Research Institute, Texas A&M Univ.-Kingsville, Kingsville, TX 78363, Andrea R. Litt, Dept. Ecology, Montana State Univ., Bozeman, MT 59717, and Fred C. Bryant, Leonard A. Brennen, and Tom Langschied, Caesar Kleberg Wildlife Research Institute, Texas A&M Univ.-Kingsville, Kingsville, TX 78363

67. [S]Bird distributions across a residential-hardwood forest edge. **Scott W. Schmidt** and Robert B. Blair, Dept. Fisheries, Wildlife, and Conservation Biology, Univ. Minnesota, St. Paul, MN 55108

68. [S]Behavioral and reproductive consequences of nest predator. **Jennifer L. Thieme** and Amanda D. Rodewald, School of Environment and Natural Resources, Ohio State Univ., Columbus, OH

69. The effectiveness of innovative wildlife harvest tools I: field assessment of flocking behavior. **Luke C. Campillo**, Scott K. Anliker, and Muir D. Eaton, Dept. Biology, Drake Univ., Des Moines, IA 50311

P11 Techniques

70. [S]Detection of Yellow Rail, *Coturnicops noveboracensis*, using multiple-visit, call-broadcast surveys. **Kristen Martin** and Nicola Koper, Natural Resources Institute, Univ. Manitoba, Winnipeg, MB R3T 2N2, Canada

71. A unified approach for using telemetry to assess risks to and take of Golden Eagles in renewable energy landscapes. **Robert K. Murphy**, Division of Migratory Birds, U.S. Fish and Wildlife Service - Southwest Region, Albuquerque, NM 87103

P12 Education and special format

72. Using the avian nest as a model system to explore biodiversity. **Margaret A. Voss**, Michael A. Campbell, and Beth A. Potter, School of Science, Penn State Erie, Behrend Coll., Erie, PA 16563

73. Bird Study Skin Preparation Website available on Beaty Biodiversity Museum Website. Phase 1 - Complete. **Ildiko Szabo**, Cowan Vertebrate Collection, Beaty Biodiversity Museum, Univ. British Columbia, Vancouver, BC V6T 1Z4, Canada

74. [S]The University of Georgia Avian Biology Study Abroad Program in Costa Rica. **Mia N. Malloy** and Adam J. Davis, Dept. Poultry Science, Univ. Georgia, Athens, GA, 30602

75. A web-available, individual-based model for exploring Least Tern river management systems. **Casey A. Lott**, Stephen F. Railsback, Colin J.R. Sheppard, Richard A. Fischer, Stephen R. Crawford, and Douglas A. Miller, American Bird Conservancy, Boise, ID 83712

76. [S]Songbird richness and abundance across a gradient of terrestrial calcium availability in the Adirondack Park, New York. **Jennifer Ma**, Stacy McNulty, and Colin Beier, Dept. Environmental and Forest Biology, State Univ. New York Coll. of Environmental Science and Forestry, Syracuse, NY 13210

Abstracts for all oral and poster presentations are listed in alphabetical order by the last name of the **presenting** author (in **bold**). Each presentation's session is indicated at the end of the abstract text. Presentations eligible for Student Presentation Award consideration are indicated by a superscript "S" at the start of the title.

Aubrey Alamshah and Edward H. Burtt, Jr., Dept. Zoology, Ohio Wesleyan Univ., Delaware, OH 43015.

[S]Seasonal variation in the maintenance behavior of House Sparrows, *Passer domesticus*.

The percentage of House Sparrows (*Passer domesticus*) with feather-degrading bacilli is significantly greater in the winter than in the spring and summer (Burtt and Ichida, 1999). One possible explanation is that the sparrows engage in less maintenance behavior in winter than in summer. There are several reasons why this might be: higher energy demands, which would necessitate more time foraging; shorter days; colder temperatures and lower humidity so that feather-degrading microorganisms are a lower risk to the plumage than in warm, humid weather (Burtt and Ichida 2004). However, seasonal change in the maintenance behavior of passerines is a largely unstudied subject. House Sparrows bathe, dust bathe, head scratch, bill wipe, sun, and preen (Summers-Smith 1963, Anderson 2006). We observed changes in the form and frequency of the behavior in wild-caught House Sparrows held in an outdoor aviary. We observed the birds for 2-3 hours/week, noting the occurrence of maintenance behavior in each individual, its type, sequential organization, and bout length. We also took samples of microorganisms from the feathers of the birds on a monthly basis. We compared changes in maintenance behavior and time allotted to such behavior throughout the year. We determined that the birds do in fact exhibit more maintenance behavior in the spring and summer than they do in the fall and winter. Further study is needed, but our results suggest increased maintenance behavior may help to reduce the amount of feather-degrading bacteria on the bird. CO18: Fri, 11 Mar 15:00

Amber Albores and Jeffery P. Hoover, Dept. Natural Resources and Environmental Science, Univ. Illinois, Champaign, IL, and Institute of Natural Resource Sustainability, Illinois Natural History Survey, Champaign, IL.

[S]Cowbird parasitism increases after high fledging success of cowbird, but not host, nestlings.

Brown-headed Cowbirds (*Molothrus ater*) are obligate brood parasites that rely solely on hosts to raise their young. Although cowbirds parasitize 200+ species, recent evidence suggests that females avoid unsuitable hosts that either reject parasitic eggs or provide incompatible parental care. Female cowbirds may be able to improve their own reproductive success by collecting information pertaining to the fledging of cowbird or host offspring. This, in turn, could influence the laying decisions and host choices of cowbirds in subsequent years. To determine whether host reproductive success and/or cowbird reproductive success in one year affects the likelihood of cowbird parasitism the following year, we examined nesting data for a highly suitable host, the Prothonotary Warbler (*Protonotaria citrea*). We recorded parasitism status (yes or no), number of cowbird eggs, and the number of host and cowbird fledglings for each of over 3,500 warbler nests from 1994-2010 in southern Illinois. Data were analyzed using a generalized linear mixed model (GLMM) with binomial distribution. We accounted for variation in site and year in our analysis as random effects and included warbler density as a covariate. The probability of parasitism increased with cowbird reproductive success in the previous breeding season but decreased with warbler reproductive success. This is the first study to suggest that cowbird fledging success may influence future host selection by cowbird females. Future work will focus on laying decisions of individual female cowbirds to determine if they adjust their host selection between years. CO22: Fri, 11 Mar 15:45

Cameron L. Aldridge and D. Joanne Saher, NREL, Colorado State Univ., Fort Collins, CO, Theresa M. Childers and Kenneth E. Stahlnecker, National Park Service, Black Canyon of the Gunnison National Park and Curecanti National Recreation Area, Gunnison, CO, and Zachary H. Bowen, USGS, Fort Collins, CO.

Crucial nesting habitat for Gunnison sage-grouse: a spatially explicit hierarchical approach.

Gunnison Sage-Grouse (*Centrocercus minimus*) is a species of special concern and is currently a candidate for listing under the Endangered Species Act. Careful management is therefore required to ensure that suitable habitat is maintained, particularly because much of the species' current distribution is faced with exurban development pressures. We assessed hierarchical nest site selection patterns of Gunnison Sage-Grouse inhabiting the western portion of the Gunnison Basin, Colorado, USA, at multiple spatial scales, using logistic regression-based resource selection functions. Models were selected using Akaike Information Criterion and predictive surfaces were generated. Landscape-scale factors influencing nest site selection included the proportion of sagebrush cover > 5%, productivity, and density of two wheel-drive roads. The landscape-scale predictive surface captured 99% of known Gunnison Sage-Grouse nests, implicating 50% of the basin as crucial nesting habitat. Crucial habitat identified by the landscape model was used to define the extent for patch-scale modeling efforts. Patch-scale variables influencing nest site selection were the proportion of big sagebrush cover >10%, distance to residential

development, distance to high volume paved roads, and productivity. This model accurately predicted independent nest locations. The unique hierarchical structure of our models more accurately captures the 'nested' nature of habitat selection, and allowed for increased discrimination within larger landscapes of suitable habitat. We extrapolated the landscape-scale model to the entire Gunnison basin because of conservation concerns for this species. We believe this predictive surface is a valuable tool that can be incorporated into land-use and conservation planning as well as the assessment of future land-use scenarios. S2: Thu, 10 Mar 11:00

Catherine Alsford, Brynne Stumpe, and Sara Morris, Dept. Biology, Canisius Coll., Buffalo, NY 14208, and Lindsey Walters, Dept. Biological Sciences, Northern Kentucky Univ., Highland Heights, KY 41099.

[S]Breeding biology of a newly-established population of House Wrens.

House Wrens (*Troglodytes aedon*) are secondary cavity breeders that will commonly use nest boxes. Our goal was to study the breeding biology of a new breeding population of House Wrens in Western New York established in 2009. Of the 60 nest boxes available in 2009, 33 were occupied by wrens. After a predation event on June 4th most females began to re-lay around the same time and further events were relatively synchronized. The average clutch size was 7.2 ± 1.2. During 2010, all 30 nest boxes were occupied. Most pairs were single brooded; however, 9 pairs had a second clutch. The average first clutch size was 6.7 ± 1.0. Neither clutch size nor likelihood of a second clutch was significantly affected by the date of male arrival, the date of female arrival, or the date the first egg was laid. However, second clutches had significantly fewer eggs than first clutches. Neither clutch size, nor the date of first egg laid, varied significantly between years. Additionally, we examined the effect of different levels of human disturbance on their breeding biology in 2010. Interestingly, the first egg in low traffic nests averaged 10 days earlier than either medium or high traffic areas, although this difference was not significant. Likewise, the average first clutch size of low traffic boxes was almost one egg higher than medium and high traffic areas, but this difference was also not significant. CO4: Thu, 10 Mar 11:30

Amy K. Amones and Michael J. Lanzone, Carnegie Museum of Natural History, Powdermill Avian Research Center, Rector, PA 15677, and Andrew J. Farnsworth, Conservation Science Program, Cornell Lab of Ornithology, Ithaca, NY 14850.

A novel method to study inter- and intraspecific variation of flight-calls in captivity.

Bioacoustics is a powerful method for studying avian migration. Recording flight-calls during nocturnal migration could be a valuable method for censusing populations over a wide geographic area, however incomplete knowledge of flight-call identities and inter- and intraspecific variation in call notes and calling rates limits the utility of using them as a census tool. Because of the difficulty of actively collecting known flight-calls from species during migration, we developed a novel method for recording flight-calls from birds by placing them in a specially designed acoustic studio. To date we have recorded over 40,000 flight-calls from 52 species in the acoustic studio. We tested whether the amount of variation within a species was similar between flight-calls recorded in captivity and wild birds. Results from our principal coordinate ordination analysis indicated that variation was similar between the two methods (92.8 ± 0.05% was explained in the first five PCO axes). We also used mixed models to study inter- and intraspecific variation in flight-calls for 14 warbler species using 28 spectographical measurements. The results indicated that there was interspecific variation in 10 measurements and intraspecific variation in 2 measurements ($p < 0.05$). There were also some subtle and significant differences between ages and sexes, but the differences were not consistent between species. These studies illustrate some of the complex questions that need answered to fully utilize flight-calls as a means to study avian migration. The acoustic studio provides a controlled environment critical for generating data that can strengthen future acoustical monitoring applications. CO30: Sat, 12 Mar 9:30

A. B. Anderson, P. M. Nolan, and K. Y. Johnson, Dept. Biology, The Citadel, Charleston, SC 29409.

[S]Hormonal correlates of West Nile virus seropositivity in House Finches.

West Nile virus (WNV) encephalitis appeared in New York state in 1999, leading to intensive research into the disease's effects on humans. Research on the ways in which WNV impacts wildlife species has been dominated by reports of its host range, and on population-level impacts. We studied a local population of House Finches (*Carpodacus mexicanus*), using basket traps to capture finches at steadily-maintained feeding stations scattered across the study site in Charleston, SC, USA. Our data include blood and feather samples (n = 245) from both sexes and three age classes. We used ELISA-based assays to determine prior exposure to WNV by assessing anti-WNV antibodies in the blood, and to measure levels of corticosterone captured in feathers at the time of molt. We found a significant relationship between age and likelihood of exposure, but not between sex and likelihood of exposure. We also found a distinct seasonal pattern to our ability to detect antibodies produced in response to WNV exposure, with samples in the late summer being significantly more likely to show anti-WNV antibodies.

We also report on a relationship between corticosterone level and exposure history. We conclude that WNV strikes immunologically naïve finches stressed by the demanding period of molt that immediately follows their independence from their parents. PO2: 11

Michael J. Anteau, Mark H. Sherfy, Terry L. Shaffer, Jennifer H. Stucker, and Mark T. Wiltermuth, USGS Northern Prairie Wildlife Research Center, Jamestown, ND 58401.

Habitat selection and breeding success of Piping Plovers on a dynamic reservoir.

Lake Sakakawea in western North Dakota has become an increasingly important breeding area for the Northern Great Plains population of Piping Plovers (*Charadrius melodus*; hereafter plovers). However, inter- and intra-annual fluctuations of water level may influence plover productivity. Inter-annual declines in water level expose unvegetated nesting habitat for plovers, but stable or increasing water level can reduce abundance of habitat through encroachment of vegetation or inundation. Large expanses of habitat that are available in declining water years apparently increases numbers of plovers using Lake Sakakawea during summer. Water levels generally peak in mid-summer, which potentially impact plover productivity. We monitored 351 plover nests during 2006-2009. We examined landscape-scale habitat features that influenced the numbers of plover pairs using a given segment of shoreline. This analysis could be used to estimate the potential number of plover pairs using the lake. We also examined within-territory nest-site selection. We found that plovers selected lower elevation sites for nesting and that elevation of the nest, relative to the lake level, was the most important factor influencing nest survival. Our data suggest that plover productivity on this dynamic reservoir has the potential for "booms" and "busts", largely dependent upon the magnitude and timing of mid-summer rises in lake level. We review historic mid-summer increases in water level and make some informed estimates of productivity in prior years. S4: Sat, 12 Mar 9:45

Todd W. Arnold, Dept. Fisheries, Wildlife, & Conservation Biology, Univ. Minnesota, St. Paul, MN 55108, and Robert M. Zink, Dept. Ecology, Evolution, & Behavior, Univ. Minnesota, St. Paul, MN 55108.

Collisions with buildings and towers do not affect long-term avian population trends.

Migrating birds regularly collide with buildings and towers and for decades this source of annual mortality has been proposed as a serious conservation concern. However, the overall impact of this source of mortality on bird population dynamics has not been rigorously assessed. We compiled 278,165 mortality records for 190 landbird species from 11 collision sites in eastern North America to determine which species were most vulnerable to collision mortality. Although there were notable differences in collision risk between towers and buildings for some species (e.g. hummingbirds were only killed at buildings), relative vulnerability to towers versus buildings were highly correlated across species. After adjusting for population size and breeding range, vulnerability to collision varied over 5 orders of magnitude among species. We identified 25 species that collide with buildings or towers >25 times more frequently than expected, and 19 of these super-colliders were wood-warblers, including five members from a 6-species clade, indicating a strong phylogenetic disposition for collision. The strongest ecological predictor of collision risk among species was nocturnal migration behavior, with nocturnal migrants averaging 30-fold greater risk than diurnal migrants. In addition, Neotropical migrants were more susceptible to collision than short-distance or non-migrants, and hover-gleaning birds were more susceptible than aerial foragers. However, collision frequency was not correlated with population trends after accounting for species overall abundance, suggesting that this conspicuous source of mortality has not contributed to population declines among North American birds. CO28: Sat, 12 Mar 11:45

David Baasch, Platte River Recovery Implementation Program, Kearney, NE 68845.

Platte River Recovery Implementation Program: a basin-wide approach toward recovery and ESA compliance for four listed species including Interior Least Terns and Piping Plovers.

The Program is intended to address issues related to endangered species, including endangered interior least tern (*Sternula antillarum*; tern) and threatened piping plover (*Charadrius melodus*; plover), and loss of habitat along the Platte River by managing land and water resources following principles of adaptive management. The Program has implemented a monitoring, independent double-observer, nest-site selection, and foraging habits study since 2007 to evaluate reproductive and foraging activities for terns and plovers in Program Associated Habitats. The trend in counts of tern and plover adults, though variable has increased since the monitoring protocol was first implemented in 2001. The number of tern and plover nests, successful nests, chicks, chicks/nest, fledglings, and fledglings/nest were also higher despite the near season-long high flows that precluded nesting opportunities on river islands and a mid-June rain event that claimed several nests during 2010 than they have been since the Program began in 2007. Though not fully evaluated, preliminary reviews of the independent, double-observer data indicates collecting data within the nesting colony results in a more accurate

depiction of number of nests initiated, nest success, and number of chicks hatched while outside monitoring appears to result in higher counts of older chicks (>5 days old), fledglings, and adults. Banding has occurred on the central Platte River for 2 years and efforts to date have provided valuable information on philopatry, fidelity, wintering grounds, survival, recruitment, re-nesting, and disturbance with little evidence that adults or nests were negatively impacted. PO4: 33

Amanda V. Bakian and Kimberly A. Sullivan, Dept. Biology and the Ecology Center, Utah State Univ., Logan, Utah 84322.

[S]The use of aquatic and terrestrial insects by Willow Flycatchers at Fish Creek, Utah revealed by carbon and nitrogen stable isotopes.

Willow Flycatchers (*Empidonax traillii*) are an insectivorous, riparian obligated nesting species. Aquatic insect subsidies may be an essential food source for Willow Flycatchers during the breeding season. We investigated the contribution of aquatic and terrestrial insects to the diet of adult (N = 32) and nestling (N = 31) Willow Flycatchers over the course of two breeding seasons at Fish Creek, Utah using 13C and 15N stable isotope analysis and fecal sample dissection. Stable isotope analysis detected differences in δ13C ($F_{2,170} = 23.43$, $P < 0.0001$) but not δ15N ($F_{2,137} = 0.30$, $P = 0.74$) between aquatic and terrestrial insects. Terrestrial insects (mean δ13C = -25.1, SD = 1.2) were more enriched in 13C than aquatic insects (mean δ13C = -26.7, SD = 2.2). Significant differences were found in δ13C between adult (mean male = -20, SD = 2.7; mean female = -20.6, SD = 2.1) and nestling flycatcher feathers (mean nestling = -23.2, SD = 1.1). Hatch year flycatcher feathers were more depleted in 13C than adult feathers ($F_{2,60} = 19.37$, $P < 0.0001$). Aquatic insects were found to comprise approximately 1/3 of the diet of adult Willow Flycatchers and 13% of the diet of hatch year birds indicating that adults consume a diet different from the one they feed to their nestlings. Our study suggests that aquatic insects are an important component of the Willow Flycatcher diet at Fish Creek. For riparian obligated species including the Willow Flycatcher, the availability of adjacent habitat types bordering nesting habitat may be important for producing food resources to complement in situ riparian arthropod production. CO1: Thu, 10 Mar 9:00

Jennifer Baldy, Kalamazoo Nature Center, Kalamazoo, MI 49009.

A method of adjusting for area overlap when using the unlimited distance method to estimate population.

Point counts are often set up for multiple purposes (mapping, monitoring of specific stands, originally used with the limited distance method) if adapted to the unlimited distance method there is sometimes overlap in the count circle area, which becomes more pronounced as detection distance increases. Comparisons between the limited and unlimited distance methods in 2010 data from Fort Custer Training Center, agree with the findings of Simons et al (2007) that the limited distance method results were consistently higher than the limited distance method and additionally find that the difference ratio increases as a function of the detection distance. To remove this trend an adjustment to the counts and their area denominators by the amount of overlap was made. The area adjustment was calculated using the buffer and intersection functions of GIS for several detection distances and found to closely follow an equation fit through them in excel. This area adjustment, unique to our set of points and removes all trends in the data resulting from detection distance. As published detection distances become more accurate and habitat/species specific, the advantages of the unlimited distance method may only improve, and adaptions such as this may enable more accurate estimations on point counts that are not entirely suited to the method. PO1: 01

Jennifer Baldy, Raymond J. Adams, John Brenneman, Mark E. Miller, and Torrey Wenger, Kalamazoo Nature Center, Kalamazoo, MI 49009.

A decade of Cerulean Warbler (*Dendroica cerulean*) research at Fort Custer Training Center, Michigan.

Fort Custer Training Center is part of a globally significant Important Bird Area (National Audubon Society 2010) with an estimated population ranging from 65 in 2010 to 121 in 2006. Point count surveys, nest searching, and color banding data collected over the past decade allow us to look at population history, and the location of colonies. There is now documented recruitment from another local population at Barry State Game Area, 30 km to the NE. Most observations occur at openings in the canopy, which function as a place of male song display, but analysis of point count data shows that the broader habitat is used up to 450 m from known openings. We suspect cowbird parasitism and changing forest conditions affect local populations. Nest surveys (for the Cerulean and other species) provide data on the local parasitism pressure. Nest success results from similarly-sized, open-cup-nesting species may provide an indication of the impacts of Brown-headed Cowbird parasitism on Cerulean Warblers. A long-term landscape history of the colony areas is being constructed using historic photos and management databases. S1: Thu, 10 Mar 14:30

Nathan Banet, Kathleen O'Reilly, Kathleen Hunt, and Dan Kim, Dept. Biology, Portland State Univ., Portland, OR 97207.

The effect of Brown-headed Cowbirds on nestling condition of hosts.

We observed Brown-headed Cowbird parasitism in central Nebraska and its effects on grassland hosts during the 2010 breeding season. Grassland birds nesting in close proximity to cattle were continually parasitized by Brown-headed Cowbirds. This study examined parasitized and non-parasitized hosts to determine whether the presence of Brown-headed Cowbird nestlings had a measurable effect on host nestling condition, as measured by baseline corticosterone. Plasma and fecal samples were collected from Dickcissels and Red-winged Blackbirds, two primary hosts commonly parasitized in the study area. Although there was no significant difference between parasitized and non-parasitized Dickcissels or Red-winged Blackbirds for either plasma or fecal baseline corticosterone, the plasma results suggest a greater impact of parasitism on Dickcissels than on Red-winged Blackbirds. PO7: 46

Daniel C. Barton and Thomas E. Martin, Montana Cooperative Wildlife Research, Univ. Montana, Missoula, MT 59812.

[S]Timing and proximate causes of mortality in wild bird populations: testing Ashmole's Hypothesis.

Fecundity in birds is widely recognized to increase with latitude across diverse phylogenetic groups and regions, yet the causes of this variation remain enigmatic. Ashmole's hypothesis suggests increasing seasonality leads to increasing overwinter mortality due to resource scarcity during winter, thus increasing per-capita resources for breeding during the resource-rich summer. Clutch sizes are therefore predicted to increase with increasing degree of seasonality, such as occurs with increasing latitude. While this hypothesis has been widely supported through indirect tests such as correlations between clutch size and measures of seasonality, the underlying mechanisms of this hypothesis remain poorly explored. We used a meta-analysis of over 200 published studies to test two underlying assumptions of this hypothesis: that mortality is greatest during the season of greatest resource scarcity and that most mortality is caused by starvation. We show that across 69 studies of seasonal mortality rates, winter was not the season of greatest mortality – indeed, summer often was. Across 39 studies from which we extracted monthly survival rates, relationships between monthly productive and monthly survival varied widely and negative relationships were as common as positive relationships. The most frequent proximate cause of mortality in 148 studies representing a diversity of seasons, study designs, and species was predation, rather than starvation. Our results fail to support the idea that seasonality of resources causes latitudinal variation in clutch size via the mechanism of Ashmole's hypothesis, and suggest alternative explanations of latitudinal variation in clutch size should remain under consideration. CO8: Thu, 10 Mar 16:15

Gina Barton and Brett K. Sandercock, Div. Biology, Kansas State Univ., Manhattan, KS 66506.

[S]Long-term changes in the stopover dynamics of migratory songbirds in northern California.

Climate change has impacted seasonal phenology and geographic distributions of plants and animals. For migratory birds, ecological mismatches between timing of life-history events and environmental conditions may negatively affect population viability. Shifts in timing of migration have been associated with changing climate conditions, but few studies have examined long-term changes in stopover duration. Based on a 22-year mark-recapture dataset collected at a coastal site in northern California, we assessed annual variation in the timing of arrival during spring and fall migration and stopover duration for five species of migratory songbirds. Median arrival dates of Yellow Warblers (*Dendroica petechia*) and Pacific-slope Flycatchers (*Empidonax difficilis*) during fall migration were delayed by about one day per two years. None of the five species showed significant shifts in spring median arrival dates. To estimate stopover duration, we used temporal symmetry models with constant apparent survival (Φ) and seniority probabilities (γ). Mean fall stopover duration for Pacific-slope Flycatcher was 7.8 ± 2.0 days and mean spring stopover duration for Swainson's Thrush (*Catharus ustulatus*) was 5.2 ± 1.2 days. Pacific-slope Flycatchers had a trend for increased stopover duration over a 13-year period, whereas Swainson's Thrush show no trend. In future analyses, we will assess whether long-term variation in arrival time and stopover duration is associated with annual variation in climatic conditions. CO23: Fri, 11 Mar 15:45

Nyambayar Batbayar, Xiangming Xiao, John Y. Takekawa, Delong Zhao, Hongfeng Zhao, and Tseveenmyadag Natsagdorj, Dept. Botany and Microbiology, and Center for Spatial, Univ. Oklahoma, Norman, OK 73019.

[S]Modeling spatial distribution of Swan Goose (*Anser cygnoides*) in East Asia.

Patterns of the geographic distribution of a species is central to many fundamental questions in understanding their ecology and conservation biology. The Swan Goose is a species that is only found in East Asia with a global

population of < 80,000 individuals in the wild. Determination of a species' distribution range can be achieved by thorough ground surveys which would require intensive field work by many staff over a long period of time. Remote sensing allows us to pursue a less labor intensive and inexpensive alternative. Remote sensing is ideal for working in inaccessible remote areas in developing countries and for studies that involve multiple countries. At present, the Swan Goose distribution and population assessment has not been done due to scarce information from range countries. We collected published information of the species observation records from Russia, Mongolia, and China, and then used this database as base absence data to model this species distribution in Asia using Maxent approach. PO10: 65

Jeffrey L. Beck and Chad W. LeBeau, Dept. Renewable Resources, Univ. Wyoming, Laramie WY 82071, Andrew J. Gregory, Division of Biology, Kansas State Univ., Manhattan KS 66506, Gregory D. Johnson, Western EcoSystems Technology Inc., Cheyenne, WY 82001, and Matthew J. Holloran, Wyoming Consultants LLC, Laramie, WY 82072.

Greater Sage-Grouse and wind energy development.

Wind energy is proposed to supply 20% of the electricity in the United States by 2030. Much of the future supply of wind-generated electricity is slated for development on lands that provide critical habitat for prairie grouse species including Greater Sage-Grouse (*Centrocercus urophasianus*). Wind-energy development has the potential to fragment wildlife habitats, leading to direct and indirect impacts to wildlife populations. Prairie grouse are likely to avoid tall structures such as turbines and transmission lines, thus changing habitat selection patterns and population fitness. We discuss the issues surrounding Sage-Grouse and wind energy and overview preliminary data from the first Sage-Grouse/wind energy study. Our study focuses on the 35 km2 PacifiCorp Seven Mile Hill (SMH) wind energy facility, ~ 15 km west of Medicine Bow, Wyoming. The SMH project was completed in late December 2008 and has 79 General Electric 1.5-MW wind turbines. The Horizon Wind Energy Simpson Ridge wind resource area serves as our offsite reference study area. Simpson Ridge encompasses ~ 115 km^2 and is directly south of the SMH facility. Three leks are within 1.4 km of wind turbines and nine leks are located in Simpson Ridge. The objectives of our study focus on understanding changes in male lek attendance and identifying distance thresholds that may influence Sage-grouse fitness parameters in relation to wind energy development. We captured 116 female Sage-Grouse in April 2009 and 2010 and have obtained > 2,800 locations over 2 years to evaluate nesting and brood success, female survival, and habitat occurrence for these grouse. S2: Thu, 10 Mar 10:30

Tyler J. Beck and Dale E. Gawlik Dept. Biological Sciences, Florida Atlantic Univ., Boca Raton, FL 33431, and Elise V. Pearlstine, Everglades Research and Education Center, Univ. Florida, IFAS, Belle Glade, FL.

[S]The avian community response to constructed treatment wetlands for Everglades restoration.

The use of constructed wetlands to treat polluted runoff water from a variety of sources has been steadily increasing since the 1950s. In the Everglades, Stormwater Treatment Areas (STAs) were constructed to remove phosphorous from surface waters. Although the primary purpose of STAs is to improve water quality and habitat, they may provide quality habitat to various groups of avifauna. We compared avian density, richness, and composition in 6 STAs, the Everglades Agricultural Area (EAA), and in the Everglades. We also compared these metrics between treatment habitats with the STAs. Bird density and species richness were significantly lower in the Everglades than in the other land types in all seasons (both tests, $p < 0.01$). Species richness was always greatest in the STAs compared to the other land types ($p < 0.01$); however avian density in the STAs was greatest in fall and winter, whereas it was greatest in the EAA during summer. The STAs are dominated by aquatic, herbivorous, wintering species whereas the EAA and the Everglades are dominated by insectivorous, resident species. Within the STAs, avian density and richness were significantly greater in dense submerged aquatic vegetation (SAV) than in emergent vegetation ($p < 0.01$). This was especially pronounced during fall and winter due to wintering waterfowl preferring the SAV habitat. To our knowledge, the avian densities in the STAs are the highest reported for any treatment wetland in the US. These results show that the STAs are used heavily by a diverse group of avifauna, particularly wintering species such as waterfowl. CO7: Thu, 10 Mar 14:45

Doug Becker and James Sheehan, WV Cooperative Fish and Wildlife Research Unit, West Virginia Univ., Morgantown, WV 26506, Petra Bohall Wood, U.S. Geological Survey, WV Cooperative Fish and Wildlife Research Unit, West Virginia Univ., Morgantown, WV 26506, and Harry Edenborn, National Energy Technology Laboratory, U.S. Dept. Energy, Pittsburgh, PA 15236.

Preliminary effects of Marcellus shale drilling on Louisiana Waterthrush in West Virginia.

Spurred by technological advances and high energy prices, extraction of natural gas from Marcellus shale is increasing in the Appalachian Region. Because little is known about effects on wildlife populations, we studied

the immediate impacts of oil and gas (O&G) extraction on Louisiana Waterthrush (LOWA) demographics and relative abundance, an exclusively riparian species, to establish a baseline for potential future changes. Annually in 2008-2010, we conducted point counts, monitored Mayfield nesting success, spotted-mapped territories, and measured habitat quality using the EPA Rapid Bioassessment protocol for high gradient streams and a LOWA Habitat Suitability Index (HSI) on a 3,500 ha study area in northern West Virginia. On 11 streams, the stream length affected by O&G activities was 58%. Relative abundance, territory density, and nest success varied annually but were not significantly different across years. Success did not differ between impacted and unimpacted nests, but territory density had minimal correlation with percent of stream impacted by O&G activities. Impacted nests had lower HSI values in 2010 and lower EPA indices in 2009. High site fidelity could mask the immediate impacts of habitat disturbance from drilling as we measured return rates of 57%. All return individuals were on the same stream they were banded and 88% within 250 m of their territory from the previous year. We also observed a spatial shift in LOWA territories, perhaps in response to drilling activities. Preliminary results identified few differences at low habitat disturbance levels but highlight the need for continued monitoring with increasing disturbance. CO28: Sat, 12 Mar 11:30

James M. Beerens, Dale E. Gawlik, and Erik Noonburg, Dept. Biological Sciences, Florida Atlantic Univ., Boca Raton, FL 33431.

Modeling flexible habitat selection of wading birds in dynamic wetlands.

Variation in food availability during the breeding season plays an influential role in the population dynamics of many avian species. This study quantifies foraging habitat selection of breeding, radio-tagged Great Egrets "exploiter" species; N = 76) and White Ibises "searcher" species; N = 125) to test the hypothesis that population responses in a dynamic wetland ecosystem can be linked to how constrained a species is in its use of habitats, especially when habitat conditions are poor and niche breadth is predicted to contract. Research was conducted during 2006 and 2007 in the Florida Everglades, where fluctuating food resources are pronounced due to seasonal periodic drying and flooding. In both species, low food resource availability impacted the selection for short-term explanatory variables involved in the concentration of prey (e.g. recession rates, and site reversal), suggesting niche contraction. In both years, the "searcher" species was more constrained in its use of habitats than the "exploiter" species. We developed and evaluated spatially-explicit models of daily resource availability and quality for two species (Great Egret and White Ibis) with opposing foraging strategies. In both years, the ibis model outperformed the egret model suggesting either a more accurate model, or alternatively, a consequence of their narrower behavioral niche. Also, as water depths decrease in the Everglades and overall habitat score improves, the models become less predictive. A possible mechanism is that water depth use is more variable later in the breeding season. CO7: Thu, 10 Mar 15:15

Julie W. Smith, Stephanie M. Sjoberg, Matthew C. Mueller, and **Craig W. Benkman**, Dept. Zoology and Physiology, Univ. Wyoming, Laramie WY 82071.

Assortative flocking in crossbills and implications for ecological speciation.

Red crossbills (*Loxia curvirostra* complex) use the foraging rates of flock mates (i.e., public information) to assess tree quality, thus natural selection should favor assortative flocking by feeding capabilities. In northwestern North America, several ecologically specialized call types of red crossbills occur, which differ in bill sizes and feeding capabilities. They also differ in vocalizations, such that flight calls may provide crossbills information on other individuals' bill sizes. We found that two call types of red crossbills were more likely to approach playbacks of their own call type than those of heterotypics, and that their propensity to approach heterotypics decreased with increasing divergence in bill size. Because crossbills choose mates while in flocks, assortative flocking could lead indirectly to assortative mating and reproductive isolation as a byproduct. These patterns of association therefore provide a mechanism by which increasing divergent selection can lead to increasing reproductive isolation. CO29: Sat, 12 Mar 11:15

Thomas J. Benson, Illinois Natural History Survey, Univ. Illinois, Champaign, IL 61820, Nicholas M. Anich, Wisconsin Dept. Natural Resources, Ashland, WI 54806, and James C. Bednarz, Dept. Biological Sciences and Environmental Sciences Program, Arkansas State Univ., Jonesboro, AR 72467.

Effects of habitat structure and song playbacks on detection probability of Swainson's Warblers: implications for survey design.

Monitoring and studies of habitat use are complicated by issues of imperfect detection. This is especially true for rare or secretive species, and extensive spatial and temporal variation in estimates of presence or abundance of these species often compromise the utility of existing survey efforts. Although many survey efforts have begun to account for detection probability, few account for non-temporal sources of heterogeneity in detection. By

influencing the behavior of individuals, some non-temporal sources of heterogeneity, such as habitat structure and composition, may have large effects on detection probability. In 2006 and 2007, we studied factors influencing detection probability of Swainson's Warblers (*Limnothlypis swainsonii*) in bottomland hardwood forests of southeastern Arkansas. Using a color-marked population, we assessed the effects of time of day, week of the breeding season, habitat structure and composition, and song playbacks on detectability. Although there was some temporal variation, habitat variables were much stronger predictors of detection probability. Among habitat variables, understory density was most influential; detectability ranged from < 20 to >50% at sparse and dense sites, respectively. Song playbacks increased detection, but there was little indication that temporal or habitat factors influenced their effectiveness. Based on the range of variation we observed, surveys in poor-quality habitat likely must compensate for poor detection probability by incorporating song playbacks and an increased number of visits to each point to achieve unbiased estimates of presence or abundance and acceptable power to detect trends. CO30: Sat, 12 Mar 11:30

Karl S. Berg, Soraya Delgado, and Kathryn A. Cortopassi, Cornell Lab of Ornithology, Ithaca, NY 14850, Virginia Sanz D'Angelo, Instituto Venezolano de Investigaciones Científicas, Caracas, Venezuela, Steve R. Beissinger, Environmental Science, Policy & Management, Univ. California, Berkeley, CA, 94720, and Jack W. Bradbury, Neurobiology & Behavior, Cornell Univ., Ithaca, NY 14850.

Vertical transmission of vocal memes in wild parrots.

Research into birdsong has yielded a nearly complete understanding of a complex, culturally-transmitted motor pattern. However, most research has concentrated on songs that are acquired by males from other males during a critical life history stage. Parrots represent the largest taxonomic group of birds with learned vocal production by both sexes and across all life history stages, but have received less attention. We studied the cultural transmission of contact calls in audio-video rigged nests of wild Green-rumped Parrotlets (*Forpus passerinus*) in the Llanos of Venezuela. Previous research showed adults have unique contact calls used when visually separated from social mates; playback experiments indicated individuals are capable of distinguishing mates based solely on contact calls. During the nestling phase, parents coordinate hourly feedings throughout the day with contact calls. Thus, we asked whether parental contact call types given during early ontogeny might influence the spectrographic structure of nestling contact calls that emerge later in ontogeny, and whether cross-fostering experiments would affect the process. Spectrographic Cross-Correlation and Principal Coordinates analysis showed contact calls of nestlings were more similar to parents than to adults at other nests; cross-fostering did not affect the relationship. Thus, nestlings develop individualized attributes that depend on prior experience with contact call templates provided by both parents. This represents the first experimental evidence for the vertical transmission of vocal memes in a wild parrot population. YP1: Sat, 12 Mar 15:45

Brian J. Bielfelt, Caesar Kleberg Wildlife Research Institute, Texas A&M Univ.-Kingsville, Kingsville, TX 78363, Andrea R. Litt, Dept. Ecology, Montana State Univ., Bozeman, MT 59717, and Fred C. Bryant, Leonard A. Brennen, and Tom Langschied, Caesar Kleberg Wildlife Research Institute, Texas A&M Univ.-Kingsville, Kingsville, TX 78363.

[S]Are wintering grounds for grassland birds threatened by a native invasive grass?

Southwestern grasslands provide important wintering grounds for many species of birds but invasive plants threaten the integrity of the few remaining grasslands. Tanglehead (*Heteropogon contortus*) is a native grass that was once a minor component of grasslands in southern Texas; however, it has increased in distribution and dominance within the past 15 years, behaving like an invasive species. We sought to quantify the effects of tanglehead and associated changes in vegetation structure and composition on wintering birds. We selected plots (N = 70) along a gradient of tanglehead dominance (0-78%) on two ranches in southern Texas. On each plot, we surveyed birds using distance sampling methods along a 250-m line transect three times during January and February 2010 and 2011. We quantified community richness, presence and density of 11 and 4 grassland species, respectively, as well as vegetation structure and composition. We examined changes in the avian community along the gradient of dominance by tanglehead using generalized linear models, after accounting for plot-based covariates. Avian richness increased across the invasion gradient. Cassin's Sparrow (*Aimophila cassinii*) and Eastern and Western Meadowlark (*Sturnella magna* and *S. neglecta*) were more likely to be found in tanglehead; presence increased by 1168%, 553%, and 1534% across the invasion gradient, respectively. In addition, density of Western Meadowlark increased by 164% across the dominance gradient. Our results indicate that tanglehead may benefit some avian species, suggesting that several grassland birds might not lose wintering habitat if this grass continues to increase in dominance throughout Southwestern grasslands. CO10: Thu, 10 Mar 15:45

Brian J. Bielfelt, Caesar Kleberg Wildlife Research Institute, Texas A&M Univ.-Kingsville, Kingsville, TX 78363, Andrea R. Litt, Dept. Ecology, Montana State Univ., Bozeman, MT 59717, and Fred C. Bryant, Leonard A. Brennen, and Tom Langschied, Caesar Kleberg Wildlife Research Institute, Texas A&M Univ.-Kingsville, Kingsville, TX 78363.

Does a native invasive grass affect breeding birds in grasslands?

Invasive plants have profound, and often negative, effects on native fauna. Few examples exist of native plants that behave like invasive species; however, native invaders can cause similar ecosystem changes as nonnative plants. Tanglehead (*Heteropogon contortus*) is a native bunchgrass that has increased in distribution and dominance in south Texas within the last 15 years. To determine how breeding birds respond to vegetation changes caused by tanglehead, we selected plots (N = 70) along a gradient of tanglehead dominance (0-70%) on two ranches in southern Texas. On each plot, we surveyed birds using point counts five times during 2010 and quantified community composition, presence and density of 7 and 6 avian species, respectively, as well as vegetation structure and composition. We found thicker and taller vegetation, and native cover decreased by 48% across the gradient of tanglehead dominance. Despite these vegetation changes, avian richness increased and the presence and density of many bird species did not change. Cassin's Sparrow (*Aimophila cassinii*) and Eastern Meadowlark (*Sturnella magna*) presence increased by 705% and 2048% across the gradient of tanglehead dominance. Density of Mourning Dove decreased by 53% across the dominance gradient. Consistent with previous research, the effects of invasive species seem to be species-specific based on habitat requirements. Given that tanglehead is not an entirely novel component of these grasslands, bird species may still consider invaded areas as habitat. Further research is necessary to determine if changes created by tanglehead attract birds but result in lower nest success, creating an ecological trap. PO10: 66

Jennifer A. Blakesley, Rocky Mountain Bird Observatory, Brighton, CO 80601, Jay D. Carlisle, Idaho Bird Observatory, Boise, ID 83725, and Steven J. Slater, HawkWatch International, Salt Lake City, UT 84106.

Site occupancy by Flammulated Owls: a pilot study in three states.

The Flammulated Owl is broadly distributed in temperate coniferous forests of North America. However, little is known about the owl's population distribution among the many forest cover types it inhabits. We developed and tested a sampling design to estimate site occupancy rates of Flammulated Owls on three National Forests and one BLM Field Office in 2010, in Colorado, Idaho and Utah. We used a spatially balanced sampling design to select sampling locations in forest cover types stratified as primary and secondary habitat (n = 49 primary and 11 secondary locations). Each sampling location was comprised of a grid of 16 evenly-spaced survey points. Surveys consisted of 10 minutes of alternately listening and broadcasting Flammulated Owl calls, in two-minute intervals. We estimated detection probability by two methods; (1) removal-in-time, and (2) repeated visits to a subset of sampling locations. Both methods provided precise estimates of detection probability. Resulting estimates of site occupancy were 0.66 (SE = 0.08) in primary habitat and 0.30 (SE = 0.15) in secondary habitat. These methods will be refined for sampling a broader geographic area in 2011. CO30: Sat, 12 Mar 14:45

David Bonter and Benjamin Zuckerberg, Cornell Lab of Ornithology, Cornell Univ., Ithaca, NY 14850, and Carolyn Sedgwick, Dept. of Natural Resources, Cornell Univ., Ithaca, NY 14850.

Daily feeding patterns in winter: predation pressure may not be driving behavior.

Theories and models of energy management in wintering birds predict that daily feeding behavior is primarily driven by differences in the intensity and timing of predation pressure. Data have been sparse, however, and insufficient to test model-based predictions. We quantifying the daily feeding behavior in 125 free-living resident birds of 4 species using individuals continuously tracked with passive integrated transponders and radio frequency identification technology. The timing of visits to 9 supplemental feeding stations was recorded over two winters (N > 500,000 feeding visits). We present the first comprehensive analysis of supplemental feeding behavior in wild passerines. Feeding activity across all species was constant throughout the day with a slight increase in intensity approaching sunset. These results support models that assume constant predation pressure throughout the day. Alternatively, predation pressure may not be a significant driver affecting foraging behavior (as assumed by foraging models), and existing models may not be capturing the key factors that influence foraging decisions in resident birds in winter. CO1: Thu, 10 Mar 10:00

Ashley Bogrand and Diane L.H. Neudorf, Dept. Biological Sciences, Sam Houston State Univ., Huntsville, TX.

[S]Nest defense behavior by Carolina Wrens (*Thryothorus ludovicianus*) in an urban environment.

We tested the hypothesis that Carolina Wrens can discern between different nest predators that they may encounter in an urban environment. The study was conducted in residential yards in the city of Huntsville, Walker County, TX where domestic and feral cats are common. We compared responses of parent birds to mounts of a

feral cat (*Felis catus*), a Texas rat snake (*Elaphe obsolete lindheimeri*), and a cardboard box (control) placed near the nest during the nestling stage. Wrens emitted a variety of alarm calls towards mounts and spent more time close to nest predators than the control. Rasp alarm calls were given in response to both the cat and snake whereas cheer calls were given only toward the cat. The control received very little response. Preliminary findings indicate that Carolina Wrens in urban environments can distinguish between potential nest predators and may use different alarm calls accordingly. PO6: 41

Bryan A. Botson, Dale E. Gawlik, and Joel C. Trexler, Biological Sciences, Florida Atlantic University, Boca Raton FL 33458.

Modeling trophic linkages with wading bird prey concentrations: turning ecosystem attributes into wading bird food.

The trophic hypothesis, a foundation of Everglades restoration, states that restored hydrology will produce higher wading bird prey availability leading to higher nesting effort. Prey availability is not just fish population size. It also incorporates factors that reorganize prey populations in to small, dense patches that are highly vulnerable to capture by wading birds. During the dry seasons of 2005-2009, we measured the concentrations of prey that form seasonally as water levels recede across the landscape. Hydrological conditions and wading bird nesting differed markedly among years. Rain during the 2005 dry season caused wading bird nest abandonment. Conversely, the 2006 and 2009 dry seasons had high peak water levels at the start of the dry season and steady recessions with strong wading bird nesting. Drought conditions led to poor nesting in 2007 and 2008. Mean prey biomass (g/m^2) at sites was significantly lower in 2007 and 2008 than in 2006 (8, 18, and 48, respectively), likely due to low wet season water levels, which likely constrained the growth of prey populations. Favorable hydrologic conditions in 2006 fostered high prey biomass and wading bird nesting. Large numbers of wading birds nested in 2009; however, prey biomass was not correspondingly high (24 g/m^2). Model selection showed that prey concentrations increased with increased microtopography, rate of water recession, and prey biomass from the preceding wet season. Microtopographical relief and receding water are mechanisms that create shallow depressions and distribute prey into these depressions as the seasonal drying front moves through the landscape. CO7: Thu, 10 Mar 15:00

Richard A Botta, Environmental Sciences Program, Florida Atlantic Univ., Boca Raton, FL 33431, and Dale E Gawlik, Dept. Biological Science, Florida Atlantic Univ., Boca Raton, FL 33431.

[S]Effects of lake stage and marsh elevation on wading bird nesting effort at Lake Okeechobee, FL.

Aerial surveys of wading bird nesting on Lake Okeechobee began in 1957. The lake supported about 10,000 pairs per year until regulatory changes increased water levels, producing a drop in nesting effort. Although the hypothesized cause of the drop in nesting was a reduction in area of foraging habitat, previous studies simply inferred that the relationship existing based on correlations between nesting effort and lake stage. Here we combined new soils surface elevation data with lake stages and an envelope of suitable foraging depths to model the area of foraging habitat available to wading birds each month. This estimate was then compared to monthly nest effort for the Great Egret (*Ardea alba*), Snowy Egret (*Egretta thula*), and White Ibis (*Eudocimus albus*), during 2006-2010. Nesting effort ranged from 10,176 pairs in 2006 to 20 pairs in 2008. During the extreme years the estimated maximum daily foraging habitat available to birds was 6526 ha and 839 ha, respectively. There was a moderate correlation ($r = 0.48$, $p < 0.03$) between monthly nest effort and estimated area of foraging habitat during the peak breeding months from February to May. The relationship between lake stage and estimated foraging habitat was a quadratic function with a peak area at 3.91 m NGVD88 (approximately 14 ft msl). This depth coincides with good nesting detected during aerial surveys at moderate lake stages of 3.77-4.36 m during the dry season. Future effort will be directed refining the habitat suitability model and incorporating other environmental factors. PO1: 02

T. J. Boves, T. A. Beachy, P. Keyser, and D. A. Buehler, Dept. Forestry, Wildlife, and Fisheries, Univ. Tennessee, Knoxville, TN 37996, P. B. Wood, J. Sheehan, J. Mizel, and G. George, Div. Forestry and Natural Resources, West Virginia Univ., Morgantown, WV 26506, J. L. Larkin, A. Evans, and M. White, Dept. Biology, Indiana Univ. Pennsylvania, Indiana, PA 15705, and A. D. Rodewald, M. Bakermans, and F. Newell, School of Environment and Natural Resources, Ohio State Univ., Columbus, OH 43210.

Cerulean Warbler *Dendroica cerulea* response to forest management in the Appalachian Mountains.

Cerulean Warblers *Dendroica cerulea* are among the fastest declining avian species in North America (Sauer et al. 2008). While this species has often been associated with closed-canopy mature forests, a growing body of evidence suggests that Cerulean Warblers may actually be adapted to disturbance in mature forests, especially those that increase canopy complexity and create canopy gaps (e.g., Bakermans and Rodewald 2009). In this study, we examined individual and population responses by Cerulean Warblers to varying levels of anthropogenic

disturbance (in the form of timber harvests) at seven locations across the Appalachian Mountains. We estimated Cerulean Warbler response in terms of territory density, nest survival, age structure, and body condition on four different silvicultural treatments (replicated at each study location). Overall, territory densities increased significantly post-harvest on intermediate and heavy treatments (compared to controls), but this response was greatest at sites situated in heavily forested, unfragmented landscapes. Nest survival rates varied spatially and temporally, but after accounting for regional and annual differences, similar treatment patterns emerged: nests in the un-harvested controls experienced greater nest survival and produced more fledglings than nests in all harvested treatments. Age structure of males did not differ among treatments and body condition was marginally greater on treatments. Our results suggest that while Cerulean Warblers are attracted to anthropogenic disturbances in highly forested landscapes, these habitats may act as 'ecological traps' with unsustainable levels of reproduction. S1: Thu, 10 Mar 9:00

Reed Bowman, Archbold Biological Station, Venus, FL 33960.

Variation in population density and territory size across a spatio-temporal urban gradient.

More than 90% of the habitat of the Florida Scrub-Jay has disappeared to human development. We began comparative studies of scrub-jay demography in wildland and urbanizing habitat in 1992. We measured jay population density and territory size in 1993 and 1994, then repeated those measures a decade later in 2003 and 2004. In 1993-94, jay density in the suburban habitat averaged 7.15 ± 0.3 pairs/40ha and the rate of population growth (λ) was 0.89, suggesting a declining population. The habitat consisted mostly of oak scrub, perforated by human development. At Archbold, in optimal, fire-maintained habitat, jay density was 3.80 ± 0.16 pairs/40ha and λ was 1.03, suggesting a stable population. Mean territory size in the suburbs was half that of the wildlands (4.3 vs. 9.0 ha). By 2003-2004, the suburban population had declined by > 70% but the wildland population was stable. The mean population density in the suburbs was 1.2 ± 0.04 pairs/40 ha, λ was 0.85, and mean territory size 4.7 ha. The human density of the suburbs had greatly increased and the study site was now mostly human development with embedded patches of scrub. In the wildlands, density was 3.94 ± 0.15, λ was 1.03, and mean territory size 9.3 ha. From these data, we conclude that some attribute of the urban environment, likely anthropogenic resource subsidies, leads to smaller territories which leads to high population density, but only when human development is low. This supports the perspective that density can be a misleading indicator of habitat quality. CO31: Sat, 12 Mar 15:15

Annie M. Bracey, Dept. Biological Science, Univ. Minnesota Duluth, Duluth, MN 55812.

[S]Window related avian mortality on Minnesota Point, MN, USA.

Various man-made structures act as barriers to the movement of migrating birds. In the United States alone hundreds of millions of birds are estimated to die annually from window collisions. This risk increases when urban environments exist at key points along migratory routes. Minnesota Point located on the western tip of Lake Superior is a major migratory corridor suitable for quantifying collision fatalities. To estimate mortality rates, 42 residential homes were searched periodically during five migratory periods between 2006 and 2009 for avian window kills. To increase the accuracy of this estimate, a scavenging experiment was incorporated into the study. A total of 40 identifiable species and 108 individual birds were recorded as window collision fatalities and of these, 90% were migratory species. Counts of individuals moving through the area indicated that the density of migrants was greater than that of resident species and was reflected in the higher mortality rates observed for migrants. The probability of a carcass being scavenged within 6 d was 79%. Variation in scavenging rates was best explained by the location of the house and the size of the carcass used. An annual estimate of fatalities for houses on Minnesota Point during peak migration was between 2,606 and 2,814 birds per year. Avian window collisions contribute significantly to annual mortality rates and are potentially avoidable. Deriving accurate estimates of mortality is vital to predicting long term population effects, especially for species susceptible to window collisions. PO3: 24

Eli S. Bridge, Center for Spatial Analysis, Univ. Oklahoma, Norman, OK 73019, Jeffrey F. Kelly, Dept. Zoology, Univ. Oklahoma, Norman, OK 73019, Nyambayar Batbayar and Xiangming Xiao, Center for Spatial Analysis, Univ. Oklahoma, Norman, OK 73019, and John Y. Takekawa, Kyle A. Spragens, and Nichola J. Hill, SFB Estuary Field Station, USGS Western Ecological Research Center, Vallejo, CA 94592.

Tracking avian influenza with stable isotopes.

When migratory birds infected with Highly Pathogenic Avian Influenza are found, there is immediate concern for localizing the provenance of the infection. For species with wide geographical distributions and extensive migration routes, it can be challenging to determine where infected birds came from and/or where they may go in the near future. Due to geographical variation in stable isotope ratios, examining stable isotopes in bird tissues

and feathers can provide a means of making a coarse estimate about bird movements on a continental scale. We have collected and analyzed feather samples from numerous locations in Asia and northern Africa with the goal of determining the utility of stable isotopes as a means of understanding long distance disease transmission. Many of the samples analyzed were from wild waterfowl that have been tracked using satellite transmitters, allowing for a rare opportunity to ground-truth animal tracking via stable isotopes. We also examined year-to-year variation in isotope ratios in feathers from the same individuals to assess long term consistency of isotopic markers. Our preliminary data indicate that there are some important limitations to the use of stable-isotopes in tracking infected migrants. However, the method appears to be useful for differentiating migratory and non-migratory individuals and for assessing how far migratory birds travel. In the future, isotope data my be useful as part of a full-information approach to tracking migratory birds that includes information on genetics, parasites, and trace metals. CO30: Sat, 12 Mar 9:45

Christopher W. Briggs, Dept. Natural Resources and Environmental Science, Univ. Nevada-Reno, Reno, NV 89512, Michael W. Collopy, Academy for the Environment, Univ. Nevada-Reno, Reno, NV 89557, and Brian Woodbridge, U.S. Fish and Wildlife Service, Yreka, CA 96097.

[S]Natal dispersal of Swainson's Hawks in Butte Valley, California.

Natal dispersal is an important, yet often poorly studied, process in population ecology. Natal dispersal can affect population structure and individual fitness. We tested correlations of natal dispersal distances in a population of Swainson's Hawks (*Buteo swainsoni*) in northern California that has been monitored from 1979-2010. We examined the effects of sex, number of offspring fledged, population density, primary productivity around a nest site, and annual trends on dispersal from the natal site to the breeding site of individuals recruited into the breeding population. Females dispersed farther than males in this population. Natal dispersal was negatively correlated with primary productivity and was positively correlated with nesting density around the nest site. We also examined the consequences of increased dispersal distance. We found no correlation between natal dispersal distance and lifetime reproductive success of those individuals that recruited into the breeding population, indicating no fitness costs of increased dispersal. Finally, we examined potential genetic contribution to dispersal distance by examining differences in dispersal distance between full siblings. Siblings had significantly more similar dispersal distances than would be expected by chance. However, no relationships were detected between paternal or maternal natal dispersal distances and offspring natal dispersal. We conclude that observed sibling similarities in natal dispersal distance is likely a result of similarities in unmeasured environmental variables rather than due to a genetic component of natal dispersal. Perinatal conditions seem to have significant effects on offspring dispersal distances, but there were no consequences of increased dispersal. CO17: Fri, 11 Mar 15:00

Charles R. Brown, Dept. Biological Sciences, Univ. Tulsa, Tulsa, OK 74012, and Valerie A. O'Brien, Dept. Entomology and Plant Pathology, Oklahoma State Univ., Stillwater, OK 74078.

Are wild birds important in the movement of arthropod-borne viruses?

The encephalitic arthropod-borne viruses (arboviruses) can cause a variety of serious human and wildlife diseases. Understanding how these pathogens are dispersed through the environment is important in managing their health-related impact and interpreting patterns of their genetic variability over wide areas. Because many arboviruses infect wild birds and can be amplified to a level that makes birds infectious to insect vectors, numerous workers have suggested that the movements of migratory birds represent a major way that these viruses can be transported locally, continentally, and intercontinentally. The idea that birds spread arboviruses is based largely on records of virus-positive birds of unknown movement status caught during the migration season, serological data showing that migrant birds were exposed to virus in the past, and indirect inferences about arbovirus movement based on patterns of genetic variation in viruses in different geographic locations. Although there are a few definitive records of migrant birds having moved arboviruses over long distances, our critical review of the literature suggests that there is no strong empirical evidence to implicate wild birds as playing a major role in the dispersal of these pathogens at the continental or intercontinental levels or that arboviruses routinely become established at new foci or are seasonally re-introduced into established foci as a result of bird transport. Unjustified assumptions that wild birds disperse pathogens could negatively affect the conservation of migratory species throughout the world and cause public health resources to be diverted into ineffective ways to predict or prevent disease spread. PO7: 47

Jessi L. Brown, Program in Ecology, Evolution, and Conservation Biology, Univ. Nevada-Reno, Reno, NV 89512, and Michael W. Collopy, Academy for the Environment, Univ. Nevada-Reno, Reno, NV 89557.

[S]Reproductive decisions by the American Kestrel: experimental evidence that female kestrels exhibit a fixed level of investment in offspring.

Life history theory predicts that fitness will be maximized by balancing production of offspring with the parents' residual reproductive value. Whether this balance is achieved at the expense of parental or nestling condition is not clear for species with intermediate life-history characteristics, such as the American Kestrel (*Falco sparverius*). We provided food supplements to 61 nesting kestrel pairs that were matched with 63 control pairs in 2008 and 2009 in north-central Florida, USA. Potential carry-over effects on reproductive decisions for the next year's first nest, such as timing of incubation, clutch size, and apparent nest success were analyzed using Bayesian hierarchical models, along with annual adult female survival and nestling mass at time of fledging. Treatment effects varied by year: in 2008, nestlings were similar in mass regardless of treatment, but food-supplemented adult females survived at very high rates. However, in 2009, food-supplemented nestlings were heavier than their control counterparts, and survival of supplemented adult females decreased. Weather and changes in nesting phenology regardless of treatment groups suggested that 2009 was more energetically demanding than 2008. We interpret the variable response of kestrels to our food supplement as evidence for a fixed investment in nestlings, such that in challenging years, adult females were unwilling to sacrifice their own condition for their nestlings. CO8: Thu, 10 Mar 16:00

David R.W. Bruinsma and Nicola Koper, Natural Resources Inst., Univ. Manitoba, Winnipeg, MB R3T 2N2, Canada.

[S]Does conspecific attraction explain area sensitivity of songbirds in tall-grass prairie?

The presence of conspecifics may be an important indicator of habitat quality for birds. Small habitat patches, which are more likely to undergo population extinctions, are less likely to remain populated if conspecific attraction influences territory selection. This may be particularly relevant for explaining area sensitivity exhibited by songbirds in tall-grass prairie. To confirm obligate grassland passerine area sensitivity, we conducted fixed-radius avian point-counts and measured vegetation structure in 23 tall-grass prairie patches of varying sizes in Manitoba, Canada, during the songbird breeding season of 2010. Results of generalized linear mixed models indicate that as natural log of tall-grass prairie patch area increases, there is an increase in obligate grassland passerine species richness, as well as increases in the abundance of our two focal species, Le Conte's Sparrow (*Ammodramus leconteii*) and Savannah Sparrow (*Passerculus sandwichensis*). The effects of patch size on focal species abundance were greater than the effects of vegetation structure. To test whether conspecific attraction might explain the settlement patterns of the focal species, we deployed artificial conspecific location cues (decoys and song playback) in the 2010 post-breeding season in small tall-grass prairie patches that were unoccupied by the focal species during previous breeding seasons. We conducted behavioral observation periods at these treatment sites and control sites. Field work in 2011 will document any settlement responses of the focal species to the artificial conspecific location cues deployed in 2010 (i.e. carry-over attraction) and will provide larger samples sizes for modeling songbird responses to patch size and vegetation structure. PO2: 12

Todd J. Buckley, Felipe Chavez-Ramirez, Larkin A. Powell, and Andrew J. Tyre, School of Natural Resources, Univ. Nebraska-Lincoln, Lincoln, NE 68538.

[S]Modeling the effect of landscape and environmental factors on Sandhill Crane distribution in the Central Platte River Valley of Nebraska.

Each spring, most of the midcontinent population of Sandhill Cranes (*Grus canadensis*) stage in the Central Platte River Valley (CPRV) in Nebraska, due to its importance in their annual cycle. The purpose of this study was to model the landscape and environmental factors effecting observed habitat use by cranes. Habitat use models were developed and ranked using Bayesian Information Criteria (BIC) and discriminated using the Receiver Operating Characteristic (ROC) curve. This study suggests cranes show a high preference for alfalfa fields as feeding habitat, but preferences for corn and sorghum fields are similar. Soybean fields were less likely to be used than both corn and sorghum, while winter wheat was the least likely row crop used for feeding. Cranes also showed a low preference for grassland habitats; however, this is likely due to limited grassland availability in the survey area and sampling protocol. The location of these habitats was also an important factor influencing crane use. Habitat use was greatest within bridge segments 2 to 7 and 9, but use decreased as distance from the river increased. Bridge segments 1 and 8 were used similarly, while bridge segments 10 and 11 had the lowest likelihood of use. Overall, it is evident cranes have a higher preference for certain habitats in certain areas. Models developed in this study provide baseline data with a practical use to directly valuate land for cranes within

the CPRV, locate areas with the potential to support cranes, and develop management plans for areas currently used. CO25: Sat, 12 Mar 9:15

Jeffrey J. Buler, Dept. Entomology and Wildlife Ecology, Univ. Delaware, Newark, DE 19716, and Deanna K. Dawson, USGS Patuxent Wildlife Research Center, Laurel, MD 20708.

Weather radar analysis of landbird stopover sites during fall migration in the northeastern U.S.

We mapped landbird distributions during fall migratory stopover across the northeastern U.S. using measures of relative bird density in the airspace (i.e., radar reflectivity) at the initiation of nocturnal migration. Data were collected by 16 WSR-88D and 3 Terminal Doppler Weather Radars from the national network of weather surveillance radars. We developed new and improved methods and software to quickly process large amounts of radar data and reduce important measurement biases so that data throughout the radar coverage area can be quantitatively analyzed. These methods primarily include interpolating data to a standardized sampling time and adjusting reflectivity measures for "range" bias by accounting for the vertical distribution of birds in the airspace and radar beam geometry. We found that the radars generally detected birds within 80 km of radar sites. Roughly 12% of sampling nights across seasons (15 Aug - 7 Nov 2008 & 2009) could be used to quantify bird distributions on the ground. Important stopover sites with the highest and most-consistent mean bird densities throughout the season were generally associated with forested habitats, particularly forested wetlands, located near coastlines and the periphery of large cities. This is presumably because most nocturnal migrants are forest-dwelling landbirds that become concentrated due to geography and/or a matrix of unsuitable stopover habitat in the surrounding landscape. We are also using the radar data to explicitly assess migrant use of National Wildlife Refuges and develop spatially-explicit models to map important stopover sites in areas not sampled by radars. CO32: Sat, 12 Mar 14:30

Curtis W. Burney, Air Force Research Laboratory, Brooks City-Base, TX 78235, and David W. Winkler, Dept. Ecology and Evolutionary Biology, Cornell Univ., Ithaca, NY 14853.

The temporal and spatial dynamics of swallow roosts found in the eastern and central United States.

Using a network of weather radar, we examined the pre-migratory, migratory, and winter distribution of swallows in the eastern and central United States. During this period, swallows form large nocturnal roosts readily detected by radar. As swallows depart roost sites at dawn, they appear on radar as an annular return that increases in circumference until the density of radiating swallows declines beneath radar detectability. Based on criteria established using information from roosts of known composition, on a daily basis, we separated roosts of swallows from those of other species using the approximate size of the largest radar echo for a given roost. The monthly distribution of observed roosts filtered for swallows corresponded with literature describing both their migration and winter distribution. In July, we detected roosts throughout eastern United States, especially the south. These large aggregations likely represented Purple Martins. During August, larger numbers of roosts were observed in the northeast. Mixed-species roosts of swallows, predominated by Tree Swallows, almost certainly comprised many of these late summer roosts. During fall and early winter, roosts formed along the Atlantic coastline and Mississippi River, matching previous accounts of the fall migration of Tree Swallows. Mid- and late winter roosts found in Louisiana and Florida were largely, if not completely, comprised of Tree Swallows. Assessment of the spatial and temporal dynamics of swallows outside the breeding season provides a distinctive opportunity to explore weather's influence on populations of a migrant songbird throughout its annual cycle. CO32: Sat, 12 Mar 15:00

Edward H. Burtt, Jr., Dept. Zoology, Ohio Wesleyan Univ., Delaware, OH 43015, and George S. Hamaoui and Max R. Schroeder, Dept. Botany/Microbiology, Ohio Wesleyan Univ., Delaware, OH 43015.

Dark plumage to resist bacterial degradation: facultative or evolutionary response?

Botteri's Sparrows (*Peucaea botterii*), which nest in southeastern Arizona, harbor feather-degrading bacilli in their plumage. However, individuals with territories in low lying, damp sacaton were not more likely to have feather-degrading bacilli in their plumage than conspecifics nesting on nearby arid mesas nor did their bacilli degrade feathers more rapidly than bacilli isolated from sparrows on the mesa. Furthermore, sparrows living in the wet sacaton were not darker than those living on the arid mesas. The lack of color variation among populations of Botteri's Sparrows and the similarity of degradation rates among their feather-degrading bacilli are unlike the light to dark plumage variation in Song Sparrows (*Melospiza melodia*) and the slow to rapid feather-degradation of bacilli in their plumage. These data from Botteri's Sparrows support the conclusion that the increased rate of feather degradation by bacilli in the humid northwest and the darker plumage of their Song Sparrow hosts are evolutionary responses to the different climate not a facultative response to habitat differences. CO18: Fri, 11 Mar 15:15

Luke C. Campillo, Scott K. Anliker, and Muir D. Eaton, Dept. Biology, Drake Univ., Des Moines, IA 50311.

The effectiveness of innovative wildlife harvest tools I: field assessment of flocking behavior.

For centuries hunters have been using waterfowl decoys in an attempt to attract more birds for harvest, yet what makes a decoy effective is relatively unstudied. More recently, new paint technology has introduced decoy colors that aim to look more like real feather colors due to the addition of UV-reflecting properties. This stems from research showing that birds have the ability to see UV reflectance due to a fourth type of cone cell sensitive from 300-410 nm (humans are blind to UV wavelengths, having only three cone cells, none sensitive to UV), and that duck feathers of many colors reflect UV light. Hence, our study aimed to investigate duck responses to decoys painted with UV reflecting paint, with the prediction that these decoys will attract more waterfowl compared to decoys painted with traditional colored paints. During fall 2008, 2009, and 2010 we collected behavioral data, recording the number of ducks and number of flocks to come within 50 m of the two types of decoys and the total time ducks spent within 50m of the decoys. We found more ducks and more flocks visited, and more total time was spent among, the UV-painted decoys, indicating an overall preference for these decoys compared to the traditionally painted decoys. PO11: 69

Matthew D. Carling, Berry Biodiversity Conservation Center, Dept. Zoology and Physiology, Univ. Wyoming, Laramie, WY 82071.

Genetics of speciation: insights from *Passerina* buntings.

Speciation is a critical component in the generation of biodiversity and elucidating its genetic basis is a fundamental goal of evolutionary biology. Among the unanswered questions in speciation genetics is whether genes contributing to reproductive isolation between species are located in particular genomic regions or belong to specific types of functional classes. Before these questions can be answered, candidate gene loci must be identified, a demanding task, particularly in non-model organisms. Here, I report the findings of a suite of studies that use the hybrid zone between Lazuli (*Passerina amoena*) and Indigo (*Passerina cyanea*) buntings as a model to explore the genetic basis of reproductive isolation in birds. Through a combination of cline-based and coalescent-based analyses I show that genes located on the sex-chromosomes contribute disproportionately to speciation, relative to autosomal loci, and identify a candidate gene region on the z-chromosome that may be involved in reproductive isolation between these species; this is the first such demonstration in avian systems. My results indicate that sex-linked genes play a key role in both the initial generation and continued maintenance of reproductive isolation and therefore make fundamental contributions to the formation of biodiversity. YP2: Sat, 12 Mar 16:15

Erin B. Cashion and Paul G. Rodewald, Ohio State Univ., Columbus, OH 43212.

[S]Migrant landbird use of natural and restored riparian forest habitats in agricultural landscapes during stopover.

Stopover habitat may be a limiting resource for forest birds in agriculturally dominated regions of the Midwestern U.S. In these landscapes, remnant natural and restored habitats may provide important refueling opportunities and cover for migrants, yet few studies have examined migrant abundance in these habitats. We studied migratory land bird use and vegetative structure across a gradient of riparian forest conditions that included mature forest, early successional shrub-sapling habitat (SS) and young forest restorations containing trees 2-15m in height developed through Farm Bill habitat conservation programs (CRP and CREP). We conducted transect surveys and mist-netting from late August through late October in 2009 and 2010 at 19 sites in northwest Ohio. A principal components analysis and an information theoretic approach were used to identify structural and floristic habitat characteristics associated with bird abundances. Overall, capture and transect detection rates for Neotropical and temperate migrants were lowest in CRP habitats and highest in SS habitats. Detection rates of temperate migrants were positively correlated with stem counts between 0.5 and 3m, whereas Neotropical migrant detection rates were independent of vegetation measures. Capture rates for temperate and neotropical migrants were strongly correlated with shrub density, which was lowest in mature forest and CRP habitats. These results support previous findings that SS habitats contain higher densities of fall migrants than mature forest, and suggest that riparian forest restorations should incorporate greater heterogeneity in shrub layer vegetation to provide benefits to stopover migrant landbirds. CO23: Fri, 11 Mar 16:00

Jameson F. Chace, Dept. Biology, Salve Regina Univ., Newport, RI 02840, Thomas LaPointe and Rachel Cliche, Nulhegan Basin Division of the Silvio O. Conte National Fish and Wildlife Refuge, Brunswick, VT, and Leslie Moffat, Middlebury Coll., Middlebury, VT.

Breeding bird responses to American Woodcock habitat management in Northeastern Vermont.

In the Nulhegan Basin Division of the Silvio O. Conte Fish and Wildlife Refuge in Brunswick, Vermont we explored breeding songbird population responses to woodcock (*Scolopax minor*) habitat management. On two

partially harvested sites (harvested winter 2006-2007) and one control site (14.5-21 ha) we spot mapped breeding birds during dawn surveys five times during the height of the breeding season (June 1 to July 10 in 2008 and 2009). Ovenbird (*Seiurus aurocapillus*), Chestnut-sided Warbler (*Dendroica pensylvanica*) and Hermit Thrush (*Catharus guttatus*) detections and number of estimated territories were greater on treated plots than the control. Canada Warbler (*Wilsonia canadensis*), Black-throated Blue Warbler (*Dendroica caerulescens*), Nashville Warbler (*Vermivora ruficapilla*), and Winter Wren (*Troglodytes troglodytes*) responded positively to blow downs on both control and unharvested sections of treatment sites. Harvesting did not seem to affect area-sensitive species such as Ovenbirds and Red-eyed Vireos (*Vireo olivaceus*). The harvested forest openings created habitat for Mourning Warblers (*Oporornis philadelphia*), Common Yellowthroats (*Geothlypis trichas*) and Chestnut-sided Warblers that were uncommon or absent in the control. While monitoring is on-going, these initial results suggest that there are benefits to avian conservation objectives through woodcock habitat management in the predominately forested landscapes of northern New England. CO2: Thu, 10 Mar 10:00

Jocelyn Champagnon and Matthieu Guillemain, French Hunting and Wildlife Agency, Le Sambuc, F - 13200 Arles, France, Johan Elmberg, Aquatic biology and chemistry, Kristianstad Univ., Kristianstad, Sweden, Grégoire Massez, Marais du Vigueirat, Mas Thibert, Arles, France, and Michel Gauthier-Clerc, Tour du Valat Research Center, Le Sambuc, Arles, France.

[S]Survival probability and morphological adaptation of captive-reared Mallard *Anas platyrhynchos* after release into the wild.

Captive-reared animals released as part of reinforcement programmes are considered less likely to survive than their wild conspecifics. One of the possible causes for this is reduced digestion efficiency. We studied adaptation of the digestive system in Mallard, a species with high adaptability to its environment. Body condition and digestive organs were compared between three groups: captive-reared Mallards remaining in a game farm, captive-reared Mallards released into the wild as juveniles and wild Mallards. We also assessed difference in diet between released birds and wild birds, and conducted a one-year survival analysis of captive-reared birds released in a hunting-free area. Released Mallards had a smaller gizzard than wild birds, but there was no difference between captive-reared and wild Mallards in the size of others organs in the gastro-intestinal tract. Body condition of captive-reared Mallards was poorer than wild ones, and this was only partially improved after release. Survival probability of captive-reared Mallards was low, compared to documented survival of wild Mallards. In particular, high mortality occurred when additional food provisioning was stopped and during harsh winter periods. We argue that in spite of a viable digestive system, pre-release conditions experienced by captive-reared ducks impeded restocking success. In the context of massive releases of this species for hunting purposes (several million birds per year in Europe), low survival due to a combination of high hunting pressure and poor condition could limit the number of farmed birds surviving to breed and thus limit introgression of "captive genes" into the wild population. CO26: Sat, 12 Mar 9:00

Jocelyn Champagnon, Matthieu Guillemain, French Hunting and Wildlife Agency, Le Sambuc, F - 13200 Arles, France, Grégoire Massez, Marais du Vigueirat, Mas Thibert, F-13200 Arles, France, Michel Gauthier-Clerc, Tour du Valat Research Center, Le Sambuc, F-13200 Arles, France, and Jean-Dominique Lebreton, UMR 5175, Centre d'Ecologie Fonctionnelle et Evolutive, Centre National de la Recherche Scientifique, F-34 293 Montpellier, France.

Impact of harvest on survival of captive-reared Mallard released for hunting purposes.

Since the 1970s, several million juvenile Mallards *Anas platyrhynchos* have been released every year into the wild for hunting purposes in Europe. Releases take place within two months of the onset of the hunting season. Based on experimental releases of farmed Mallards on two hunting estates and one non-hunting reserve, we evaluated the impact of hunting on survival of these birds using marking-resighting dataset of individually tagged birds. Survival of released Mallards was always very low, even when these were not hunted. The estimated survival probability from release in June to the next breeding season was 6.7%, 21.3% and 5.4 % on the two hunting estates and the non-hunting reserve, respectively. These results suggest that a large part of the released Mallards shot during their first hunting season would not have survived anyway (that is, hunting mortality was almost 100% compensatory to natural mortality). It also tends to indicate that released mallards are likely to enter the breeding segment of the population only in limited numbers. PO3: 25

Rob Channell and Greg Farley, Dept. Biological Sciences, Fort Hays State Univ., Hays, KS 67601.

Analyses of the distribution and population trends of Lesser Prairie-Chicken with reference to Kansas populations.

Lesser Prairie-Chicken inhabit a variety of shortgrass, mixed, and sandsage prairies, as well as shinnery oak rangelands in five states, with the largest extant population in Kansas. Rangewide declines in population number, size and distribution have been observed since early in the last century, and more precipitous declines have been

quantified in recent decades. The distribution of this species in Kansas decreased from its historical distribution of 76,800 km^2 to 10,300 km^2 in the 1950s, followed by an increase during the 1990s to 29,100 km^2. Some populations in Kansas have been estimated to be less than 15% of their former sizes. In this research, we examine the data regarding these declines in distribution and abundance, and present new analyses of population trends of the Lesser Prairie-Chicken in Kansas. A maximum entropy model (MaxEnt) was developed to predict potential species distribution change due to global climate change; the model indicates distribution is limited by spring precipitation and maximum temperatures in winter and summer. Anecdotal observations have proposed this species is sensitive to weather fluctuations. These observations and the inference of the model suggest the Lesser Prairie-Chicken might have persisted historically with a dynamic distribution as a response to adverse weather. The potential influence of weather on this species suggests large, continuous extents of habitat are needed to adequately conserve this species and the scale of current conservation efforts might need to be reconsidered. S2: Thu, 10 Mar 9:45

Scott J. Chiavacci and James C. Bednarz, Dept. Biological Sciences, Arkansas State Univ., Jonesboro, AR 72467.

[S]Multi-scale temporal variation in prey deliveries at Mississippi Kite nests.

Little information exists on the diet of nestling Mississippi Kites (*Ictinia mississippiensis*) and no study has investigated variability or potential reasons for it in the diet of this primarily insectivorous species. We studied the diet of Mississippi Kite nestlings in east-central Arkansas during 2008 - 2009 using time-lapse video recording systems. We quantified diets at 10 nests and observed 9018 prey deliveries, approximately 69% and 4% of which were identified as arthropods and vertebrates, respectively. The types of prey delivered varied with nestling age, time of day, and date. Arthropod and vertebrate deliveries were positively and negatively related to nestling age, respectively. Diel pattern analyses revealed differences in the types of prey delivered throughout the day, likely due to kite and prey activity patterns. Due to the high proportion of dragonflies and cicadas delivered to nests, we analyzed how the proportions of each of these prey items varied with respect to multiple factors. We found that date and year were the best predictors of the proportions of dragonflies and cicadas delivered to nests, suggesting kites shifted their primary prey from dragonflies to cicadas as the latter became available. Due to our inability to identify a relatively large proportion of prey items (27%), we analyzed how prey identification was influenced by various factors; time of day had the most influence on our ability to identify prey, possibly due to varying degrees of sunlight as well as potentially smaller prey items being delivered during certain times of the day. CO1: Thu, 10 Mar 9:15

William S. Clark, Harlingen, TX 78550.

Harlan's Hawks differ in adult plumage and a leg measure from Red-tailed Hawks.

Hull et al (2010) reported little differences and ongoing gene flow, using Mt- & microsatellites of nuc-DNA, between Harlan's Hawks (*Buteo jamaicensis harlani*) and two other subspecies of Red-tailed Hawks (*B. j. calurus* and *B. j. borealis*, which is, however, allopatric), but did not include parapatric *B. j. alascensis*. They concluded that, without mention of the distinct differences in plumages, *harlani* is same species. Winker (2009) advocated using both phenotypic (results of natural selection) and genotypic (results of time and random mutations) to evaluate speciation. Humphries and Winker (2009) showed that for nine species pairs of Beringia birds, Mt-DNA, nucDNA, and phenotypes gave conflicting results as to estimates of divergence. Based on many years of studying Harlan's Hawks, both in the field (all seasons) and museums, I will show that they differ in adult plumage from adults of the other races of Red-tails, especially their tails, as well as in the frequency of color morphs, and in the extent of bare tarsus. Plumage differences are greater than that of two subspecies of any raptor. Differences in color morph frequencies caused solely by environmental factors, as suggested by Hull et al. will be discussed and dismissed. I will describe instances of light *harlani* breeding in the range of *calurus*, and a few *calurus* occurring during breeding in the *harlani* range and discuss hybridization and its significance in this case phenotypically and taxonomically. CO11: Fri, 11 Mar 9:00

Peter S. Coates, Michael L. Casazza, Brian J. Halstead, and Joseph P. Fleskes, USGS Western Ecological Research Center, Dixon, CA 95620, and James A. Laughlin, USDA California Wildlife Services, Beale Air Force Base.

Using avian radar to examine time-dependent effects on avian activity and relationships with meteorological factors.

Portable radar systems provide valuable information on bird migration and daily movement patterns, which can be used for conservation planning and avoiding bird-aircraft collisions. We deployed a portable radar system to measure avian activity at Beale Air Force Base located along the Pacific Flyway in California during 2008 and 2009. We developed generalized linear mixed models of an avian activity index (AAI) to examine season and daily light effects and relationships with multiple weather-related variables. Models were evaluated using an information-theoretic approach. We first explain variation by seasons that were based on average migration dates,

and then modeled AAI by those seasons to investigate the effects of meteorological factors and daily light levels within a 24-h period. In general, avian activity increased with decreased temperature, wind, visibility, and precipitation, and increased with humidity and sky cover. These effects differed by season. For example, during spring migration, most activity occurred before sunrise on clear days with low winds, whereas during fall migration, activity occurred after sunrise at lower temperatures. Variation in AAI was partly explained by responses of different bird communities in the Central Valley. An avian radar survey approach is helpful for understanding short- and long-term trends in migration at local-scales. In a second analysis, we found AAI was greater at times when bird-aircraft collision occurred than on average using a permutation resampling technique. Estimated parameters of AAI models can be used to make better-informed decisions of risk of bird-aircraft collision and bird conservation. CO32: Sat, 12 Mar 14:45

Sharon Coe, Deborah Finch, and Megan Friggens, U.S. Forest Service, Rocky Mountain Research Station, Albuquerque, NM 87102.

Assessing the vulnerability of birds to climate change using a decision-support tool.

Climate change threatens the persistence of species and their habitats. We utilized a scoring system that was developed by the US Forest Service (Rocky Mountain Research Station) and aimed at determining the relative vulnerability or resilience of vertebrate terrestrial species to the potential effects of climate change. In part, its purpose is to assist resource biologists in managing species under climate change. The scoring system uses a set of criteria based on how expected changes in temperature, precipitation, and vegetation may impact species. An overall score is calculated, as well as sub-scores in 4 categories in which criteria are grouped (habitat, physiology, phenology, and biotic interactions). As part of an assessment of multiple vertebrate groups, we scored 8 species of birds that occur, or potentially occur, in southeast Arizona, USA, on the Coronado National Forest. All 8 species achieved scores indicating overall vulnerability to climate change (i.e., positive values). The species that was considered most vulnerable (highest score) was the Elegant Trogon; the American Peregrine Falcon was considered to be the least vulnerable (lowest score). Sub-scores suggest that 7 of the 8 bird species exhibit vulnerability via anticipated effects to their habitats and/or their ability to respond to change in habitats. All species were vulnerable with respect to criteria related to their physiology, and most were also vulnerable with respect to criteria related to phenology. The results of our assessment will be utilized by USFS personnel in conservation planning under the threat of climate change. PO2: 13

Richard N. Conner, USDA Forest Service Southern Research Station, Stoneville, MS 38776.

The ecology of the Red-cockaded Woodpecker, by necessity a multidiscipline study.

The Red-cockaded Woodpecker (*Picoides borealis*) is a cooperatively breeding species that inhabits open park-like, fire-maintained pine forests in the southeastern United States. This woodpecker selects only mature living pines for cavity excavation and nesting, pines that have very specific characteristics. In order to have a sufficient diameter of nonliving heartwood for the cavity chamber, the pine must be old, often in excess of 80 to 120 years depending on pine species. If the cavity chamber includes living sapwood, the chamber will fill with sticky pine resin rendering it a death trap for the woodpecker. Red-cockaded Woodpeckers also actively select pines that have been infected by redheart fungus (*Phellinus pini*). The fungus decays and softens the heartwood of the pine, facilitating cavity excavation. The ability of pines to produce resin and the resin's chemistry also appear to influence which pines are selected as cavity trees. The pine's resin system has evolved to help the pine repel infesting bark beetles. Red-cockaded Woodpeckers use this resin system by excavating small wounds, termed resin wells, around the entrance to their nest and roost cavities and fresh sticky pine resin flows from these daily maintained wells creating a sticky barrier that deters predation by rat snakes (*Elaphe* spp.). Red-cockaded Woodpeckers actively select pines that are the best resin producers. When using loblolly pines (*Pinus taeda*) Red-cockaded Woodpeckers may select pines with resin that has certain viscosity and crystallization properties. Thus, a study of Red-cockaded Woodpeckers involves forest ecology, fire ecology, mycology, entomology, herpetology, and chemistry. PL1: Thu, 10 Mar 13:00

Reesa Yale Conrey and Susan K. Skagen, USGS Fort Collins Science Center, Fort Collins, CO 80526, and Victoria J. Dreitz, Colorado Division of Wildlife, Fort Collins, CO 80526.

Precipitation and temperature influence nest survival of shortgrass prairie birds.

Understanding how populations respond to climate is important within the context of changing patterns in precipitation and temperature across Great Plains landscapes. We are investigating the effects of climate and weather on nest survival of seven grassland birds in the shortgrass steppe of Colorado: Mountain Plover (*Charadrius montanus*), Burrowing Owl (*Athene cunicularia*), Horned Lark (*Eremophila alpestris*), McCown's Longspur (*Rhynchophanes mccownii*), Chestnut-collared Longspur (*Calcarius ornatus*) Lark Bunting

(Cala*mospiza melanocorys*), and Western Meadowlark (*Sturnella neglecta*). Data from > 2500 nests were collected from 1997 to 2009 and nest survival models were analyzed in Program MARK. Nest survival in most species was depressed by large rainfall events, but other responses to daily temperature, daily rainfall, and seasonal averages differed markedly by species. For example, plovers and owls, which prefer shorter vegetation structure, were more successful in dryer weather, while buntings, which prefer taller vegetation, were more successful during wetter springs. This variation suggests that species assemblages may be altered by climate change, with some species moving into cooler, dryer areas and others selecting warmer, wetter areas. Many shortgrass prairie birds are already declining across parts of their range, and this could be exacerbated by the larger storms and longer droughts that are predicted for this region. In addition to influencing vegetation growth and prey populations, rain events may directly affect ground nesting species by flooding nests or reducing foraging activity, while temperature extremes may affect thermoregulation and parental care. CO8: Fri, 11 Mar 10:45

Andrea Contina and Jeff Kelly, Univ. Oklahoma, Oklahoma Biological Survey, Norman, 73019 OK.

[S]Preliminary genetic analysis of the Painted Bunting *Passerina ciris* in South West Oklahoma.

Genetic population structure of Neotropical migratory birds can provide insight into migratory strategies, especially for species with extensive Neotropical wintering ranges, but relatively restricted summer breeding ranges. Novel molecular techniques have the promise of increasing the spatial resolution of genetic data, which would facilitate identification of those individuals with shared summer breeding and nesting ground, but different wintering sites. We investigated the genetic population structure of the Painted Bunting *Passerina ciris* breeding and nesting at the Wichita Mountains National Wildlife Refuge, Oklahoma. Our primary goal was to determine whether individuals of different age and gender, collected at the selected breeding and nesting site, molted at different stopover locations in Mexico. Females were sighted while incubating eggs or feeding hatchlings, then captured at nesting sites. This approach to collecting genetic samples also enabled us to perform nesting habitat surveys accounting on over 50 nests found during summer 2010. Stopover samples of molting individuals were collected at El Fuerte, Sinaloa, MX in August 2009. We used a microsatellite genotyping approach following the M13 hybrid primer technique. The hybrid primer process greatly reduced costs and maximized laboratory work efficiency. The first allelic richness screening yielded 8 informative loci. Samples included adult males (N = 20), juvenile males (N = 20), and nesting females (N = 15). All the individuals were captured alive by mist-netting, then measured, banded, and released for future mark-recapture studies. Initial screening at these 8 loci indicates little overlap between samples collected in MX and those samples collected in OK. CO3: Thu, 10 Mar 11:15

Sheldon J. Cooper and Andrea Holzbauer, Dept. Biology, Univ. Wisconsin Oshkosh, Oshkosh, WI 54901.

The energetic cost of an immune challenge in Black-capped Chickadees.

We examined the energetic cost of an immune response to injected PHA (phytohemagglutinin) in Black-capped Chickadees during the reproductive season. We measured basal and summit metabolism in chickadees injected into their left wing web with sterile saline (control group) and compared them with birds injected with PHA (treatment group). PHA is a mitogen that induces swelling and cell-mediated immune responses. Wing web thickness was measured to evaluate swelling prior to injections and 48 hour after injections. Initial wing web thickness (0.57 ± 0.04 mm) did not vary from post-saline injection thickness (0.59 ± 0.03 mm). The PHA injected birds had significantly ($P < 0.01$) thicker wing webs after injection (pre-injection = 0.60 mm ± 0.04 mm ; post injection = 1.30 ± 0.10 mm). This demonstrates the presence of an immune response in PHA birds. Neither basal nor summit metabolism differed significantly between control birds and treatment birds indicating no energetic cost to the immune response to PHA. Summer Black-capped Chickadees do not seem to have significant energetic costs associated with an immune response to PHA. Thus, chickadees do not seem to be energetically constrained by immune costs and therefore can devote ingested energy that is not used for basal metabolism and thermoregulation into reproductive effort. PO7: 48

Melissa Creasey and Erica Nol, Trent Univ., Peterborough, ON K9J 5G8, Canada, and Dawn Burke, Ministry of Natural Resources, London, ON, Canada.

[S]The effects of selection harvesting on Black-throated Blue Warbler reproduction.

Selection harvesting is a low-impact method used to mimic single tree falls, but it creates edges with logging roads and skidder trails, increasing predation risks for songbirds. We examined the possible short- and long-term impacts of selection harvesting on the nesting success of Black-throated Blue Warblers (*Dendroica caerulescens*) in Algonquin Provincial Park, Ontario, Canada. Black-throated Blue Warblers typically breed in undisturbed forests with thick understories suitable for nest placement. Few studies have examined this species in harvested forests making this research a priority. 84 nests were monitored in stands ranging from 0.5 to 70 years post-

harvest, resulting in an effective sample size of 317. The top ranked models included a term for nest age3 (W_i = 0.369) and nest age3+time since harvest (W_i = 0.323). Daily survival rates increased slightly during the laying stage, were relatively steady during the egg stage, and decreased during the nestling stage. Time since harvest has only a slight, non-significant, effect on the daily survival rate (W_i = -0.0045 [-0.0176, 0.0085]). The highest daily survival rate was experienced by birds nesting in the most recently cut stands. Because there is very little change in daily survival rate as harvested stands age, selection harvesting within Algonquin Provincial Park has no significant impact on the nesting success of Black-throated Blue Warblers, supporting the sustainability of this method of silviculture in this park. CO20: Fri, 11 Mar 14:45

C. M. Curry and M. A. Patten, Dept. Zoology and Oklahoma Biological Survey, Univ. Oklahoma, Norman, OK 73019.

[S]Song varies across older and younger hybrid zones in Black-crested (*Baeolophus atricristatus*) and Tufted (*B. bicolor*) titmice.

Hybridization, defined as interbreeding between two distinguishable populations, is widespread in nature and provides an excellent opportunity to examine the mechanisms of the evolution of reproductive isolation. Our objective is to describe song across recent (within the past century) and historical (thousands of years ago) hybrid zones of two passerine sister species, the Black-crested (*Baeolophus atricristatus*) and the Tufted (*B. bicolor*) Titmice. We recorded songs from central TX, north-central TX, and southwestern OK. Center frequency, notes per phrase and phrases per song were significantly different in the older zone (here including both north-central and central TX), while center frequency, phrase duration, and interphrase interval were significantly different in the younger zone. A Mantel test did not find significant spatial autocorrelation, suggesting these differences are not due solely to regional song dialects. This preliminary finding of disparity in song characteristics between hybrid zones suggests that the birds across the young hybrid zone may be adapting to the signaling environment, while birds in the old hybrid zone may have selection pressures on species recognition. This is because two of the three characteristics that differ in the young hybrid zone (interphrase interval and phrase duration) are predicted by Morton's acoustic adaptation hypothesis to change with the environment, while notes per phrase and number of phrases per song are not. This suggests that differences in mate choice and species recognition are likely to be found and that the influence of environmental and social factors may change with continued contact. CO14: Fri, 11 Mar 11:30

Robert L. Curry and Karen E. Zusi, Dept. Biology, Villanova Univ., Villanova, PA 19085.

Song repertoire size and composition in Carolina Chickadees in southeastern Pennsylvania.

Female parids are known to base mate choice on male song performance. We investigated song structure and repertoire composition in a population of Carolina Chickadees (*Poecile carolinensis*) in southeastern Pennsylvania, to compare their singing behavior to patterns within a nearby hybrid zone between Carolina and Black-capped chickadees. We analyzed 169 songs from 11 Carolina males for number of notes, pitch, and note duration. Discriminant Function Analysis separated 100% of songs into two types based only on variables measured for each song's first two notes: Type A songs invariably comprised four alternating HLHL notes (first two notes averaging 6.5 and 4.3 kHz respectively) whereas Type B songs included three or four HLL or HLLL notes (first two notes averaging 4.6 and 3.4 kHz). Variation in pitch was greater among than within males. The 8 males for which we had > 10 song examples all produced both song types. The two-song composition of the Carolina Chickadee repertoire differs fundamentally from that of Black-capped Chickadees, which produce only one song type (*fee bee-ee*) that varies with respect to absolute but not relative pitch of the notes ("pitch-shifting"). Available data suggest that most males in the hybrid zone are "bilingual," producing both the Black-capped song without pitch-shifting as well as the Type A Carolina song (and not Type B). Continuing work focuses on temporal presentation of song types by individual Carolina males in comparison with hybrid-zone males, testing the hypothesis that males in both areas use their 2-song repertoires similarly, despite differences in composition. CO14: Fri, 11 Mar 11:45

Anthony C. Dalisio and William E. Jensen, Dept. Biological Sciences, Emporia State Univ., Emporia, KS 66801, and Timothy H. Parker, Dept. Biology, Whitman Coll., Walla Walla, WA 99362.

[S]Song dialects in alpine-breeding birds of the Rocky Mountains.

Song dialects have been well documented among isolated bird populations. Natural fragmentation of bird populations among elevationally-restricted life zones could promote dialect formation. We are investigating dialect patterns among populations of songbird species isolated across alpine life zones in the Rocky Mountains of North America. In 2010 we recorded songs of American Pipits (*Anthus rubescens alticola*), Wilson's Warblers (*Wilsonia pusilla pileolata*) and White-crowned Sparrows (*Zonotrichia leucophrys oriantha*) across 6 mountain

ranges in Colorado. We digitally recorded songs and used spectrographic cross-correlation (SPCC) to calculate time-frequency similarity coefficients from pair-wise comparisons of song phrases among birds. Dialects per species were considered evident if mean within-site song similarity was greater than mean similarity between birds across all sites. We also used Pearson correlation to determine if song similarity among paired sites was related to distance between sites (range: 34 - 189 km). Within-site song similarity was greater than mean, across-site similarity for 4 of 6 populations in the American Pipit, 2 of 4 populations in the Wilson's Warbler and, 4 of 5 populations in the White-crowned Sparrow. These results provide strongest evidence for the existence of alpine-defined dialects in the American Pipit and White-crowned Sparrow. Song similarity between sites was not related to between-site distance in the American Pipit or the White-crowned Sparrow, but curiously increased with distance between sites in the Wilson's Warbler. Further sampling will determine if dialect divergence among sites is a function of decay in song similarity with distance or due to isolation of cultural units. CO14: Fri, 11 Mar 11:15

Amy J. Davis, Phillip Street, and Paul Doherty, Dept. Fish, Wildlife, and Conservation Biology, Colorado State Univ., Ft. Collins, CO 80523, and Mike Phillips, Colorado Division of Wildlife, Ft. Collins, CO 80526.

[S]Habitat effects on nesting success of Gunnison Sage-grouse, *Centrocercus minimus*, in Gunnison, Colorado.

Nest success is a primary factor in determining reproductive success, and thus population growth rates of bird species. Consequently, declines in nest success are thought to correspond to population declines. In population viability analyses female reproductive success was found to be one of the parameters to which Gunnison Sage-grouse *Centrocercus minimus* population growth rates was most sensitive. From 2005-2009, we captured and monitored female Gunnison Sage-grouse to determine nesting status. We examined the effects of nest site characteristics (average shrub height, percent shrub cover, percent grass cover, slope and aspect), temporal covariates (year, nest initiation, a quadratic effect of nest initiation, and age of the nest), and the effect of minimum daily temperature on daily nest survival. We found the temporal factors were overwhelmingly influential. The daily survival rates decreased within a year. Predation of nests was the primary cause of nest failure (> 85% of known failures was due to predation). Variation in predator abundance may be reflected in the high weight of temporal covariates associated with nest success. Habitat factors were not found to be influential in determining nest success. Management to improve GUSG nesting success might be better served by managing predator levels than by managing for specific habitat characteristics. CO25: Sat, 12 Mar 10:00

Nicole M. Davros, Program in Ecology, Evolution, & Conservation Biology, Univ. Illinois at Urbana-Champaign, Urbana, IL 61801, Jeffrey D. Brawn, Dept. Natural Resources and Environmental Sciences, Univ. Illinois at Urbana-Champaign, Urbana, IL 61801, and Jeffrey P. Hoover, Illinois Natural History Survey, Institute of Natural Resource Sustainability, Univ. Illinois at Urbana-Champaign, Champaign, IL 61820.

[S]An experimental test of density-dependent reproduction in Prothonotary Warblers, *Protonotaria citrea*.

Despite being well-studied for over half a century, clear evidence for density-dependent reproduction in songbirds remains elusive. From 2008-2010, we experimentally tested the effects of density on reproductive output in Prothonotary Warblers (*Protonotaria citrea*), a secondary-cavity nester that readily accepts nest boxes. By eliminating predation and using a grid system of boxes, we established 12.5 ha subplots with both low-densities (mean = 11.5 females/subplot) and high-densities of warblers (mean = 18.3 females/subplot). We monitored all breeding pairs each year (N = 66 in 2008, N = 96 in 2009, and N = 119 in 2010) and recorded their annual reproductive success. We found no effect of conspecific density on clutch size, hatching success, fledging success, or attempts at second broods. Further, neither nestling provisioning rates nor nestling body condition varied in relation to density. We did find an effect of density on rates of Brown-headed Cowbird (*Molothrus ater*) brood parasitism, with the probability of a nest being parasitized by cowbirds increasing with warbler density. We also found strong year effects for nearly every measure of reproductive output that we examined. We conclude that our warblers may not yet have reached threshold densities that would induce density-dependent reproduction. We also suggest that including an analysis of both survival and physiological data (e.g., stress hormones, immune function) may yield density-dependent effects that in turn affect other fitness parameters (e.g., adult survival, fledgling returns) that indices of annual reproductive success may not demonstrate. CO16: Thu, 10 Mar 15:00

Michele de Verteuil, William P. Kuvlesky, Jr., Caesar Kleberg Wildlife Research Institute, Texas A&M Univ.-Kingsville, Kingsville, TX 78363, Andrea R. Litt, Dept. Ecology, Montana State Univ., Bozeman, MT 59717, Leonard A. Brennan, Caesar Kleberg Wildlife Research Institute, Texas A&M Univ.-Kingsville, Kingsville, TX 78363, James F. Gallagher, Texas AgriLife Extension, Uvalde, TX 78801, and Daniel P. Walker, Chaparral Wildlife Management Area, Texas Parks and Wildlife Dept., Artesia Wells, TX 78001.

[S]Impacts of wildfire on avian communities.

High-intensity wildfires can significantly affect foraging and nesting habitat for birds; however, wildfire impacts on avian communities in the mixed-brush ecosystem of South Texas are mostly unknown, as most research has focused on prescribed winter burning. On March 14, 2008, an intense wildfire occurred on the Chaparral Wildlife Management Area, located in southern Texas. An adjacent private ranch remained unburned. Both properties have sites with comparable native grass/brush cover, soil types and grazing regimes. We conducted transect and point-count surveys on burned and unburned sites (20 total sites in winter, 40 in summer) in February - March and May - June of 2009 and 2010. We quantified avian species richness, relative abundance, and presence on burned and unburned sites. Avian species richness was 38% and 30% higher on burned sites in both winters; however we failed to detect significant differences during breeding seasons. Relative abundances of at least one to two grassland species were significantly higher on burned sites for every season except winter 2009, with increases on burned sites ranging from 0.2 - 4.9 more birds/survey. Bell's vireo and Bewick's wren, both brush species, 2.9 and 3.6 times more likely, respectively, to occur on unburned sites. Although intense wildfires can have drastic, and sometimes negatively viewed, impacts on wildlife habitat, they can provide the same benefits as prescribed fire by creating diversity in structure and density of woody and herbaceous vegetation in mixed-brush communities. As such, wildfires can greatly benefit grassland-obligate birds, a declining guild in North America. CO21: Fri, 11 Mar 15:45

Sarah Cubaynes, Centre d'Ecologie Fonctionnelle et Evolutive, UMR 5175, Campus CNRS, F-34293 Montpellier Cedex 5, France, E. A. Schreiber, Division of Birds, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560, **Paul F. Doherty, Jr.**, Dept. Fish, Wildlife, and Conservation Biology, Colorado State Univ., Fort Collins CO 80523, Ralph W. Schreiber, deceased, and Olivier Gimenez, Centre d'Ecologie Fonctionnelle et Evolutive, UMR 5175, Campus CNRS, F-34293 Montpellier Cedex 5, France.

To breed or not to breed: seabirds' response to extreme climatic events.

Intermittent breeding is an important life history strategy that has rarely been quantified in the wild and for which drivers remain unclear. It may be the result of a trade-off between survival and reproduction, with individuals skipping breeding when breeding conditions are below a certain threshold. Heterogeneity in individual quality can also lead to heterogeneity in intermittent breeding. We modeled survival, recruitment and breeding probability of the Red-footed Booby (*Sula sula*), using a 19 year mark - recapture dataset involving more than 11,000 birds. We showed that skipping breeding was more likely in El-Niño years, correlated with an increase in the local sea surface temperature, supporting the hypothesis that it may be partly an adaptive strategy of birds to face the trade-off between survival and reproduction owing to environmental constraints. We also showed that the age-specific probability of first breeding attempt was synchronized among different age-classes and higher in El-Niño years. This result suggested that pre-breeders may benefit from lowered competition with experienced breeders in years of high skipping probabilities. PO3: 26

Andrew S. Dolby, D. A. O'Dell, and W. Humayon, Dept. Biological Sciences, Univ. Mary Washington, Fredericksburg, VA 22401.

Enzyme immunoassay quantification of heat shock proteins to evaluate chronic stress in birds.

Unexpected challenges such as adverse weather, food restriction, and attacks by pathogens and predators activate a protective physiological stress response. This response includes both release of stress hormones, such as corticosterone (CORT), and intracellular production of heat shock proteins (HSPs). Long-term activation of the stress response diverts reserves toward critical survival processes and away from growth and reproduction. To effectively manage bird populations, therefore, the ability to directly assay birds' stress status is crucial. CORT has been applied far more heavily than HSPs in avian stress research, but HSPs have received increasing attention. Despite their promise, HSPs have been used in few studies, and these studies have employed an analytical method which generates data in arbitrary units that are difficult to compare across studies. We measured HSP60 in House Sparrows (*Passer domesticus*) using enzyme immunoassay (EIA), which can quantify protein concentrations on an objective scale. The HSP60 concentration mean was 372 ng/μg total protein (n = 16, SD ± 31). Values for males and females did not significantly differ, and HSP60 concentration was not correlated with body mass. Additionally, more field experiments are needed to establish causal relationships between HSPs and particular stressors, and thereby, to increase confidence that HSP data are being appropriately interpreted in

observational studies. We are currently evaluating the effect of induced allostatic overload in Tufted Titmouse (*Baeolophus bicolor*) on HSP60 levels as quantified by EIA. We propose that EIA analysis of HSPs could add a more refined tool to quantify chronic stress in birds. PO7: 49

Roi Dor and Caren B. Cooper, Cornell Lab of Ornithology, Cornell Univ., Ithaca, NY 14850, Irby J. Lovette and David W. Winkler, Cornell Lab of Ornithology, Cornell Univ., Ithaca, NY 14850 and Dept. Ecology and Evolutionary Biology, Cornell Univ., Ithaca, NY 14950.

Clock gene variation in swallows.

Several studies have reported a latitudinal cline in the circadian gene, *Clock*, which influences rhythms in both physiology and behavior, and latitudinal variation in this gene thus may reflect local adaptation to seasonal variation. Furthermore, there is also an indication for a link between variation in *Clock* genotype and laying date and incubation period among individuals within populations. To examine latitudinal patterns in *Clock* and its association with lay date, we sequenced the polymorphic poly-Q region of this gene in populations of five species of *Tachycineta* swallows from North to South America and in Barn Swallow (*Hirundo rustica*) populations from North America and Europe. Generally, variation in *Clock* in swallows is relatively low. We were not able to find any trends for latitudinal variation among *Tachycineta* species, though an association between lay date and *Clock* genotype was found in the only species for which we had large numbers of samples and life history data, *T. bicolor*. Barn Swallows exhibited extremely low variability in *Clock*, despite a wide geographic distribution and substantial neutral genetic differentiation at other loci. These results suggest that the phenotypic effects of the *Clock* gene are not general, even within a single clade of birds, and the genetic underpinnings of photoperiodic variation in birds are just beginning to be discovered. CO24: Fri, 11 Mar 15:45

Jeff Drahota and Letitia Reichart, Biology Dept., Univ. Nebraska at Kearney, Kearney, NE 68849, and Mark Vrtiska, Waterfowl Program Manager, Nebraska Game and Parks Commission, Lincoln, NE 68503.

[S]Rainwater Basin wetland seed availability in annual and perennial plant communities prior to spring migration.

The Rainwater Basin (RWB), located in south-central Nebraska, provides mid-latitude staging habitat for millions of migratory waterfowl each spring. Wetland food abundance on staging grounds is likely a primary factor influencing breeding success for many species of waterfowl. In fact, wetland derived resources may be a limiting factor for spring migratory waterfowl. Currently, estimates of wetland seed availability in RWB wetland habitats are needed to determine the effectiveness of conservation strategies used to support migrants. Here we examine wetland seed availability in moist soil annual (MSA) and moist soil perennial (MSP) plant communities in the RWB. Specifically, we estimate seed availability just prior to arrival of spring migrants. In early spring 2010, 10 cm soil cores were collected just prior to arrival of spring migrants. Overall mean seed mass of moist soil plant communities (i.e., both MSA and MSP) was 43.77 kg/ha ± 55.84 SD prior to arrival of waterfowl. Additionally, available seed mass prior to migrant arrival was significantly different between MSA and MSP plant communities ($F_{1,238} = 30.76$, $P = 0.0001$). Mean seed mass available in MSA communities was 64.10 kg/ha of seeds ± 58.48, whereas mean seed mass available in MSP communities was 26.28 kg/ha ± 28.55. Thus, preliminary analysis suggests MSA communities are more productive than MSP communities and provide more potential food for spring migratory waterfowl. Seed availability estimates from this study will be useful for regional Joint Venture partners in determining best management practices that increase available resources for spring migrants. PO1: 02

Matthew B. Dugas, Dept. Zoology, Univ. Oklahoma, Norman OK 73019.

[S]Environmental and parental effects explain among-brood differences in ornamental mouth coloration of nestling House Sparrows, *Passer domesticus*.

Dependent offspring use specialized traits to attract parental care. In birds, this includes morphological ornaments (e.g., plumage, mouth and skin coloration) that are often associated with nestling condition (e.g., mass, immune status) and influence the allocation decisions of parents. The intensity of ornament expression often differs among broods, even after differences in individual condition are accounted for statistically. I used a cross-fostering experiment to assess the relative contributions of parental effects to such among-brood differences in the ornamental mouth coloration of nestling House Sparrows. The expression of carotenoid-based coloration was explained by dyad, nest-of-rearing and nest-of-origin, while features of color that are likely physical in origin (brightness and relative UV intensity) were explained by dyad, but not by parents. Overall, this experiment suggests that brood-level variation in mouth coloration primarily contains information not about the intrinsic quality of offspring themselves, but about the environment in which they are reared. At the individual level, ontogenetic changes in the carotenoid-richness and brightness of flanges positively reflected mass gain (a proxy for food intake) and, within broods, larger and yellower chicks gained more mass. These individual-level results further support a role of this trait in offspring-parent communication. CO24: Fri, 11 Mar 16:15

Kevin Ellison and Steve Zack, Wildlife Conservation Society, Bozeman MT 59715.

Using grassland birds to guide an ecological restoration of bison.

Grasslands depend on disturbances that create and maintain patch-level heterogeneity in structure and species composition. For > 10,000 years the American bison (*Bison bison*) was the dominant grazer that shaped and maintained grassland communities of the Great Plains. Twelve bird species developed as endemics within this region. Following the extirpation of bison and the introduction of cattle and agricultural production, grassland birds have declined significantly. We are investigating how the restoration of bison may benefit grassland birds. We also hypothesized that the habitat preferences of some grassland birds may be used to guide bison management, e.g. elements of the timing and intensity of grazing, scale, and using fire to enhance grazing. Thus, we are studying bird-habitat relationships in mixed-grass prairie to guide grassland restorations based on evolutionary grazing patterns. In a literature review, we found 14 studies that addressed bison and bird relationships; only 6 relied on empirical data and none were from the northern Plains. During 2009-2010, we surveyed birds and vegetation at 1,580 points from 15 sites in the northern Great Plains (SD, ND, WY, MT, SK). Eleven sites grazed bison (range: 50-2,500/herd) and four grazed cattle (100-500/herd). Our points were distributed within sites that ranged between 3,100 and 184,000 acres. Using multivariate analyses, we found that several habitat relationships were more complex than simple response to vegetation height. Based on our analyses, we have developed management recommendations that our partners will employ. We will monitor the efficacy of our recommendations through several cycles of our adaptive management framework. PO2: 14

Heidi J. Erickson and Cameron L. Aldridge, Natural Resource Ecology Laboratory, Colorado State Univ., Fort Collins, CO 80523.

[S]Effects of prescribed fire and timing of summer livestock grazing on avian habitat selection in a high-elevation sagebrush ecosystem.

Land use changes over the last two centuries have been linked to reduced geographic distributions of sagebrush (*Artemisia* spp.) habitats and associated avifauna. Federal agencies manage more than half of the sagebrush habitat that remains. Prescribed fire and grazing are common management practices across federally administered sagebrush rangelands. Understanding how these management practices affect wildlife populations across this habitat type is fundamental to wise conservation. We accessed the impacts of grazing timing treatments (early summer before peak green-up, mid-summer at peak green-up, and late summer after peak green-up) in conjunction with prescribed fire on songbird and sage-grouse (*Centrocercus urophasianus*) populations at a high elevation sagebrush study site in south-central Wyoming. Relative habitat use by sage-grouse was greater in burns with patchy configuration compared to larger, more contiguous burns. However, sage-grouse strongly avoided all burns during winter and use of burns, regardless of configuration, was minimal the first four post-fire summers. Sagebrush obligate songbirds, such as Brewer's sparrow (*Spizella breweri*) and sage thrasher (*Oreoscoptes montanus*), also avoided burn treatments, particularly with increasing distance to appropriate nesting substrate (tall shrubs). A grassland specialist, vesper sparrow (*Pooecetes gramineus*), preferred reduced shrub cover associated with burn treatments, but was also negatively affected by more uniform patterns of big sagebrush (*A. tridentata*) removal. While clear negative effects on avifauna resulted from prescribed fire treatments, the effects of light to moderate intensity summer livestock grazing treatments had minimal impact on avian habitat use. CO2: Thu, 10 Mar 9:15

Dorothy A. Fatunmbi and Sara R. Morris, Dept. Biology, Canisius Coll., Buffalo, NY 14208.

[S]How is plumage used to determine age and sex of birds?

Because individual birds may display a variety of plumages that are each characteristic of a specific age and sex, field ornithologists and bird banders use different plumage characteristics, to determine age and sex. Our goal was to provide an educational resource that gives examples of how plumage characteristics may be used in age and sex determination. We intended to show the differences that may occur between individuals of different age and sex classes to demonstrate how plumage may be used in field studies. We used museum specimens to provide case studies of particular plumage variation for illustration. To show a difference in plumage when comparing juveniles to adults, the Cedar Waxwing (*Bombycilla cedrorum*) was illustrated. When accurately determining age, some basic principles hold across many taxa including the use of feather wear, fault bars and molt limits. As an example of seasonal plumage variation, the Scarlet Tanager's (*Piranga olivacea*) adult male breeding or alternate plumage was compared to his basic plumage. The American Redstart (*Septophaga ruticilla*) is distinctly sexually dichromatic and was illustrated to demonstrate variation in plumage that is attributed to sex. We hope this resource may be used to help train field assistants, inform the public about methods used and encourage citizen scientists to collect information on age and sex when making field observations. PO7: 50

Joy Felio, Daniel Catlin, James Fraser, Dept. Fisheries and Wildlife, Virginia Tech., Blacksburg, VA, 24061.

Colonization and abandonment of Missouri River sandbars by breeding Piping Plovers.

For early successional species like the Piping Plover, colonization and abandonment of habitat patches determine their distribution in space and time. The natural rate of patch creation has slowed, causing Piping Plovers to decline on the Missouri River. The U.S. Army Corps of Engineers is creating sandbars in an effort to mitigate habitat loss. To determine the rate and timing of colonization of new patches, sandbars were surveyed for nesting activity and use by banded individuals during the 2008 and 2009 breeding seasons. The likelihood of a bird moving from one sandbar to another between seasons was found to be a function of sex (β = -0.53, UCI = -1.046 to -0.008) and the sandbar population (β = -0.02, UCI = -0.045 -0.0003). Females were more likely to disperse than males and birds were less likely to leave sandbars with higher populations than those with lower plover populations. Once a bird moved, area and population of the new sandbars were the only factors to significantly affect the probability of colonization (Area: β = 0.23, UCI = 0.113 to 0.341, Pop: β = 0.11, UCI = 0.027 to 0.187). Birds that moved were more likely to colonize new sandbars that were larger and contained more birds than to colonize smaller sandbars with fewer birds. In order to effectively manage the Piping Plover population for recovery, it is important to understand what is driving the colonization and abandonment of habitat patches, both at a small-scale, like that of our study, and at the larger scale of northern Great Plains. S4: Sat, 12 Mar 11:00

Andrew Flynn and Rebecca J. Safran, Dept. Ecology and Evolutionary Biology, Univ. Colorado, Boulder, CO 80309.

[S]Predictors of nest predation in North American Barn Swallows *Hirundo rustica*.

Nest predation is a primary cause of reproductive failure in most bird species, and thus is a powerful source of natural selection. In order to understand individual variation in reproductive success and through it the effects of natural selection on a population, we must understand the predictors of nest predation. Past studies have examined an extensive range of these predictors (e.g. nest placement and type, adult behavior near the nest, and nestling begging), yet there has been a lack of studies examining the effects of other factors on nest predation, including the timing of clutch initiation and parental morphology. We examined seasonal and morphological predictors of nest predation of the North American barn swallow, *Hirundo rustica erythrogaster*, over the course of two breeding seasons in Colorado and found interesting morphological and seasonal predictors associated with nest predation in the wild. Pairs that breed early in the season are more susceptible to predation events than pairs that initiate their clutches later. Further, nests associated with males of greater body mass experience slightly more predation. These results suggest an interesting counter-balance to the benefits of early clutch initiation dates and also suggest morphological correlates in parents that may be under negative selection in this species. PO3: 27

Cecily F. Foo and Timothy H. Parker, Whitman Coll., Walla Walla, WA 99362.

[S]Song similarity in Dickcissels (*Spiza americana*) is not well described by cross-correlation.

Individual male Dickcissels (*Spiza americana*) typically sing one song type, and neighbors tend to share song types with each other, thus leading to geographically structured patterns of vocal culture. The one published study of Dickcissels relied on human classification of song elements. However, qualitative classification is subjective and tedious, and thus we investigated the effectiveness of cross-correlation as a means of assessing song sharing in Dickcissels. We used songs of 37 male Dickcissels each of which defended a territory for at least two breeding seasons. Over four years, we made an average of three recordings per male, each with multiple songs, from all males present. From each recording, we selected the song with the best signal:noise ratio, filtered high and low frequency noise, and then compared songs using cross correlation in Raven 1.3. We found that, on average, within-individual cross correlation scores were higher than those from between-individuals, and individuals within the same site had higher song sharing than individuals between sites. However, cross-correlation scores overlapped substantially among these categories because of high variance, even when comparing nearly identical songs of the same individual. A small part of this effect appears to be due to seasonal patterns in background noise, probably related to insect acoustic signals. Visual inspection of spectrograms suggests that variation in recording quality is responsible for lowering cross-correlation scores of songs that are actually similar. Random noise, the well-known problem with cross-correlation, is probably one of the other major causes of our variance in song sharing values. PO6: 42

Chris Foote, Lubna Nasir, and Pat Monaghan, Ecology & Evolutionary Biology, Univ. Glasgow, Glasgow G12 8QQ UK.

Telomere length is linked to early life conditions and survival in long-lived seabirds.

Identifying markers that are indicative of fitness and can be used to investigate life-history trade-offs in wild populations is extremely difficult. Telomeres, the repetitive DNA sequences that cap eukaryotic chromosomes,

have been suggested to be potentially useful in this context. Telomeres shorten at each cell division and considerable evidence links the rate of shortening (which varies considerably between individuals) with cellular and organismal senescence. However, relatively little is known about the pattern of telomere loss and its relation to fitness in wild populations. We measured telomere length in a wide age-range of individuals from a very long-lived seabird, the southern giant petrel (*Macronectes giganteus*). Those individuals with longer telomeres were more likely to survive during the subsequent eight years than individuals with shorter telomeres; indeed, telomere length was a significantly better predictor of survival than age. We then investigated what might be causing variation in telomere length between individuals. We examined the relationship between early life conditions and telomere dynamics in chicks of the lesser black-backed gull (*Larus fuscus*). Larger hatchlings tended to have shorter telomeres, suggesting a possible link between embryonic growth rate and telomere loss. Independent of this trend, males had longer telomeres at hatching than females. Our results support the idea that adult telomere length is a marker of individual quality and that early life conditions play a large role in shaping variation in this trait. CO24: Fri, 11 Mar 16:30

Alexandra Frohberg and Keith Geluso, Dept. Biology, Univ. Nebraska at Kearney, Kearney, NE 68849, and Mary Harner, Dept. Biology, Univ. Nebraska at Kearney, Kearney, NE 68849 and the Platte River Whooping Crane Maintenance Trust, Wood River, NE 68883.

[S]Interacting effects of land management and hydrology on bird communities along the Platte River.

Land management practices, such as burning and grazing, alter bird communities. Birds are often concentrated in wetland and riparian zones, so it is especially important to assess the impact of land management in these moist areas. The objectives of my study were to estimate bird abundance and species richness across pastures with different types of land management (burned and grazed, burned and non-grazed, and non-burned and non-grazed) and between sloughs and uplands within these pastures in grasslands associated with the Platte River in central Nebraska. Surveys were conducted in summer and autumn 2010 and involved walking transects, identifying and counting birds that flushed, landed, or displayed territorial behavior. I counted a total of 528 birds of 22 different species. There was a trend for more birds on non-grazed pastures and fewer birds on grazed pastures. Also, more birds were observed in sloughs than uplands. Bird abundances appeared to follow vegetative differences between sloughs and uplands, as well as between burned, grazed, and non-grazed pastures. Species richness did not vary between sloughs and uplands, or between burned, grazed, and non-grazed pastures, but species composition differed among these habitats and pastures. These results will help managers assess how land management activities may affect the abundance of birds in this riparian landscape. CO2: Thu, 10 Mar 9:30

Alexander L. Galt, Minnesota Private Lands Office, US Fish and Wildlife Service, Waite Park, MN 56387, and Elmer J. Finck, Dept. Biological Sciences, Fort Hays State Univ., Hays, KS 67601.

[S]Testing a long-standing ecological principle: the hemi-marsh condition hypothesis.

Ecological principles are the fundamental tenets that guide the actions of resource managers and rarely are questioned until they extend beyond the scope of the systems they originally described. We refer to the commonly held perception that the hemi-marsh condition provides the highest quality habitat for avian communities in all prairie pothole wetlands as the "hemi-marsh condition hypothesis." The literature currently does not address the effects of the proportion of vegetative zones (i.e., sedge meadow, emergent vegetation, and open water) on avian communities in semi-permanent wetlands that are less than 0.6 ha, yet there are thousands of these wetlands throughout the region. Our statistical models indicated that avian diversity was best predicted by a combination of the proportion of emergent vegetation spring, proportion of emergent vegetation summer, and wetland area more so than by the proportion of emergent vegetation alone, which is the basis of the hemi-marsh condition hypothesis. Clearly, small prairie pothole wetlands function differently than their larger counterparts. Resource managers should recognize that there are limitations when managing small wetlands; therefore, promoting the hemi-marsh condition in all situations is not the most efficient use of management resources. Wetland area is likely the limiting factor associated with avian diversity since small wetlands only support a subset of the potential wetland breeding birds, i.e., those species that are not area sensitive. Our recommendations are to use wetland management techniques that increase heterogeneity between wetlands within prairie wetland complexes since intra-wetland heterogeneity does not influence habitat quality in small prairie wetlands. CO12: Fri, 11 Mar 9:45

Jeff Garcia and Craig W. Benkman, Dept. Zoology and Physiology, Univ. Wyoming, Laramie WY 82071.

[S]Cascading trait-mediated indirect effects across the boreal forest.

Ecologists have increasingly recognized the diversity of indirect effects in biological communities. Knowing how and why variation in direct and indirect interactions arises at geographic scales is critical for furthering our

understanding of major ecological and evolutionary questions including those related to speciation, coevolution, and latitudinal species diversity gradients. I propose to test for indirect and community-wide effects arising from geographic variation in a coevolutionary (and direct) interaction between a dominant herbivore in the boreal forests, the snowshoe hare (*Lepus americanus*), and birch (*Betula* spp.). Fire frequency varies across the boreal forests of Canada, where some regions, especially towards the northwest, have been subject to more regular burning. Geographic variation in fire frequency affects the strength of the interaction between hares and birch. Increasing fire frequency leads to more early successional birch forest, and more hares that browse on birch saplings favoring enhanced triterpene defenses in birch sap. Variation in triterpene defenses in birch sap could have a considerable effect on species like the yellow-bellied sapsucker (*Sphyrapicus varius*), which relies on birch sap as a major resource. If so, then cascading effects of the hare-birch interaction could be profound because a number of species rely on the nest cavities built by sapsuckers, including at least six species of birds (two that are obligate secondary cavity nesters), brown bats, and insects. Levels of birch defense could also alter abundances of phytophagous insects and even abundances of those species at higher trophic levels (such as insectivorous birds) that ultimately rely on birch. CO19: Fri, 11 Mar 14:30

Thomas Gardali, Diana Humple, Renée Cormier, and Nathaniel E. Seavy, PRBO Conservation Science, Petaluma, CA 94954.

Establishing the breeding provenance of a temperate-wintering sparrow with light-level geolocation.

The migratory biology of songbirds is poorly known especially for those that move primarily within the temperate zone. We used light-level geolocators to describe the migratory geography of a north temperate migrant, the Golden-crowned Sparrow *Zonotrichia atricapilla*. In January to March of 2010, we attached geolocator tags to 33 sparrows that wintered on the coast just north of San Francisco, California, USA. As of January 2010, we recovered four tags. We used a Bayesian state-space model to estimate the most likely migration paths and breeding locations. All four birds migrated to breed on the coast of the Gulf of Alaska but none appeared to breed at the same site. Our results suggested that Golden-crowned Sparrows migrated faster during the spring than they did when returning in the fall. For one individual there was strong evidence that the bird shifted locations between breeding and molting before migrating south. Our results provide more evidence of the contributions that geolocators can make to our understanding of the migratory geography and connectivity of small songbirds. PO8: 57

Thomas Gardali, Nathaniel E. Seavy, and Ryan T. DiGaudio, PRBO Conservation Science, Petaluma, CA 94954, and Lyann A. Comrack, California Dept. Fish and Game, Sacramento, CA 95811.

Integrating climate vulnerability into the California Bird Species of Special Concern list.

It is now clear that conservation scientists must develop new strategies and adapt existing tools to address the consequences of anthropogenic climate change. One of the most widely used tools for conservation planning are lists of at-risk species. To support statewide climate change adaptation, we developed a framework for integrating climate change vulnerability into the existing California Bird Species of Special Concern list. We defined vulnerability as the amount of evidence that climate change will negatively impact a population. We then quantified vulnerability by scoring sensitivity (intrinsic characteristics of an organism that make it vulnerable) and exposure (the magnitude of climate change expected) for each taxon. The sensitivity score was based on four characteristics: physiological tolerances, dispersal ability, migratory behavior, and habitat specialization. Exposure was based on projected changes in three environmental characteristics: habitat, food availability, and extreme weather events. We multiplied the sensitivity and exposure scores to generate a single vulnerability score. Using this score we classified species into three vulnerability groups. Out of the 357 taxa evaluated, 127 are considered especially vulnerable to climate change. Of these, 31 were on the original concern list, 96 were new, and 9 moved up in priority. Modifying species of concern lists to include vulnerability to climate change may be an immediate strategy to adapt wildlife conservation strategies across agencies and political boundaries. CO13: Fri, 11 Mar 9:15

Dale E. Gawlik, Environmental Sciences Program, Florida Atlantic Univ., Boca Raton, FL 33431, Garth Herring, USGS Western Ecological Research Center, Univ. California Davis, Davis, CA 95616, James M. Beerens, Samantha M. Lantz, and Bryan Botson, Dept. Biological Sciences, Florida Atlantic Univ., Boca Raton, FL 33431, Mark I. Cook, Everglades Division, South Florida Water Management District, West Palm Beach, FL 33406, and Rachael Pierce, Okeechobee Division, South Florida Water Management District, West Palm Beach, FL 33406.

A synthesis of recent studies showing how prey availability affects wading bird habitat selection, physiology, and reproduction.

The physiological and reproductive responses of the Great Egret (*Ardea alba*) and White Ibis (*Eudocimus albus*), two species with contrasting foraging strategies, were compared in years with high and low prey availability. Habitat selection was determined by comparing random and used sites, and in enclosures where water depth, food, and habitat were manipulated. In the year with low prey availability, White Ibises selected a narrower range of habitats, lowered their clutch size, and fledged chicks in poorer physiological condition relative to Great Egrets. Adult ibises, particularly females, showed higher stress levels in response to lower prey availability than did adult egrets. The stronger response of White Ibises than Great Egrets to poor foraging conditions may explain the difference in population trends between the two species in the Everglades. When fish density was controlled experimentally, wading birds selected sites with vegetation, rather than open areas where prey were vulnerable. In marshes, fish density was highest in areas with dense vegetation so it is likely that birds in our experiments selected sites based on expected prey density rather than actual prey density or prey vulnerability. Receding water was more important to both species when prey availability was low than when it was high. Moreover, egrets, which eat primarily fish, were more dependent on receding water than were ibises, which consume primarily crayfish. Indeed, crayfish density did not increase as much as fish density during a drydown. Recession rates below 5 mm per day or above 7 mm per day increased nest failures. CO7: Thu, 10 Mar 14:30

Richard E. Gibbons, Louisiana State Univ. Dept. Biological Sciences and Museum of Natural Sciences, Baton Rouge, LA 70803, Javier Barrio, Centro de Ornitología y Biodiversidad (CORBIDI), Urb. Huertos de San Antonio, Lima 33, Peru, Gustavo Bravo, Dept. Biological Sciences and Museum of Natural Sciences, Louisiana State Univ., Baton Rouge, LA 70803, Luis Alza, Centro de Ornitología y Biodiversidad (CORBIDI), Lima, Peru.

[S]Do new distributional records represent vagrancy or the typical range? Testing for climatic niche equivalency using extralimital and winter range occurrence records of Black-fronted Ground-Tyrant (*Muscisaxicola frontalis*).

Estimating a species' geographic range can be complicated by insufficient occurrence data and the lack of knowledge on range limit determinants. Having accurate estimates of a species distribution is key to understanding evolutionary and ecological processes that maintain biological diversity. Here, we provide specimen and observation records obtained during months of field work in central and southern Peru within estimated safe dates that represent new information on the winter distribution of the Black-fronted Ground-Tyrant (*Muscisaxicola frontalis*; Tyrannidae). Climate envelope models (CEM) generated from new extralimital records and records from the current range were tested for equivalency using Maxent and ENM Tools. Model equivalency was statistically significant suggesting the possibility that the extralimital records were from poorly sampled areas of the true winter range. We observed a microhabitat association more specific than the somewhat general published accounts. We present the first case of frugivory in *Muscisaxicola* with the identification of *Cumulopuntia boliviana ignescens* (Cactaceae) seeds and pericarp in all five stomach samples collected in southern Peru. Additional field observations are needed to determine the significance of potential range limit drivers including demography, trophic interactions, and interspecific interactions. CO3: Thu, 10 Mar 10:45

Robert M. Gibson, School of Biological Sciences, Univ. Nebraska-Lincoln, Lincoln, NE 68588.

The effect of hunting on population size in Greater Sage-Grouse.

How hunting mortality affects population size is an important, but understudied problem in the applied ecology of grouse and other upland game birds. At issue is whether mortality from recreational hunting is additive and therefore depresses population size, or is compensatory and does not. In this talk I will (1) discuss analytical pitfalls that affect the interpretation of some previous studies of this topic, (2) present results from a 39-year study of an intermittently-hunted population of Greater Sage-Grouse in California that provide clear evidence of additive hunting mortality, and (3) synthesize our results with those from other recent studies across the species' geographical range. S2: Thu, 10 Mar 10:45

Karine C. Gil-Weir, The Crane Trust, Inc., Wood River, NE 68883, and William. E. Grant, and R. Douglas Slack, Dept. Wildlife and Fisheries Sciences, Texas A&M Univ., College Station, TX 77843.

Demography and predicted population trends of the Whooping Crane.

We analyzed data from 12 cohorts of the only non-experimental Whooping Crane (*Grus americana*) population, which were banded between 1977 and 1988. Sixty-seven of the 132 marked individuals formed nesting pairs, and the ages at which marked females first produced hatchlings ranged from 3 to 7 years. Population projections based on estimated survivorship and fecundity rates, assuming continued exponential growth, indicate population size in the year 2035 (target year for down-listing) would be 803, 901, or 939, and the population would surpass 1000 individuals (target size for down-listing) in 2041, 2038, or 2037, depending on assumptions regarding the proportion of reproductively mature females that reproduce successfully each year. Projections assuming density-dependent decreases in per capita recruitment beginning when population size reaches 500, 600, 700, 800, or 900 individuals indicate population sizes in the year 2035 could be as low as 723 or as high as 939, depending on assumptions regarding the density-dependency of recruitment and the proportion of successful females. CO13: Fri, 11 Mar 9:30

K. S. Gopi Sundar, Conservation Biology Graduate Program, Univ. Minnesota, St. Paul, MN 55108.

[S]How widespread are "common and widespread" species in the Gangetic floodplains, India?

In the Gangetic floodplains, India, a large number of bird species are suspected to be declining due to agricultural intensification. Status assessments have been largely absent, and increasing reliance on convenience-based sampling methods confounds objective evaluations. I use data from roadside observations and systematically-located transects, and employ multi-season robust occupancy modeling for 10 species to (1) evaluate if convenience-based methods are useful to describe species status, (2) assess effect of intensifying agriculture on species occupancy, and (3) verify if species suspected to be “common and widespread” here are indeed widespread. Roadside observations provided more precise estimates for five species, but appear to be biased to roadside conditions. Irrespective of method, species occupancy mostly declined with increasing agricultural intensification. Only three species were relatively widespread (occupancy > 0.85), and one was very rare (occupancy < 0.2). While convenience sampling methods may enable faster coverage of the large area and number of species requiring attention, results are likely to reflect roadside conditions and assessments will be biased relative to the entire landscape. Intensifying agriculture appears to be a prominent threat to bird species of various habitat guilds here. Using coarse descriptions like “common and widespread” can imply species are doing well (when they are not) and that there is adequate ecological information (when there is none). Indicating explicitly when information is lacking will allow robust techniques and conservation intervention to assist widespread species to remain so. CO26: Sat, 12 Mar 9:15

Jessica M. Gorzo and Patrick G.R. Jodice, USGS South Carolina Cooperative Fish and Wildlife Research Unit, Clemson Univ., Clemson, SC 29630.

[S]Bird community distribution on golf courses in coastal Beaufort County, SC.

South Carolina has the highest number of golf holes per capita in the U.S., with the largest concentration of courses located in the coastal zone. The prevalence of the golf course landscape there provides both the opportunity and necessity of studying the effects of this land use on the native avian community. We conducted point count surveys over 24 golf courses in Beaufort County, with the objective of measuring the bird community at multiple spatial scales. Survey points were located on a 440m grid within each course. Only points where the detection area included the golf course proper were used. Each golf course was surveyed early between 25 May and 15 June, and also between 20 June and 1 August 2010. During each visit, surveys were conducted between 0600-0900h and then again between 0900-1200h. Birds detected by sight and sound were recorded at each point. Landscape characteristics were classified at each point and for each golf course. Avian community metrics such as species richness, diversity, and PIF index also were calculated and subsequently correlated with landscape variables, such as habitat patch and land cover characteristics. Golf courses were compared statistically by breeding bird species recorded, and also by painted bunting presence/absence as this species is declining in the region and considered a species of high conservation concern. Higher avian diversity was often associated with a matrix of habitats, while painted bunting presence responded positively to marsh buffer area. Additional analyses will include comparison of PIF score with course-scale landscape variables. PO1: 04

Elizabeth A. Gow and Karen L. Wiebe, Dept. Biology, Univ. Saskatchewan, Saskatoon, SK S7N 5E2, Canada.

[S]Female Northern Flickers increase parental care but males don't during temporary brood enlargements.

Investing heavily in a current reproductive effort can be costly to an individual, and in bi-parental systems each parent would prefer the other parent to work harder, in a game theory approach. Northern Flickers (*Colaptes auratus*), have partially reversed sex roles, where the male provides the majority of the parental care, making them an ideal species to study underlying factors which determine levels of parental care for each sex. We studied flickers in the interior of British Columbia in 2010 and used radiotelemetry and a repeated measures design to test whether temporarily (24 hrs) increasing brood demands (by adding 2 - 4 nestlings) resulted in one or both parents increasing their parental effort. We hypothesized that because males invest more heavily than females during nest construction, nest defense, incubation and brooding females may be more capable of providing additional parental care during the nestling phase. Consistent with this we found that following manipulation, females significantly increased feeding rates, but males did not (N = 15). Both sexes did not spend significantly more time away from the cavity, or travel shorter distances to forage. Nestling mass in enlarged broods decreased compared to nests with a reduction in the number of nestlings. Our results indicate that females respond more than males to increased brood demands and are more flexible in providing parental care. However, because nestling mass decreased the increased provisioning rate of the females is not enough to meet the overall demands of an increased brood. CO5: Fri, 11 Mar 16:45

Andrew J. Gregory, L.B McNew, B.K. Sandercock, and S.M. Wisely, Kansas State University, Wamego KS 66547.

Multiple paternity and conspecific brood parasitism among Greater Prairie-Chickens: A conditional strategy for coping with anthropogenic landscape disturbance?

Growing evidence suggests that human activities on the landscape alter life history characteristics of wildlife inhabiting them. Many species will allocate more time and resources toward reproduction on disturbed landscapes than on intact ones. Behaviorally, this may manifest as a proclivity for promiscuity and or increased tendencies toward bet hedging against your own survival via con-specific nest parasitism. Using molecular data from 16 microsatellite markers, on 305 chicks in 53 broods, we assessed rates of multiple paternity and con-specific brood parasitism (CBP) among female Greater Prairie-Chicken (*Tympanuchus cupido*) broods at three study sites across eastern Kansas. Human impacts on the landscape across our study area vary by latitude; from 90% grassland landcover and 0.3 km road/km2 in the south to 53% grassland landcover and 1.04 km road/km2 in the north. Across this same gradient we found variation in the rates of CBP and multiple paternity among Prairie-Chickens (CBP rate south - north = 0 - 7% hens being parasitized, and multiple paternity rate south – north = 0 – 31% broods). These data support the notion of a conditional reproductive strategy among Prairie-Chicken populations driven by anthropogenic disturbance on the landscape. We found that Prairie-Chickens are more promiscuous and more likely to parasitize con-specific nests on disturbed landscapes than on less fragmented ones. We could not, however, discount a latitudinal effect. This conditional strategy may be adaptive and could have significant impacts on the viability of populations inhabiting disturbed landscapes. S2: Thu, 10 Mar 9:00

Cory Gregory and Stephen Dinsmore, Dept. Natural Resource Ecology and Management, Iowa State Univ., Ames, IA 50011, Larkin A. Powell, School of Natural Resources, Univ. Nebraska, Lincoln, NE 68583, and Joel G. Jorgensen, Nebraska Game and Parks Commission, Lincoln, NE 68503.

Estimating the abundance of Long-billed Curlews in Nebraska.

The Long-billed Curlew (*Numenius americanus*) is an imperiled shorebird of western North America. Populations have declined dramatically in the last 150 years from the conversion of prairie to agriculture and the curlew is now listed as a "Tier I at-risk" species in Nebraska. We undertook a 2-year study to estimate the density and statewide abundance of breeding Long-billed Curlews in Nebraska during 2008 and 2009. Unlike the Breeding Bird Survey, our surveys occurred in April during the pre-nesting period when curlews are most easily detected. We used a simple random sample of roadside survey routes (N = 39), each consisting of 40 5-min point counts at 800 m intervals. We used Program Distance to model detection probability and found that wind speed negatively affected detectability; we found no evidence of year effects or observer bias. We estimated there were 0.0038 curlews/hectare (0.38 curlews/km^2) along survey routes and by extrapolation we estimated that there were 23,909 (SE = 1,685; 95% CI: 20,810 - 27,471) Long-billed Curlews in Nebraska. This population estimate far exceeds estimates from surrounding states and points to the need of a thorough and quantitative survey approach for estimating curlew abundance. Our population estimate confirms that Nebraska holds a sizeable portion of the continental Long-billed Curlew population; this population should continue to be monitored to ensure that this imperiled grassland species endures. CO15: Fri, 11 Mar 11:00

Blake Grisham and Clint Boal, USGS, Texas Cooperative Fish and Wildlife Research Unit and Dept. Natural Resources Management, Texas Tech Univ., Lubbock, TX 79409, and David Haukos, US Fish and Wildlife Service, Texas Tech Univ., Lubbock, TX 79409.

[S]Thermal tolerances of nesting Lesser Prairie-Chickens and the potential population level influence of climate change.

The Southern Great Plains is anticipated to experience increased maximum and minimum temperatures and reduced yet greater intensity precipitation events, with concurrent spring and associated environmental phenology occurring earlier due to climate change. These changes and subsequent altered landscape management techniques in response may influence the Lesser Prairie-Chicken (*Tympanuchus pallidicinctus*; hereafter LEPC), a candidate for protection under the Endangered Species Act, in positive or negative ways. Our study objectives are to compile data on LEPC phenology and reproduction in Texas and New Mexico and examine the thermal aspects of nesting LEPCs and parameters involved in nesting success. We note the scarcity of phenological data for LEPCs in general. We found that LEPC nests are maintained at temperatures and humidities that are consistent compared to wide swings in ambient conditions, and appear to be more associated with presence of the hen than nest location or vegetation cover type. Nests are maintained at significantly warmer temperatures throughout most of the 24-hr period, but are kept significantly cooler than external temperatures when those temperatures are in the ranges that would result in increased potential for egg death. We also found that hens go into thermal stress due to more than just ambient temperatures, and suspect it may be due to direct exposure to solar radiation. These results may have important implications for selection of nesting cover that have not yet been addressed by Lesser Prairie-Chickens, but for which we are directing new research priorities. CO9: Thu, 10 Mar 16:30

A. Groves, Dept. Environmental Studies, Illinois Wesleyan Univ., Bloomington, IL 61701, V. Berardi, Hawk Migration Association of North America, Illinois Beach State Park Hawk Watch, Zion, Illinois 60099, P. Sweet and J. Sweet, Illinois Beach State Park Hawk Watch, Zion, Illinois 60099, A. P. Capparella and G. Knapp, School of Biological Sciences, Illinois State Univ., Normal, IL 61790, and R. G. Harper, Dept. Biology, Illinois Wesleyan Univ., Bloomington, IL 61701.

[S]Winter abundance of Red-tailed Hawks (*Buteo jamaicensis*) and American Kestrels (*Falco sparverius*) in human-altered landscapes in northeastern and central Illinois.

Though Red-tailed Hawks (*Buteo jamaicensis*) and American Kestrels (*Falco sparverius*) are among the most common raptors found across North America, no study has examined their winter abundance in Illinois since the 1960s. This study investigated their winter abundance using five years (2004-2005 through 2008-2009) of winter (December-March) automobile survey results (282 surveys) in northeastern and central Illinois using a standardized survey technique. In both regions combined, red-tails were most abundant in 2008-2009 (196.7/1000 km) and least abundant in 2005-2006 (94.5/1000 km); the highest number was observed in February and the lowest in December. However, there were no significant effects of year ($P = 0.15$) or month ($P = 0.24$) on red-tail abundance, and no regional differences. Adults were observed 9.8 times more frequently than immatures. In northeastern Illinois, American Kestrels were most abundant in 2006-2007 (34.6/1000 km) and least abundant in 2005-2006 (14.8/1000 km). Kestrel abundance was highest in January and lowest in February. There were no significant effects of year ($P = 0.40$) or month ($P = 0.93$) on kestrel abundance. In contrast, there was a significant effect of year ($P = 0.003$) on kestrel abundance in central Illinois; they were most abundant in 2006-2007 (88.8/1000 km) and least abundant in 2004-2005 (35.5/1000 km). There was no significant effect of mean temperature ($P = 0.40$) or total snowfall ($P = 0.79$) on kestrel abundance by year. Kestrels were most abundant in February and least abundant in January, but there was no significant effect of month ($P = 0.42$). In all surveys males were observed 1.7 times more frequently than females. PO3: 30

Joseph A. Grzybowski, Coll. of Mathematics and Science, Univ. Central Oklahoma, Edmond, OK 73034, and Matthew A. Etterson, Mid-Continental Ecology Division, US Environmental Protection Agency, Duluth, MN 55803.

Modeling fecundity in birds: conceptual overview and significance in avian biology.

Fecundity (which we define to be the number of young raised per female per year) is fundamental to many questions of fitness, population dynamics, evolution, conservation and management in birds. For all the efforts to measure fecundity or its indices over the past century of avian research, it is still frequently mismeasured, misrepresented and misunderstood. Fundamentally, the problems arise because of partial observability of underlying processes such as renesting, multiple brooding and temporary emigration. Among the key misconceptions is the relation between nest success (a commonly used surrogate) and actual fecundity. More recently, various analytical approaches have been developed to estimate fecundity from incomplete biased data. In this presentation, we identify current methods for modeling fecundity, place these models under a common

conceptual framework depicting explicitly the component processes of reproductive success, and provide insights for future considerations and challenges in the application of fecundity models. CO17: Fri, 11 Mar 14:45

Jeremy E. Guinn, Environmental Science Dept., Sitting Bull Coll., Ft. Yates, ND 58538.

Effects of productivity on productivity: shrike nesting effort related to regional photosynthetic output 1994-2009.

This study examined the effect of the timing of spring green-up and the intensity of vegetative productivity throughout the season on the number of Loggerhead Shrikes (*Lanius ludovicianus*) banded annually at 16 sites in Sioux County, North Dakota between 1994 and 2009. The total number of adult and nestling shrikes banded incorporated both the number of active nests and the number of young produced. Timing of green-up was determined using Start-of-Season-Time NDVI (SOST), while seasonal vegetative productivity was determined using Time-Integrated NDVI (TIN). Peak SOST during the study period occurred annually between 24 March and 27 April. The four years in which the greatest number of shrikes were banded, and six of the top seven years, occurred when the peak SOST fell between 2 April and 9 April. There was no relationship between photosynthetic output for the season (TIN) and the number of shrikes banded ($r2 = 0.1088$). Of the four years which ranked highest in number of shrikes banded, only one year had a TIN-value greater than the mean. A moderate start of season was a more important factor for shrikes in this area than photosynthetic output during the growing season. Early or late green-up may be related to site-selection by migrating birds entering the area or may have indirect effects on shrike productivity such as the timing of the emergence of insect prey. Timing of prey emergence and shrike productivity should be a focus for future research in this area. PO1: 05

Jodi A. Gullicksrud and Muir D. Eaton, Dept. Biology, Drake Univ., Des Moines, IA 50311.

Intra- and inter-specific variations in cone photoreceptor abundances among waterfowl.

Research over the past few decades on avian vision has revealed a fundamentally different visual physiology in birds compared to humans. Birds have four types of photoreceptive single cone cells, compared to three in humans, including one that is sensitive to ultra-violet (UV) wavelengths (300-400nm), and a photoreceptive double cone cell sensitive to a broad spectrum of wavelengths. The possession of this suite of photoreceptive cone cells appears to be universal across the Class Aves, and the spectral sensitivities of the avian photoreceptors appear to vary relatively little, suggesting conserved visual evolution at the level of cone cell physiology. However, comparatively little is known about both individual intra-specific variation, and inter-specific variation within a family of birds, in the relative abundances of the five classes of avian cone cells (SWS1, SWS2, MWS, LWS, and Double Cones). The large inter-specific variation shown in retinal composition of cone cell types thus far is based on data from one individual per species across a very coarse sampling of avian diversity. Using microscopic imaging of retinal dissections from fresh and frozen waterfowl eyes, we present data on: 1) individual variation in the cone cell photoreceptor abundances of Mallard (*Anas platyrhynchos*), and 2) intra-familial differences among ducks, suggesting visual evolution through retinal composition in waterfowl. PO7: 51

Paul B. Hamel, US Forest Service, Center for Bottomland Hardwoods Research, Stoneville, MS 38776, T. Bently Wigley, National Council for Air and Stream Improvement, Inc., Clemson, SC 29634, Deanna K. Dawson, USGS Patuxent Wildlife Research Center, Laurel, MD 20708, Patrick D. Keyser, Dept. Forestry, Wildlife, and Fisheries, Univ. Tennessee, Knoxville, TN 37996, and David Mehlman, Migratory Bird Program, The Nature Conservancy, Santa Fe, NM 87501.

Cerulean Warbler Technical Group fosters real conservation progress for a challenged species.

A voluntary group of more than 100 individuals, universities, nonprofit organizations, and government agencies, Cerulean Warbler Technical Group comprises four subcommittees: Breeding Season Research, Breeding Season Monitoring, Breeding Season Conservation, and Nonbreeding Season Issues, the latter called "El Grupo Cerúleo." In the period 2001-2010, members of the Cerulean Warbler Technical Group and of El Grupo Cerúleo have developed and solidified a substantial new understanding of the breeding and nonbreeding biology of Cerulean Warbler (*Dendroica cerulea*), assisted the US Fish and Wildlife Service to assess the status and evaluate a proposal to list the species under the US Endangered Species Act, and to develop two conservation action plans, at the rangewide and at the nonbreeding range scale, for the species. Two reserves to protect habitat for this species and resident endemic birds have been established. Primary hope for future conservation of the species lies with managers of forest habitat in the breeding grounds and agroforestry systems, especially shade coffee, in the nonbreeding period. Biology of the migration has been addressed much less than either of the residency periods. Our task today is to present to you a short history of the Cerulean Warbler Technical Group by way of introduction to the symposium to follow, a coordinated summary of some of the breeding season research conducted in the group's Cerulean Warbler Conservation Initiative. S1: Thu, 10 Mar 8:45

Tyler M. Harms and Stephen J. Dinsmore, Dept. Natural Resource Ecology & Management, Iowa State Univ., Ames, IA 50010.

[S]Habitat associations of secretive marsh-birds in Iowa.

Wetland habitats have declined across the Midwest since European settlement. Consequently, populations of many marsh-birds have declined in North America and several species are conservation priorities. Our objective was to evaluate habitat associations of secretive marsh-birds in Iowa. We conducted call-broadcast surveys at wetlands across Iowa from 16 May – 7 July 2009 (n = 86) and from 20 April – 10 July 2010 (n = 183) in accordance with the North American Marsh Bird Monitoring Protocol. In our study, we had 2487 detections of the five focal species (Pied-billed Grebe [n = 507], Least Bittern [n = 143], Virginia Rail [n = 393], Sora [n = 288], and American Coot [n = 1156]). We randomly assigned survey points to each wetland and the number of points was dependent upon wetland size. We measured water depth, vegetation height, percent coverage of open water, and percent coverage of each type of emergent vegetation at each survey point prior to conducting bird surveys, and also included other relevant variables such as wetland size and degree of isolation (distance to nearest wetland, amount of wetland habitat with 1 km). We used logistic regression to examine the presence or absence of marsh-bird species in response to the different habitat variables. Some species of marsh-birds do associate with specific wetland characteristics in Iowa, although habitat responses varied by species. Knowing the habitat associations of these birds will help guide future habitat restoration and management decisions and will ultimately allow for the effective conservation of these birds. CO12: Fri, 11 Mar 9:15

Margret I. Hatch, Penn State Worthington Scranton, Dunmore, PA 18512, and Robert J. Smith and T. J. Zenzal, Dept. Biology, Univ. Scranton, Scranton, PA 18510.

Male and female differences in morphology including plumage coloration in a "monomorphic" species, the Gray Catbird.

Gray Catbirds (*Dumetella carolinensis*) are generally considered sexually monomorphic. However, as others have pointed out, species which appear visually monomorphic to humans may actually be dimorphic from the birds' perspective. As part of our ongoing study of catbird migration and breeding ecology, we collected measures of several structural and plumage traits and tested them for quantifiable variation attributable to sex. Most measures were greater for males, although females were heavier than males (mean difference 1.9g). Males possessed longer (mean difference 0.19mm) and deeper (mean difference 0.09mm) bills as well as longer wings (mean difference 1.6mm) than females. Some differences were only evident in ASY individuals with ASY males having longer tarsi (mean difference 0.23mm) and tails (mean difference 2.8mm) than ASY females. Females had brighter rectrices and body contour feathers than males, but male rectrices were more saturated. Initial analyses of photographs of undertail coverts (crissum) indicated individual variation in the percentage of crissum area that was gray vs. chestnut but we detected no sex-related differences (possibly due to a small sample size of females; N = 4). We expect to confirm our initial results with further analyses and increased sample sizes of crissum measurements including spectral analysis of crissum feathers. PO7: 52

Lyndon R. Hawkins and Brian D. Peer, Dept. of Biological Sciences, Western Illinois Univ., Macomb, IL 61455.

Egg shape and its effect on incubation temperature in the Brown-headed Cowbird.

Brown-headed Cowbirds (*Molothrus ater*) have one of the shortest incubation periods of any bird relative to their egg mass. Cowbird eggs and those of other brood parasites are more spherical than non-parasitic eggs due to their greater relative width. While the traditional explanation for this egg-shape is that it helps resist puncture-ejection by hosts, it is also possible that wider eggs provide more contact with a host's brood patch, especially in larger host nests. We tested the hypothesis that the greater egg width of Brown-headed Cowbirds increases heat acquisition during incubation by measuring the temperature of cowbird and House Sparrow (*Passer domesticus*) eggs placed into Red-winged Blackbird (*Agelaius phoeniceus*) nests. There was no significant relationship between mean egg temperature and egg shape. Variation in egg temperature also was not related to egg width, however, it was significantly affected by species, with Brown-headed Cowbird eggs having less variation in temperature than House Sparrow eggs. These results suggest that Brown-headed Cowbirds may have shorter incubation periods relative to many of their hosts in part because their eggs have less temperature variation allowing their embryos to develop faster. The relatively constant temperature of cowbird eggs may be achieved through the cowbird's thick eggshell that presumably insulates the egg and reduces heat loss despite encountering a wide range of hosts. PO4: 32

Matthew A. Hayes, Univ. Wisconsin, Madison, WI 53706, and Jeb A. Barzen, International Crane Foundation, Baraboo, WI 53913.

[S]Mate and site fidelity of breeding Sandhill Cranes in a dense population in Wisconsin.

We studied mate and site fidelity among 97 color-marked, breeding Sandhill Crane (*Grus canadensis*) pairs in Wisconsin over a 19-year period. Temporary switches occurred in 10 pairs; however, none immediately led to permanent divorce. The primary reason (40%) was asynchronous arrival from spring migration. We observed 62 pairs permanently switch mates. Twenty pairs divorced permanently (5% mean annual divorce rate); the remaining permanent switches occurred following known or suspected mate death. Following divorce, males retained the original territory more frequently than females (Fisher's exact test = 3.54, $p = 0.08$); retaining the original territory did not increase reproductive success (Fisher's exact test = 0.005, $p = 0.94$). Divorced birds had low reproductive success prior to divorce compared to non-divorced pairs ($t = 2.48$, one-tail $p = 0.02$). Individual reproductive success was lowered after a mate switch for both divorced (paired $t = 3.24$, $p = 0.002$) and widowed birds (paired $t = 2.98$, $p = 0.002$). Divorce was typically (57%) triggered by vacancy (through divorce or mate loss) on an adjacent breeding territory. This spatial relationship was non-random through both linear distance between territories (Chi-square = 45.7, $p < 0.001$) and number of territories crossed (Chi-square = 50.8, $p < 0.001$). Because territories in this population are limited, a breeding adult Sandhill Crane may choose to stay with a current mate regardless of reproductive history until a nearby territory becomes available. Subsequently, the bird may weigh reproductive history against reproductive cost risked bychanging mates and/or territories. In this dense breeding area, being a territory holder, allowing annual breeding potential, may outweigh recent reproductive success experienced by a pair. CO29: Sat, 12 Mar 10:45

Sacha K. Heath and Matthew D. Johnson, Dept. Wildlife, Humboldt State Univ., Arcata, CA 95521.

[S]A bird-caused trophic cascade in the context of riparian habitat restoration: does it exist and does it represent an ecosystem service?

Habitat restoration efforts aimed at encouraging bird recolonization may have broad ecological consequences because of the supporting ecosystem services that birds provide. We considered one potential bird-driven ecosystem service by investigating trophic interactions between birds, arthropods and black cottonwoods (*Populus balsamifera* ssp. *trichocarpa*) along tributaries to Mono Lake, California. The cottonwoods are recovering with reestablished water flows after decades of municipal diversions. We tested the hypothesis that insectivorous bird predation causes a top-down species-level trophic cascade that indirectly increases black cottonwood sapling shoot growth. We compared several measures on "bird present" and "bird exclosure" saplings and tested predictions that: (1) phytophagous arthropod density and resulting leaf damage would be lower on bird present saplings than on bird exclosure saplings; (2) black cottonwood shoot growth would be greater for bird present saplings than for bird exclosure saplings; and (3) the magnitude of these differences would be positively correlated with insectivorous bird abundance. CO21: Fri, 11 Mar 16:30

Christopher M. Heckscher and Syrena M. Taylor, Delaware State Univ., Dept. Agriculture and Natural Resources, Dover, Delaware, and James W. Fox and Vsevolod Afanasyev, British Antarctic Survey, Natural Environment Research Council, Cambridge, CB3 0ET, UK.

Veery wintering locations and intratropical migration: results from geolocator tracking.

We used light-level archival units (geolocators) to track five Veeries (*Catharus fuscescens*) as they migrated from Delaware to South America and back. Our objectives were to determine the wintering locations and the timing of migration of individuals in our study population. All birds initially settled at geographically separate locations south of the Amazon River in Brazil. However, all relocated to a second winter site prior to spring migration. Arrival dates at initial winter sites ranged from 2 November to 2 December. Dates of departure to second winter sites occurred from 7 January to 7 March. The location of second winter sites ranged from southern Venezuela to Bolivia. All Veeries commenced northward migration in mid-April. To the best of our knowledge, this is the first documentation of intratropical migration in a temperate-breeding North American forest songbird and the first study to successfully track a songbird for one full annual cycle through dense tropical forests of equatorial South America. Our results not only add to the growing body of knowledge demonstrating the potential of geolocator technology to elucidate the migratory connectivity of songbird populations, but further exemplify how little is known regarding the non-breeding season ecology of Nearctic-Neotropical migrant songbirds. CO27: Sat, 12 Mar 10:00

Steven C. Hess, USGS Pacific Island Ecosystems Research Center, Hawai`i National Park, HI 96718, Christina Cornett, Hawai`i Cooperative Studies Unit, Univ. Hawai`i, Hilo, Hawai`i National Park, HI 96718, Kathleen Misajon, US National Park Service, Division of Resources Management, Hawai'i National Park, HI 96718, and John J. Jeffrey, Pepeekeo, HI 96783.

Tracking movements of the endangered Hawaiian Goose with satellite telemetry.

After being reduced to less than 50 individuals during the middle of the 20th century, the Hawaiian Goose (Nene; *Branta sandvicensis*) has begun to repopulate its former range and re-establish traditional movement patterns on Hawai'i Island. Satellite telemetry is becoming an increasingly important tool to track these types of movements and habitat use in waterfowl. The application of satellite telemetry to Nene for habitat studies requires a finer scale resolution than for most other species because Nene are restricted to relatively small islands rather than continents. In 2009 and 2010, we outfitted eight Nene ganders on Hawai'i Island with backpack harnesses and 40-45 gram Platform Transmitter Terminals (PTTs) equipped with Global Positioning System (GPS) receivers. Nene accepted the transmitters and provided us with 3,700 GPS locations in near real-time. One of the most frequently used travel routes in this study has been along the windward slopes of Mauna Kea and Mauna Loa from the northern terminus of Hakalau Forest National Wildlife Refuge (HFNWR) to the southern terminus of the Kahuku Unit of Hawai'i Volcanoes National Park (HAVO). Two subjects at the Kahuku Unit of HAVO revealed roosting areas within subalpine shrubland known as Kipuka Nene surrounded by rugged lava flows, where Nene had not been observed since 1949. Subjects also ranged more than 2,400 meters in elevation between leeward Kona and the slopes of Mauna Loa. Actions to further recover Nene will likely include more intensive monitoring and management of previously unknown, but important habitat patches revealed by this work. CO26: Sat, 12 Mar 8:45

Jeffrey P. Hoover, Wendy M. Schelsky, and Thomas J. Benson, Illinois Natural History Survey, Univ. Illinois, Champaign, IL 61820, and Scott K. Robinson, Florida Museum of Natural History, Gainesville, FL 32611.

Dispersal decisions recalibrate annual adult survival estimates in a migratory songbird.

Life history theory predicts that long-distance migratory birds should have annual adult survival rates intermediate to tropical (~80%) and temperate (~40%) resident species because of the costs and benefits of migration. Current methods of estimating apparent survival, however, confound true survival and permanent emigration. Experiments have shown that high reproductive success reduces between-year breeding dispersal, which has rarely been accounted for when estimating survival. We used multi-state mark-recapture models to estimate annual apparent survival of adult male and female Prothonotary Warblers (*Protonotaria citrea*), a long-distance migrant, while accounting for reproductive success in the preceding breeding season. Estimates of apparent survival for birds that produced no broods were lower (females = 44%, males = 64%) than for those that produced one (females = 70%, males = 78%) or two broods (females = 88%, males = 88%). Differences in these rates of apparent survival are likely the result of individuals emigrating from or remaining faithful to breeding sites based on past reproductive success. Our results suggest that survival rates of migratory birds may be much higher, and migration costs lower, than presently thought. If our results are the rule rather than the exception, then the way we think about and model life history trade-offs, migration costs, and population dynamics in migratory birds have to be reconsidered. CO16: Fri, 11 Mar 11:45

Kyle G. Horton and Sara R. Morris, Dept. Biology, Canisius Coll., Buffalo, NY 14208, and Amy Amones and Michael Lanzone, Carnegie Museum of Natural History, Powdermill Avian Research Center, Rector, PA 15677.

[S]Flight calls in wood-warblers: do migrants respond to conspecific calls?

During migration birds give simple vocalizations known as flight calls that are used primarily during sustained periods of flight. During fall 2010, we investigated whether birds respond more to conspecific calls than to heterospecific calls at Braddock Bay Bird Observatory (Greece, NY) and Powdermill Nature Preserve (Rector, PA). Focal species included Magnolia Warbler (*Dendroica magnolia*), Blackpoll Warbler (*D. striata*), and Yellow-rumped Warbler (*D. coronata*). Using recording studios to isolate birds from ambient noise, each bird was presented with one of four cues, flight calls of one of the three species or a control (spring peeper, Pseudacris crucifer). Of the 291 birds that heard avian flight calls (regardless of species), 24.4% responded with flight calls. The percentage of birds responding varied significantly among species, with Magnolia Warblers (40% gave calls, n = 110) responding more than Yellow-rumped Warblers (19.5% gave calls, n = 82) and Blackpoll Warblers (11.1% gave calls, n = 99). Of the 99 warblers that heard spring peeper calls, only one bird gave a flight call. Our results also supported our initial hypothesis, that bird would be more likely to give flight calls in response to conspecifics. Overall, 49.5% of the birds that heard conspecific calls gave flight calls, while only 11.8% of those that heard other species gave flight calls. When the individual species were examined, all three species showed significantly more birds responded to conspecific calls than to the other two species pooled (Blackpoll Warblers:

$\chi^2 = 18.5$, $p < 0.001$; Magnolia Warblers: $\chi^2 = 17.7$, $p < 0.001$; Yellow-rumped Warblers: $\chi^2 = 21.0$, $p < 0.001$). CO27: Sat, 12 Mar 9:45

Peter A. Hosner and Robert G. Moyle, Univ. Kansas, Lawrence, KS 66046.

[S]Testing the Pleistocene aggregate island complex (PAIC) model of diversification in co-distributed avian lineages.

For decades, the Pleistocene aggregate island complex (PAIC) hypothesis has influenced biogeographic inference in the Philippines and other island archipelagos. This model is based on the simple observation that aggregate islands repeatedly formed when sea levels decreased during glacial maxima, increasing connectivity among islands. During time periods with dry land connections between islands, populations might have expanded into new areas, and previously isolated island populations could come into contact and potentially interbreed again. PAIC boundaries are largely congruent with current day Philippine bird distributions. To test if the PAIC model explains population structure and recent diversification of Philippine birds, we compared mitochondrial gene sequences from multiple populations in eight polytypic bird species. Results indicate substantial population structure in all eight species, and PAIC paraphyly of in five of eight species. Genealogies of several species are consistent with a stepping stone model of colonization from south to north. Results also suggest that many distinctive subspecies may be better treated as species, and identify the Zamboanga Peninsula and the Eastern Visayan Islands as potentially under-appreciated centers of avian endemism in the Philippines. CO3: Thu, 10 Mar 11:00

Kristy B. Howe and David J. Delehanty, Dept. Biological Sciences, Idaho State Univ., Pocatello, ID, and Peter S. Coates, USGS Western Ecological Research Center, Dixon, CA 95616.

[S]Selection for anthropogenic structures and vegetation characteristics by Common Ravens (*Corvus corax*) within a sagebrush-steppe ecosystem.

Human-made structures in sagebrush ecosystems can increase Common Raven (Corvus corax) populations by providing food and nesting resources. This is cause for concern because ravens are important nest predators of sensitive species, including Greater Sage-Grouse (*Centrocercus urophasianus*). During 2007 - 2009, we conducted raven surveys (n = 710) and located raven nests (n = 97) in southeastern Idaho. We conducted two resource selection analyses (available-use), first identifying habitat associations of all ravens and then focusing on nesting individuals. At sampling points (nests, surveyed, and random), we measured variables at multiple spatial scales (GIS; scales, 102.1, 660.5, 4048.9 ha), including vegetation type (e.g., annual grassland) and anthropogenic resources (e.g., transmission lines). We compared multiple models (hypotheses) using an information-theoretic approach. The most parsimonious models included transmission lines, facilities, and non-native grasslands. For every 1 km increase in distance to transmission lines and facilities, the odds of raven presence decreased by 9.3% and 4.5%, respectively. Also, for every 10 ha increase of non-native grasslands (660.5 ha scale), the odds of raven presence increased by 2.7%. In post hoc analyses, the odds of raven presence increased with greater edge length of big sagebrush (*Artemisia tridentata* spp.) and non-native grassland. We found greater odds of nesting with decreased distance to transmission line and increased amount of vegetation type edge (102.1 ha scale). These findings contribute to our understanding of raven expansion into rural environments and could be used to make better-informed conservation decisions, especially in the face of increasing renewable energy development. CO15: Fri, 11 Mar 11:30

Joanna K. Hubbard, Brittany R. Jenkins, and Rebecca J. Safran, Dept. Ecology and Evolutionary Biology, Univ. Colorado, CO 80309.

[S]Heritability of a sexually selected melanin-based trait in North American Barn Swallows, *Hirundo rustica erythrogster*.

Plumage coloration is often a target of sexual selection via both mate choice and competition for mates. Yet, in order to see an evolutionary response to selection, the trait must be heritable. In North America, male barn swallows (*Hirundo rustica erythrogster*) with darker melanin-based plumage achieve higher reproductive success, suggesting there is selection on this trait. While melanin-based traits typically have a stronger genetic component compared to other pigment-based colors, there are few estimates of the heritability of sexually selected melanin-based plumage color in birds. As in many passerines, barn swallows show high rates of extra-pair paternity creating a natural cross-fostering experiment with nests consisting of full- and half-siblings. Using this natural experiment, we compared juvenile color of full- and half-sibs raised in the same nest, half-sibs raised in different nests, and unrelated individuals raised in different nests. Color is more similar between full-sibs than half-sibs or unrelated individuals and more similar in half-sibs than in unrelated individuals. However, comparisons of extra-pair offspring to genetic and social parents suggest the nest environment, as well as genetics, affects plumage coloration. Additionally, preliminary analyses suggest juvenile color is potentially an

adequate proxy for adult color, meaning that the differences in color shown here will be maintained into adulthood. Finally, mid-parent – offspring regressions show a moderate heritability estimate for ventral plumage color. These results will allow us to make better inferences regarding the response to selection that we might see in this trait. CO24: Fri, 11 Mar 16:00

Nicholas P. Huffeldt, Dept. Arctic Environment, National Environmental Research Institute, Aarhus Univ., Roskilde, Denmark and Animal Behaviour Group, Dept. Biology, Univ. Copenhagen, Copenhagen, Denmark, and Iben N. Aggerholm, Nathia H. Brandtberg and Jacob H. Jørgensen Dept. Biology, Univ. Copenhagen, 2200 Copenhagen N, Denmark, and Klaus Dichmann and Peter Sunde, Dept. Wildlife Ecology and Biodiversity, National Environmental Research Institute, Aarhus Univ., 8410 Rønde, Denmark, and Project Barn Owl, www.tytoalba.dk.

[S]Factors in Barn Owl (*Tyto alba*) natal dispersal, is it density dependence?

The Danish Barn Owl (*Tyto alba*) population has recently undergone an exponential increase in size with the introduction of nest-boxes in Denmark (c.1998), resulting in a 15-fold increase in breeding density over 13 years with rather stable environmental conditions. We wanted to test the effects of density dependence on natal dispersal behavior over varying population sizes to see if there were any complex density dependence patterns. We also wanted to test against other factors that could affect natal dispersal, i.e., age and hatching date. We used ring marking data from 1921 to 2009 of individuals ringed as chicks and were recovered dead (n = 590). Despite considerable spatial as well as temporal variation in population density, it did not appear to directly influence Barn Owl dispersal distance. Age showed an effect within 100 days post ringing suggesting that dispersal behavior in Barn Owls could primarily be affected early after fledging, while hatching date had a highly significant ∩–shaped influence that suggested an effect throughout the breeding season on dispersal probability and dispersal distance. Hence, in this species natal dispersal decisions did not appear to be conditional on the density of conspecifics, but sensitive to reproductive timing. PO5: 37

Pamela Hunt, NH Audubon, Concord, NH 03301.

Using auditory detections to assess habitat use in the Eastern Whip-poor-will (*Caprimulgus vociferus*).

Populations of the Eastern Whip-poor-will (*Caprimulus vociferus*) have been declining across most of its range since at least the 1960s. Among the hypotheses proposed to explain this decline has been the loss or maturation of the edge or open forest habitats that the species prefers. Testing this hypothesis requires detailed information on habitat preferences, but because whip-poor-wills are nocturnal, traditional methods of assessing habitat use — such as spot mapping — are not effective. Radio telemetry has been used with much success, but poses additional costs and logistical challenges. Here I present a modified version of spot mapping, "triangulation mapping," that was developed to delineate whip-poor-will home ranges at two study areas in New Hampshire. Results from three breeding seasons — including comparison to limited telemetry — suggest that this method can effectively identify home ranges, and can provide information on broad habitat associations. However, it is limited because only calling males are usually detected and it is not always possible to distinguish between individual birds. More extensive use of radio telemetry is planned in coming seasons to further investigate the suitability of triangulation mapping as a tool for rapid assessment of local habitat use by this species. CO30: Sat, 12 Mar 11:15

Kamal Islam, Ryan Dibala, Kyle Kaminski, Margaret MacNeil, Jennifer Wagner, and Lila (Prichard) Young, Dept. Biology, Ball State Univ., Muncie, IN 47306.

The Hardwood Ecosystem Experiment: do silvicultural treatments affect Cerulean Warbler relative abundance and territory size and placement in southern Indiana?

Cerulean Warblers (*Dendroica cerulea*) are small neotropical migrant songbirds that have experienced population declines during the last four decades. As part of the Hardwood Ecosystem Experiment, a large scale and long term (100 years) experimental study of forest management impacts on plants and wildlife, we monitored Cerulean Warbler populations, as well as size and placement of territories during pre-treatment (2007 & 2008) & post-treatment (2009- & 2010) years. Our study sites were located within nine management units (6 treatment and 3 control) in the Yellowwood and Morgan-Monroe state forests in southern Indiana. Overall, relative abundance increased each year from 2007 to 2009 but declined by 27.2% in 2010 (7.43 males/km^2 in 2009 versus 5.41 males/km^2 in 2010); however, this estimate is still an increase of 1.5% from 2007 estimates. Overall territory sizes increased from 2007 (0.18 ha) to 2008 (0.36 ha) but remained the same during post-treatment years (0.21 ha) and this trend was consistent across most study sites. Territories were spatially clustered in all four years. These findings are similar to other research involving Cerulean Warblers in southern Indiana. Future studies will continue to monitor relative abundance and territory characteristics along with an intensive breeding study. S1: Thu, 10 Mar 11:30

Allyson K. Jackson, Sarah B. Folsom, and David C. Evers, BioDiversity Research Institute, Gorham, ME 04038, Anne M. Condon and John Schmerfeld, US Fish and Wildlife Service, Gloucestor, VA 23061, Daniel A. Cristol, Dept. Biology, Coll. William and Mary, Williamsburg, VA 23187.

Mercury footprint extends far downstream for songbirds along the South Fork Shenandoah River.

Mercury, a heavy metal historically used in manufacturing, is a persistent environmental contaminant found in many freshwater aquatic systems. In riverine systems, mercury methylation and subsequent bioavailability in the terrestrial ecosystem can be increased by annual flooding and deposition of mercury-laden sediment into the floodplain. In one such riverine system, the South River (Virginia, USA), the effect and extent of historical mercury contamination on the terrestrial biota is well documented. The South River, however, flows into a much larger riverine corridor, the South Fork Shenandoah River and little is known about the extent of mercury contamination downstream. In 2009, we sampled terrestrial songbirds at sites spaced approximately every 30 km along the South River and South Fork Shenandoah River, continuing as far as 172 km downstream of the historical source of mercury, to determine whether blood mercury levels decline with distance downstream of the historical point-source of mercury. We found that blood mercury levels of four target species (Carolina Wren *Thryothorus ludovicianus*, Indigo Bunting *Passerina cyanea*, Red-eyed Vireo *Vireo olivaceus*, and Song Sparrow *Melospiza melodia*) remained elevated above reference levels as far as 172 kilometers downstream of the contamination site, with some sites and species exhibiting little decline with increasing distance. This is the first study to document that blood mercury levels of terrestrial songbirds remain elevated far downstream and has important implications for both wildlife damage assessments and remediation efforts. CO21: Fri, 11 Mar 16:45

Jerome A. Jackson, Dept. Marine and Ecological Sciences, Florida Gulf Coast Univ., Ft. Myers, FL 33965, and Bette J. S. Jackson, Dept. Biological Sciences, Florida Gulf Coast Univ., Ft. Myers, FL 33965.

Functional morphology of the bill in the Anhingidae: an adaptation that can be maladaptive in the modern world.

The ensnarement of Anhingas (*Anhinga anhinga*) in frayed rope led us to examine the bill morphology of both species of Anhingidae: the Anhinga, and the Darter (*Anhinga melanogaster*). Adults of both species have a dense row of backward pointing barbs that grow along the distal half of the upper and lower tomia. These barbs probably serve the birds well in helping to prevent escape of captured prey. Nestling Anhingas and Darters lack these, thus preventing potential entanglement of the bill of nestling and parent. Recent fledglings are beginning to develop them. Foraging adults sometimes snare adjacent vegetation with the barbs, but free the bill by swishing it around in the water. Unfortunately, if the barbs come into contact with multiple fine, strong fibers, such as the frayed end of a nylon rope, the birds become snared and may die as a result. CO11: Fri, 11 Mar 10:00

Frances C. James and John A. Pourtless IV, Dept. Biological Science, Florida State Univ., Tallahassee, FL 32306.

Character support for the hypothesis that birds are maniraptoran theropod dinosaurs.

Acknowledgment of the striking similarity between Mesozoic birds and at least some maniraptoran theropod dinosaurs reached a new peak with the discovery of the "four-winged" *Microraptor*, a basal dromaeosaurid, and *Anchiornis*, a basal troodontid. These discoveries suggest that various maniraptoran taxa may actually belong within Aves, and that the morphotype of forms like *Deinonychus* and *Troodon* might represent convergence on cursorial theropods, as apparently occurred with predatory flightless birds like phorusrhacids. Or, they may be theropods that converged on birds. In either case, the theropod hypothesis predicts that birds share synapomorphies with nested clades at deeper phylogenetic levels than the Maniraptora within the Theropoda. To test this prediction, we identified the synapomorphies for the nodes Maniraptoriformes, Coelurosauria, Neotetanurae, Tetanurae and Neotheropoda in trees calculated from recently published matrices. We found two problems. First, birds share few of the synapomorphies of these successively larger clades; second, many of the synapomorphies are themselves problematic. Character support for the theropod hypothesis, beyond the fact that birds and maniraptorans share numerous similarities, is actually weak. These findings support the alternative that some maniraptorans are actually not theropods but rather birds, and that the origin of birds may not be within the Theropoda. CO6: Thu, 10 Mar 14:45

Levi R. Jamison, School of Natural Resources and the Environment and USGS Southwest Biological Science Center, Sonoran Desert Research Station, Univ. Arizona, Tucson, AZ 85721, and Charles van Riper, III, School of Natural Resources and the Environment, Univ. Arizona, Tucson, AZ 85721.

[S]Rapid spread of the tamarisk leaf beetle (*Diorhabda carinulata*).

The distribution of the tamarisk leaf beetle (*Diorhabda carinulata*) is of increasing interest to ornithologists in the Southwest US. This recently introduced biological control agent for invasive/exotic tamarisk (*Tamarix* spp.), defoliates extensive areas of the riparian dominating tamarisk, often leaving entire monotypic forests denude of greenery in a matter of weeks. While tamarisk has generally been considered poor habitat for birds, recent studies

have shown value in the non-native vegetation for certain avian species including the endangered Southwestern Willow Flycatcher (*Empidonax traillii extimus*). Foreseen as a conflict of management, *D. carinulata* has been spreading uncontrollably from regions where tamarisk control has been a management priority into regions where tamarisk is being preserved for avian use. Using five years of *D. carinulata* abundance data collected across the Colorado River Basin we compiled a geographic history of the spread of *D. carinulata* throughout the Upper Colorado River Basin. Using GIS software we predict the future spread of *D. carinulata* as it moves south into the Lower Colorado River Basin in Arizona, New Mexico, and California. We will discuss the implications of *D. carinulata* colonization in regards to avian habitat and future management decisions. PO2: 15

Julie A. Jedlicka Dept. Environmental Studies, Univ. California, Santa Cruz, CA and Russell Greenberg, Smithsonian Migratory Bird Center, National Zoological Park, Washington, DC and Deborah K. Letourneau, Dept. Environmental Studies, Univ. California, Santa Cruz, CA.

Conservation of avian species strengthens ecosystem services in California vineyards.

Insectivorous Western Bluebirds (*Sialia mexicana*) are known to occupy vineyard nest boxes that California winegrape growers sometimes establish in their vineyards to encourage avian conservation. We experimentally tested whether this practice increases bird populations and whether these birds provide growers with ecosystem services in the form of pest control. We compared the species richness and abundance of foraging birds in California vineyard plots with and without established songbird nest boxes. Species richness and abundance of insectivorous birds (primarily the Western Bluebird) significantly increased in nest box treatments. Omnivorous and granivorous birds (including some species that opportunistically forage on grape crops) did not occupy nest boxes and showed no significant difference between treatments. A sentinel pest experiment to measure predation rates on caterpillars indicated a greater predation rate by insectivorous birds, both immediately adjacent to occupied nest boxes and at randomly selected points throughout the nest box treatment plots compared to vineyard control plots with no nest boxes. Predation rates near nest boxes were nearly 3.5 times greater than in control areas. Consequently the presence of Western Bluebirds in vineyard nest boxes strengthened ecosystem services to winegrape growers, a benefit of agroecological conservation practices. S3: Fri, 11 Mar 11:00

Brittany Jenkins, Dept. Ecology and Evolutionary Biology, Univ. Colorado at Boulder, Boulder, CO 80303.

[S]Information content of sexual signals: a temporal investigation of stress resistance.

Sexual signals confer greater reproductive benefits to males with the most elaborate form of the signal. However, producing these elaborate traits can come at a cost, including greater predation risk, increased oxidative damage, and impaired immune function. Sexually-selected morphological traits can therefore serve as honest indicators of an individual's ability to bear the costs of producing or maintaining these signals. Despite the importance of these traits, the information content of sexual signals and their physiological underpinnings remain largely unknown. Likewise, little is known about the temporal dynamics of physiology-signal relationships. There is often a temporal disconnect between an individual's physiological state during trait development and trait advertisement. What physiological processes provide a link between condition and signaling? And in the case of signals that develop in non-reproductive contexts, and are advertised months later during the mating season, what are the temporal dynamics of the physiology-signal relationship? In North American barn swallows, males produce their plumage-based sexual signals months before they are used to attract mates, so a male's physiological state during trait development may differ from that during trait advertisement. Corticosterone (CORT), a hormone involved in the stress response) produces many behavioral and fitness consequences, and would provide an excellent opportunity to evaluate the costs of expressing this sexual signal because melanin production and pigment deposition are both impacted by CORT secretion. As such, I will investigate the hypothesis that sexually-selected melanin-based plumage coloration is an honest signal of a male's ability to respond to stressful situations. PO7: 53

Travis J. Runia and **Kent C. Jensen**, Dept. Wildlife and Fisheries Sciences, South Dakota State Univ., Brookings, SD 57007.

Impacts of Conservation Reserve Program (CRP) and landscape composition on presence and density of prairie grouse leks in South Dakota.

Since European settlement, millions of hectares of native prairie have been lost to cropland conversion within the original range of prairie grouse in North America. Conversely, the Conservation Reserve Program (CRP) of the Federal Food Security Act of 1985 converted millions of cropland hectares back to perennial grassland. These land use changes have undoubtedly impacted prairie grouse abundance and distribution. We investigated Sharp-tailed Grouse (*Tympanuchus phasianellus*) and Greater Prairie-Chicken (*T. cupido*) distribution and abundance in relation to landscape-level land use at multiple scales in northeastern South Dakota, USA. We searched for leks in

three, 10,000-ha study areas with dissimilar landscape compositions including varying influence of CRP and agriculture intensity. We generalized and digitized the entire landscape in the study areas into nine general land use categories in a geographic information system (GIS). We then analyzed land use surrounding lek sites at seven scales (400 to 3,000 m) because birds may utilize the landscape differently dependent upon scale. We identified land use factors that may influence lek location at each scale. Spatial GIS habitat suitability models were developed to project how anticipated land use changes could affect prairie grouse habitat. More land in grass (CRP and/or pasture) was found surrounding lek locations versus non-use points at several scales at all study areas. Opposite trends were found for cropland. Pasture and CRP lands were strong predictors of lek presence at several scales at all study areas. S2: Thu, 10 Mar 10:00

Allison E. Johnson, Dept. Ecology and Evolutionary Biology, Univ. Chicago, IL 60615, and Steve Freedberg, Dept. Biology, St. Olaf Coll., Northfield, MN 55057.

[S]Facial markings may serve as a kin recognition cue in juvenile Cliff Swallows (*Petrochelidon pyrrhonota*).

The ability to recognize kin is essential in the evolution of complex social behavior; however, little is known about kin recognition cues in birds. The Cliff Swallow (*Petrochelidon pyrrhonota*) is a highly social species that nests in large colonies and exhibits high incidence of both conspecific brood parasitism and cuckoldry. These situations may lead to individuals expending parental care on unrelated offspring and reduce their inclusive fitness. Previous work has shown that adult cliff swallows use vocalizations to recognize juveniles raised in their nest, In addition to variable calls, juvenile cliff swallows have distinct, mottled facial patterns, varying from almost entirely white to nearly black. We used image analysis to examine facial patterns of nestlings, and microsatellite markers to examine genetic relatedness among offspring in a nest. There was variation in facial patterns within a nest, but most variation occurred between nests. Furthermore, we found a significant correlation between facial similarity and relatedness of nestlings. Closely related nestlings had more similar facial markings, suggesting that facial markings could serve as a kin recognition cue. The reliability of this cue would depend on the rates of intraspecific egg dumping and extra-pair paternity, and the importance of this cue would vary between males and females. We found no association between nestling relatedness and weight suggesting that if facial markings are kin recognition cues, they are likely important after the young fledge, when parents need to discriminate between the young in their nest and others once the fledglings join a crêche. CO28: Sat, 12 Mar 10:30

Erik I. Johnson and Philip C. Stouffer, Dept. Renewable Natural Resources, Louisiana State Univ., Baton Rouge, LA 70803.

[S]Ectoparasites reduce feather growth in an Amazonian forest bird, *Willisornis poecilinota*.

Effects of anthropogenic landscape change on ectoparasitism are not well understood, but may include regulation of ectoparasite loads by hosts. We quantified wing mite loads on 24 species of birds captured either on forest fragment edges or forest interiors in a fragmented landscape near Manaus, Brazil. For only three hosts were wing mite loads greater along edges; these hosts were among the five most sensitive to fragmentation. Ectoparasite abundance may not correlate with their virulence, however, depending on host responses through behavioral and physiological adjustments. In an ectoparasite-removal experiment, we examined the combined effects of ectoparasites and habitat quality on host body condition, using ptilochronology, for *Willisornis poecilinota*, a moderately fragmentation-sensitive species. We dust-ruffled captured birds with pyrethrin powder to remove parasites and plucked a tail feather to stimulate production of a new feather, which was collected upon recapture. For birds occupying forest interiors, feather growth increased by 7.3 ± 1.5% when ectoparasites were removed, but birds along edges and those untreated with pyrethrin showed no change in feather growth. This increase in feather growth for ectoparasite-free birds would result in molt completing 15 days faster than the typical 205 days. Increased feather growth rates also correspond to a decreased probability of molting and breeding simultaneously, a costly life history trait that increases sensitivity to forest fragmentation. Thus ectoparasite virulence can directly decrease host body condition, but also indirectly increase sensitivity to fragmentation by increasing the probability of molt-breeding overlap. CO18: Fri, 11 Mar 14:45

C. F. Thompson, S. K. Sakaluk, B. G. P. Johnson, L. A. Vogel, B. S. Masters, **L. S. Johnson**, and A. M. Forsman, Dept. Biological Sciences, Towson Univ., Towson, MD and Illinois State Univ., Normal, IL.

Effect of sex and condition on immune function in nestling House Wrens, *Troglodytes aedon*.

In birds, adult males typically respond to immunological challenges less robustly than females, but when this sex difference manifests itself during development is unknown. In altricial species, young hatch in an extremely immature state and immune systems may be so poorly differentiated at the time of hatching that sex-related differences in immune function may not develop until relatively late in life, possibly post-fledging. This timing

may vary, however, with immune responses that derive largely from the innate branch, e.g., bactericidal activity of blood plasma, displaying sexual dimorphism earlier in ontogeny than responses that incorporate components of both the innate and adaptive branches, e.g., phytohaemagglutinin (PHA). We tested for sex-related differences in bactericidal and PHA immune responses in nestling House Wrens, while controlling for the effects of nestling health state and condition. Tests were made two-thirds of the way through the nestling stage when young were at or near their peak mass. We found no differences between the sexes in the bactericidal assay, but female nestlings had a stronger PHA response than male nestlings in one of three breeding seasons. This sex-based difference in PHA response occurred in the one year that female nestling condition was significantly greater than that of males, so the difference could simply reflect a condition-based difference. Our results suggest that any differences between adult males and females in the immune responses that we measured usually develop after fledging. PO7: 54

Cara Joos, Division of Biological Sciences, Univ. Missouri, Columbia, MO 65201, Frank R. Thompson, III, USFS Northern Research Station, Univ. Missouri, Columbia, MO 65211, and John Faaborg, Div. Biological Sciences, Univ. Missouri, Columbia, MO 65201.

[S]Settlement order and productivity of Bell's Vireos (*Vireo bellii bellii*).

A greater understanding of factors influencing fitness of Neotropical migrants is necessary to make better habitat management decisions. The ideal despotic distribution model of habitat selection hypothesizes that individuals select territories in an order reflecting habitat quality. This selection pattern should result in increased fitness of earlier arriving individuals, therefore territory settlement order will predict productivity of occupants. In 2010 we recorded territory settlement dates and monitored nests in a population of individually marked Bell's Vireos (*Vireo bellii bellii*) in central Missouri. Territories were searched systematically for newly arriving males prior to the species' arrival on breeding grounds. We searched for and monitored nests in occupied territories, monitored nests to record date of first egg laid (lay date) and number of fledged young (productivity). Productivity declined with territory settlement date and lay date within a territory. Both early arrival and early nest initiation were important predictors of productivity in this population. Settlement date appears to predict productivity of Bell's Vireos in central Missouri, supporting the ideal despotic distribution model with settlement order predicting productivity. If territory quality is a function of habitat features these results will allow us to better define high quality Bell's Vireo habitat. Further, as settlement order is a relatively simple metric to measure in the field it may be a used by habitat managers to identify high quality habitat for this species. CO4: Thu, 10 Mar 10:30

Christopher F. Jorgensen, Nebraska Cooperative Fish and Wildlife Research Unit, School of Natural Resources, Univ. Nebraska-Lincoln, Lincoln, NE 68583, Joseph J Fontaine, USGS Nebraska Cooperative Fish and Wildlife Research Unit, Lincoln, NE 68583, and Larkin Powell, School of Natural Resources, Univ. Nebraska-Lincoln, Lincoln, NE 68583.

[S]Assessing landscape and habitat attributes at multiple scales: what drives avian abundance and distribution in grasslands?

Grassland bird populations are declining throughout North America and while habitat restoration efforts can be beneficial, management actions do not always demonstrate the desired outcome. Understanding why management actions fail is paramount; yet, past studies have focused on assessing habitat attributes at a single scale, and often fail to consider the importance of ecological mechanisms that act across multiple scales. By looking at multiple scales, we can construct hierarchical models to identify the ecological characteristics driving grassland bird populations and how these factors interact with each other. These models will be useful tools to focus future management efforts. We located survey sites across southern Nebraska, on public wildlife management areas and conducted a series of point counts to estimate densities. We also measured vegetation cover and visual obstruction at the local level while quantifying landscape effects using ArcGIS spatial analyst tools. Preliminary results showed 99 species using managed public grasslands in Nebraska, of which, 6 are obligate grassland breeders. Grassland bird response to habitat attributes varied across scales and species. CO10: Thu, 10 Mar 16:15

Joel G. Jorgensen, Nongame Bird Program, Nebraska Game and Parks Commission, Lincoln, NE 68503, and Mary Bomberger Brown, Tern and Plover Conservation Partnership, Lincoln, NE 68583.

Interior Least Terns and Northern Great Plains Piping Plover nesting on natural and human-created habitat in the Lower Platte River: implication for species and river management.

Interior Least Terns (*Sternula antillarum athalassos*) and Piping Plovers (*Charadrius melodus*) nest along the Lower Platte River in Nebraska, USA. The birds use two different types of habitat: river sandbars and human-created habitats. River sandbars are part of a dynamic river system and the amount and quality of this habitat is variable. Human-created habitats are unintentional by-products of sand and gravel mining or commercial real

estate development and the amount of this habitat is relatively static. As the Lower Platte River is further altered for human use, there is a need to evaluate whether or not human-created habitats can serve as an alternative to river sandbars, the "natural" habitat used by terns and plovers. From 2008 - 2010, we monitored nest numbers, nest survival and chick survival of both species utilizing the two habitats. Using a mark-recapture framework, we found that nest and chick survival were markedly higher on river sandbars than on human-created habitats. River sandbars were not available for nesting in 2010 because of high water and bird use at human-created habitats increased that year. Additionally, we observed numerous Piping Plovers that were originally banded in a different system, the Missouri River, using both habitat types on the Lower Platte River. Our results suggest that natural sandbar and human-created habitats complement each other, with the latter serving as a "safety-valve" in years when river habitat is unavailable. The loss of either habitat would have negative consequences for both species. S4: Sat, 12 Mar 9:15

Erica Judd, Chris Butler, and Eric Judd, Univ. Central Oklahoma, Edmond, OK 73034.

Ecological niche modeling as a method for mapping distribution of hummingbird hybrids.

Hybrid zones are important because they provide a model for studying divergence and speciation. Recently, we have discovered that hybrids of Ruby-throated Hummingbirds (*Archilochus colubris*) and Black-chinned Hummingbirds (*A. alexandri*) are more common in Oklahoma than previously reported in the literature, with 12 apparent male hybrids banded during the last four years. Currently it is not possible to separate female hybrids by morphology. We are developing a PCR technique to identify F1 hybrids and are sampling hummingbirds across Oklahoma and Texas to examine the extent of hybridization. We will also compare ecological niche models to determine their effectiveness at mapping the hybrid zone. PO9: 62

Stephanie A. Kane, Fort Hays State Univ., Hays, KS 67601.

[S]Effects of multiple habitat management practices on breeding habitat usage by Eastern Black Rail.

Two subspecies of Black Rail (*Laterallus jamaicensis*) occur in the United States; of these, the Eastern subspecies (*L. j. jamaicensis*) has a larger range, but has been studied to a lesser extent than the California subspecies. Little information is available on characteristics of breeding habitat for inland Eastern Black Rail populations, and few studies have investigated the effect of habitat management techniques on these populations. Eastern Black Rail are known to breed at several locations in Kansas, and are most often observed at Quivira National Wildlife Refuge. The refuge utilizes prescribed burning and haying to manage vegetation in the wet-meadow habitat that the rails typically occupy. Call playback surveys were conducted in the summers of 2009 and 2010, in accordance with National Marsh Bird Survey Program's protocol; I quantified vegetation structure in areas where Black Rail responded during playback surveys. Black Rail were most often detected in sections with moderate levels of disturbance (e.g., burned annually, burned and grazed); canopy cover (% vegetation) of both living and dead vegetation were higher in these areas (250.2 and 329.2, respectively). Areas with frequent (i.e., annual) haying did not appear to possess suitable habitat as no rails were detected in these locations (living vegetation cover: 281.5, dead vegetation cover: 112.1). Black Rail also occupied areas with no recent history of disturbance (living vegetation cover: 263.0, dead vegetation cover: 463.6). Moderately disturbed areas, such as those burned every two years, may contain a mosaic of living and dead vegetation necessary for Black Rail nesting. CO12: Fri, 11 Mar 9:30

Laura J. Kearns and Amanda D. Rodewald, Ohio State Univ., Columbus, OH 43210.

[S]Influence of prior fate and nest predator community on renesting decisions of multi-brooded forest songbirds.

Among multi-brooded songbirds, fate of previous nests can influence a bird's decision to nest or renest, as well as the placement of successive nests. In some of these studies, the composition of the predator community is inferred but not evaluated with respect to these decisions. We examined responses of Northern Cardinals (*Cardinalis cardinalis*) to previous nest fate and composition of the predator community in riparian forest fragments (N = 14) in central Ohio from April-August 2006 – 2009. Fate of the previous nest was significantly associated with changes in nest height and nest concealment, but contrary to our expectations, nest heights were higher following successful (+2.1m ± 0.58 SE) rather than failed (+0.8m ± 0.24 SE) nests, and percent concealment of nests increased after successful nests (5.2% ± 5.75 SE) but decreased after failed nests (-0.9% ± 3.19 SE; Wilks' Lambda $F_{2,112} = 2.64$, $p = 0.08$.) At sites dominated by mammalian predators, successive nest heights marginally increased (+1.0m + 0.45 SE) and amount of nest cover decreased (-8.6% ± 5.30 SE; Wilks' Lambda $F_{2,112} = 2.35$, $p = 0.10$.) At sites where nests were more likely to be attacked by avian predators, successive nest heights increased less (+0.7m ± 0.29) although the amount of nest cover marginally increased (+2.05% ± 3.90; Wilks' Lambda $F_{2,112} = 2.35$, $p = 0.10$). Collectively, these results suggest that nesting decisions may reflect use of public information about predator communities. CO4: Thu, 10 Mar 10:45

Jeff Kelly, Ryan Shipley, Ken Howard, Phil Chilson, Winifred F. Frick, and Thomas H. Kunz, Oklahoma Biological Survey, Univ. Oklahoma, Norman, OK 73019.

A national scale analysis of Purple Martin pre migratory roost formation using weather surveillance radar.

Over the past 20 years several studies have demonstrated that weather surveillance radars can quantify the size and phenology of pre-migratory roosts of Purple Martins (*Progne subis*). These analyses have been very informative, but have been spatially limited primarily to large roost sites that are well sampled by individual WSR-88D stations and temporally limited to a few days or weeks of data. Recent availability of Continental-scale mosaic radar products from NOAA-NWS has made it possible to access much broader spatial and temporal range of radar data that retains biological information. To examine the utility of these data for broad scale studies we used local maxima in the mosaic reflectivity data (dBZ) from 3x3 grid locations surrounding all 358 Purple Martin roost locations listed on the web page of the Purple Martin Conservation Association (purplemartin.org) for the summer of 2010 (June through September at 5 minute temporal resolution). We restricted our analyses to the hour prior to dawn local time and removed from our analyses all reflectivity data from time periods in which the rainfall rate was > 0 mm/h. Patterns in the reflectivity data from individual roosts varied widely, probably as a result of the size of the roost, distance from a WSR-88D facility, and surrounding landscape. Nonetheless, the overall seasonal pattern in reflectivity, obtained by averaging over all roost sites, matches the expectation of increasing densities of martins at pre-migratory roosts through July and a declining trend in August. These preliminary findings suggest that further investigation of mosaic radar products as a tool for monitoring phenology of broad scale aeroecological processes is warranted. CO32: Sat, 12 Mar 15:15

Janice K. Kelly and Kenneth A. Schmidt, Dept. Biological Sciences, Texas Tech University, Lubbock, TX 79409.

Post-breeding public information use in a ground-nesting songbird community.

The territory a bird chooses to breed in can have large and direct effects on the bird's fitness. Birds can use social cues emitted by other organisms to gather public information as an indicator of territory quality. Public information can accurately reveal territory quality by advertising the inhabitants' reproductive success. I am studying the use of public information in the Veery (*Catharus fuscescens*) and its effect on community assembly. I hypothesize that Veery fledgling vocalizations produced during the post-breeding season are public information cues used by Veeries and heterospecific ground-nesting songbirds for territory selection in subsequent breeding seasons. To test this, I played Veery fledgling vocalizations and silent controls at plots during the post-breeding season in 2009. In 2010, response data (nest distances to nearest plot, nest counts at each plot, and settlement dates) was collected. A second round of treatments was applied during the post-breeding season 2010. The final round of data collection will occur during summer 2011. Results to date show that Veeries are more likely to occupy post-breeding public information plots relative to control plots. Additionally, Veeries settled at post-breeding treatment plots one week earlier compared to control plots, but this trend is not significant. Heterospecific ground-nesters showed no difference in response to post-breeding public information plots relative to control plots. My study will be the first to address how social cues influence community assembly and will add to the growing field of public information use among songbirds. PO1: 06

S. D. Kevan and C. E. Trainor, Enviroquest Ltd., Cambridge, ON N3C2B7, Canada.

Carbohydrate analysis of berries available for foraging by birds.

Berries were collected from 19 species of plants from June through November, in Bechtal Park (Waterloo, Ontario, Canada). Twelve of the species had undetectable levels of sucrose, with 11 showing increases in glucose and fructose concentrations. Four species showed significant positive correlations for fructose and time. Red raspberry had decreases of both glucose and fructose. Staghorn sumac concentrations of glucose remained fairly steady, but fructose concentrations dropped to undetectable levels several weeks into the study. Concentrations of sucrose were found in only 7 plant species. Out of the seven, four of those showed increasing concentrations of sucrose, and the remaining 3 showed decreasing concentrations of glucose and fructose. CO1: Thu, 10 Mar 8:45

William Jaeckle, **Miranda Kiefer**, Brittany Childs, R. Given Harper, Dept. Biology, Illinois Wesleyan Univ., Bloomington, IL 61701, and Brian Peer, Dept. Biological Sciences, Western Illinois Univ., Macomb, IL 61455.

Comparison of eggshell porosity and estimated gas flux between the Brown-headed Cowbird (*Molothrus ater*) and its hosts: the Dickcissel (*Spiza americana*) and the Red-winged Blackbird (*Agelaius phoeniceus*).

The Brown-headed Cowbird is a brood parasitic icterid that lays eggs in nests of other species, including the Dickcissel and a non-parasitic icterid, the Red-winged Blackbird. Cowbird eggs reportedly hatch sooner than equivalently-sized host eggs, providing their hatchlings a potential competitive advantage over host offspring. We tested the hypothesis that the apparent accelerated development of cowbird offspring is a result of differences in the physical character of the eggshell and that those differences increase the fluxes of respiratory gases to and

from the developing chick. Cowbird egg size is intermediate between those of the larger Red-winged Blackbird and the smaller Dickcissel, but cowbird eggshell thickness was significantly greater than the eggshells of either potential host ($p < 0.001$). The number of pores per egg was similar between cowbirds and Dickcissels, but the total pore area per egg was significantly greater in cowbirds ($p < 0.001$). Red-winged Blackbird eggs, in contrast, had a greater number of pores than cowbird eggs ($p < 0.001$), but cowbird egg pore area was 1.9x larger ($p = 0.016$). Estimates of eggshell conductance (GH20) revealed that cowbird eggs were more conductive than Dickcissel eggs ($p < 0.001$), but not different than the eggs of Red-winged Blackbirds ($p = 0.064$). When conductance was normalized to published values of egg weight, cowbird eggs had a higher weight-specific conductance than Dickcissel ($p < 0.001$) or Red-winged Blackbird eggs ($p = 0.004$). Differences in eggshell characteristics predicatively influence gas fluxes across the eggshell and potentially explain variation in incubation periods among species. PO4: 31

Daniel Kim, Portland State Univ., Portland, OR 97210.

Effects of severe weather to reproductive success of hosts and brood parasites.

The direct affects of weather events to the survival of individuals are well documented. Cyclical events, such as drought or wet periods, may impact population densities directly, through the availability of resources such as nesting sites, or indirectly through changes in the density of food or predators. Severe weather events may disrupt the breeding cycle of entire avian communities, including obligate brood parasites. I describe the effects of several weather events to breeding bird communities during three summers compared to four years without weather-induced disruptions to the breeding cycle. The average number of female nesting attempts increased along with average the number of young fledged/successful nest. Community wide re-nesting decreased parasitism levels but not parasitism intensity in severe weather years, implying re-nesting attempts swamped the needs of Brown-headed cowbirds females to maximize nest parasitism. CO30: Sat, 12 Mar 10:30

Rebecca Kirby, Dept. Forest and Wildlife Ecology, Univ. Wisconsin, Madison, WI 53706, and Mark E. Berres, Dept. Animal Sciences, Univ. Wisconsin, Madison, WI 53706.

Conservation genetics of the White-tailed Sabrewing (*Campylopterus ensipennis*) on Tobago, West Indies.

We characterized the genetic diversity and effective population size of the White-tailed Sabrewing (*Campylopterus ensipennis*), a species of hummingbird with conservation concern and ecotourism value on Tobago, West Indies. Utilizing a temporal sampling scheme and a special form of codominant amplified fragment length polymorphisms, we generated fingerprints for 86 individuals collected in 2008 ($n = 37$) and approximately ten years earlier ($n = 49$). We found low genetic diversity, high inbreeding, and a lack of population genetic structure, although at this time none appears to have negatively affected fitness. Despite estimates of small genetic effective population size, the White-tailed Sabrewing population appears stable or slightly increasing as evidenced by demographic census data. Although not statistically significant, the distribution of private alleles and individual movement patterns suggest an early onset of population stratification. Further we found evidence of a single immigration event from an as yet unsampled population, an occurrence which could have a future ameliorating effect on any potential fitness issues. These findings emphasize a need for complementary genetic and field research to inform wildlife management planning. CO13: Fri, 11 Mar 8:45

Eileen M. Kirsch and Brian R. Gray, USGS Upper Midwest Environmental Sciences Center, La Crosse, WI 54603, and Sherwin Toribio, Mathematics Dept., Univ. Wisconsin-La Crosse, La Crosse, WI 54601.

Possible effects of an invasive plant, reed canary grass (*Phalaris arundinacea*), on the breeding bird assemblage in Upper Mississippi River floodplain forest.

The Upper Mississippi River (UMR) is a Globally Important Bird Area but floodplain forests of the UMR and conditions that maintain abundant and diverse bird communities are threatened. Altered hydrology and encroachment by invasive plant species, especially reed canary grass (*Phalaris arundinacea*), are affecting regeneration, tree species composition, age, and structural diversity of the forest. We examined *Phalaris* distribution and if breeding bird assemblages differed in areas with *Phalaris* or native plant species ground cover. This study was conducted on the UMR between Hastings and Red Wing, MN in 2008. *Phalaris* was found throughout the study area including in forest interiors. Bird assemblages in sample sites with low basal area and high *Phalaris* cover clearly differed from those in other sites in the study area. Occupancy and relative abundance of several species were related to *Phalaris* cover. Common Yellowthroat, Black-capped Chickadee, and Grey Catbird were favored in sites with high *Phalaris* cover. Abundance or occupancy of American Redstart, Great Crested Flycatcher, Prothonotary Warbler, Baltimore Oriole, and Red-bellied Woodpeckers were reduced in sites with greater *Phalaris* cover. Bird diversity and overall abundance in sites with high *Phalaris* cover was not appreciably different than diversity and abundance for sites with little or no *Phalaris*. These results suggest how

the bird assemblage may shift as the forest canopy becomes more open and *Phalaris* dominates the ground cover. CO31: Sat, 12 Mar 14:30

Jessica A Klassen, Florida Atlantic Univ., Pembroke Pines, FL 33026.

[S]Canopy characteristics affecting avian reproductive success: the Golden-cheeked Warbler.

The Golden-cheeked Warbler (*Dendroica chrysoparia*) is a Neotropical migrant songbird that breeds exclusively in mature juniper-oak (*Juniperus-Quercus*) woodlands in central Texas. In 1990, the U.S. Fish and Wildlife Service listed the Golden-cheeked Warbler as endangered, providing habitat loss as justification. Whereas the majority of research has focused on areas in the center of the breeding range, little is known about interactions between warblers and the environment at the edge of the range. I investigated relationships between Golden-cheeked Warbler reproductive success and habitat characteristics, including canopy closure and tree species composition, at the study site and territory scale in the southwest corner of the breeding range. I derived habitat characteristics from the US Geological Survey National Land Cover Dataset and from field sampling. I determined reproductive success by nest monitoring and the Vickery index when I could not locate nests. I monitored 80 territories across six study sites in 2009 and 2010. Reproductive success was 39.5% in 2009 and 59.4% in 2010. I found statistically significant results at the study site scale, whereas Golden-cheeked Warbler abundance increased as the portion of woodland increased ($P = 0.001$), and reproductive success increased as canopy closure increased ($P = 0.034$). I did not find correlations between reproductive success and canopy closure or tree species composition at the territory scale. Results suggest that Golden-cheeked Warblers utilize a wider variety of habitat composition than previously thought, and habitat composition as a whole may not be the driving factors influencing warbler reproductive success in this region. CO21: Fri, 11 Mar 16:00

Robert W. Klaver, USGS/EROS, Sioux Falls, SD, Douglas Backlund, South Dakota Game, Fish, and Parks, Pierre, SD, Paul E. Bartelt, Waldorf Coll., Forest City, IA, Michael G. Eriscksson, South Dakota Dept. Environment and Natural Resources, Pierre, SD, Craig J. Knowles and Pamela R. Knowles, Fauna West Wildlife Consultants, Townsend, MT, and Michael C. Wimberly, South Dakota State Univ., Brookings, SD.

Spatial analysis of Northern Goshawk territories in the Black Hills, South Dakota.

The Northern Goshawk (*Accipiter gentilis*) is the largest of the 3 North America accipiter species and is more closely associated with older forests than the other species. This relationship of Northern Goshawks to older forest has resulted in concern about the species, extensive research into their habitat relationships, and litigation. Our objective was to examine the spatial patterns of Goshawk territories in the Black Hills, South Dakota in order to make inferences about the underlying processes. We used a modification of Ripley's K function which accounts for inhomogeneous intensity to determine whether territoriality or habitat determined spacing of Goshawks in the Black Hills. If there was evidence of significant repulsion after controlling for variation in vegetation characteristics, we would conclude that territoriality determined spacing of Goshawks. Otherwise, we would conclude that vegetation characteristics were the primary influence on Goshawk distributions. Our analysis indicated that locations of Goshawk territories in the Black Hills were determined by habitat conditions rather than territoriality. A spatial model incorporating stand basal area, crown canopy cover, age of trees > 23 cm, trees/ha, and geographic coordinates provided good prediction of territories. There was no indication of repulsion at close distances that would have indicated spacing was determined by Goshawk territoriality. These findings were in contrast to spacing of Goshawk territories on the Kaibab Plateau, Arizona. On the Kaibab Plateau, territories were constrained by the availability of high potential habitat within spaces defined by neighboring territories; habitat was not limited rather territoriality set the upper limit to the nesting population. Our findings have important implications for interspecific predation and competition and nest stand protection. CO20: Fri, 11 Mar 15:00

Mary E. Kornegay and Jaime A. Collazo, USGS North Carolina Cooperative Fish and Wildlife Research Unit, North Carolina State Univ., Raleigh, NC 27695, Stephen J. Dinsmore, Dept. Natural Resource Ecology & Management, Iowa State Univ., Ames, IA 50011, and James F. Saracco, Inst. Bird Populations, Point Reyes Station, CA 94956.

[S]Testing assumptions underlying estimates of breeding productivity derived from mist netting data.

Estimates of breeding productivity from mist netting data, derived by dividing seasonal tallies of juvenile birds by adult birds, assume that age-specific capture-recapture rates are similar and that temporary emigration is not severe. We designed a study to test these assumptions in 2009-2010 in Guánica State Forest, Puerto Rico. Estimates of temporary emigration from mist netting data for our focal species, Bananaquit, Adelaide's Warbler, and Puerto Rican Bullfinch, were high (0.65-0.92). Capture-recapture rates were similar between age classes for the Adelaide's Warbler and Puerto Rican Bullfinch, but not for the Bananaquit. Telemetry results also indicated

that 58-75% of individuals were detected in the study area on days when nets were operated, and so were available for capture in the study area. Home range estimates for individuals of all three species encompassed mist netting stations, further supporting their availability for capture. However, analyses of capture data strongly suggested that birds were not available for recapture and possibly avoided nets after initial capture. These results suggest that estimates of breeding productivity based on unadjusted capture data can be strongly biased. Use of seasonally adjusted estimates of age-specific population size might be an alternative. If the latter is used as a basis for an index, it is necessary to: 1) define the spatial extent over which inferences about population size derived from nets apply, 2) establish the relationship between net-derived population estimates and true population size, and 3) validate net-derived breeding productivity estimates with estimates derived from field studies. PO3: 28

Gary L. Krapu, USGS Northern Prairie Wildlife Research Center, Jamestown, ND 58401.

Sandhill Cranes and the Platte River: a local and global perspective.

The Midcontinent Population (MCP) of sandhill cranes (*Grus canadensis*) is the largest and most wide ranging population of cranes in the world with major breeding grounds located on 2 continents and 3 nations. Virtually all of the 600,000 cranes in the MCP stop for varying lengths of time along the Platte and North Platte rivers in early spring, creating a unique spectacle. I examine underlying factors that have led to development of this exceptionally strong spring staging tradition in the Platte Valley, describe temporal and spatial aspects of use by each subpopulation, and evaluate the significance of this annual stopover to the MCP. Cranes have successfully adapted to massive habitat change in the Platte Valley over the past 70 years and continue to be challenged by new developments which I will address. Aided by new technology, I follow the cranes from when they depart from the Platte to their return the following spring identifying important stopovers, major breeding grounds and wintering areas, along with key habitat resources supporting the MCP. My research has documented a much larger number and wider breeding distribution in sandhill cranes in northern Russia than previously thought and I describe a 2009 expedition that led to the discovery of the species breeding westward to near the Lena River Delta. Although the trajectory of MCP growth over the past 70 years reflects a major conservation success story, climate change, energy development, and intensification of agriculture could pose potential long-term threats to the population which I will discuss. PL2: Fri, 11 Mar 13:00

Eunbi Kwon and Brett K. Sandercock, Division of Biology, Kansas State Univ., Manhattan, KS 66506.

[S]Age-specific demography and population dynamics of the Western Sandpiper, *Calidris mauri*.

Variation in avian breeding performance often shows an increase in reproductive output among younger age-classes. Age at maturity in migratory shorebirds is often delayed, with subadults remaining at nonbreeding sites for one or more years, which can induce age-specific variance in fecundity. In this study, we examined how the age-specific demography affects the population dynamics of a long-distance migratory shorebird, the Western Sandpiper (*Calidris mauri*). We estimated fecundity for each of three age-classes from a 1-year study in western Alaska: yearlings identified by plumage (N = 11), newly marked adults (N = 35), and old adults (N = 24). Sandpipers showed evidence of assortative mating by age, where yearling females were more likely to mate with yearling males. Female Western Sandpipers showed changes in timing of laying which resulted in greater breeding success of old adults than that of new adults and yearlings. Fecundity rate increased across the three age-classes and was 2.07\pm0.07 (95% CI: 0.74-3.08) offspring per female among yearlings, 2.93\pm0.05 (95% CI: 2.03-4.03) in newly marked adults, and 3.66\pm0.04 (95% CI: 2.69-4.52) for older adults. We built a post-breeding life-cycle diagram and an age-structured population projection matrix. Survival rates have greater impact on changes of population growth than fecundity rates, and the fecundity and survival of adult breeders would have the greatest impact on É… We use our model to identify current gaps in knowledge and as a framework for understanding the potential impacts of environmental change in the arctic. PO3: 29

Linda A. Lait and Theresa M. Burg, Dept. Biology, Univ. Lethbridge, Lethbridge, AB T1K 3M4, Canada.

Postglacial recolonisation patterns of the Chestnut-Backed Chickadee (*Poecile rufescens*).

The current population structure of high-latitude species in North America is driven by the way in which they survived the last glacial maximum – the population size, number of refugia used and postglacial colonisation patterns. Multiple refugia were known to exist south of the ice sheets and in Beringia in the north-west. Fossil evidence suggests additional western glacial refugia both on or near the Queen Charlotte Islands and in northern Idaho. The chestnut-backed chickadee is a small songbird found in Western North America. It has a linear distribution along the coast, as well as an isolated interior population. This distribution coincides with the presence of a mesic cedar-hemlock rainforest and includes multiple identified and putative glacial refugia. PO9: 63

Linda A. Lait and Theresa M. Burg, Dept. Biology, Univ. Lethbridge, Lethbridge, AB T1K 3M4, Canada.

[S]The genetic makeup of the Boreal Chickadee: using mtDNA and microsatellites to discern the population structure of a small boreal songbird.

During the Wisconsin glaciation, the Laurentide and Cordilleran ice-sheets covered much of North America. As a result, both plants and animals were forced to move to ice-free regions (refugia) in order to survive. Two large refugia are known to have existed – one south of the ice sheets, and one in Beringia in western Alaska. Evidence supports a number of smaller, putative refugia on both the east and west coasts of North America. The current population structure of North American species is heavily influenced by the Pleistocene glaciation and the way in which these species recolonized as the ice sheets receded. The boreal chickadee (*Poecile hudsonicus*) is a small passerine which resides in the boreal forests of Canada and the northern United States, an area almost entirely glaciated during the last glacial maximum. In order to study their postglacial expansion, and how physical barriers such as mountain ranges and large bodies of water may have affected their population makeup, we evaluated mitochondrial sequences and microsatellites (N = 275) covering all of the chickadees' range. The mitochondrial sequence data support an east/west split, with the populations in the center containing haplotypes from both coasts. Both the mitochondrial and nuclear markers support the separation of Newfoundland from the mainland, perhaps as a refugial population, however, the lower genetic diversity makes it an unlikely source for expansion. Alaska Fairbanks has a high haplotype diversity, suggesting it may have been a source population. Both Newfoundland and Alaska Fairbanks are thought to have acted as glacial refugia. CO3: Thu, 10 Mar 10:30

Diane V. Landoll, Michael S. Husak, Michael T. Murphy, Dept. Biology, Portland State Univ., Portland, OR 97207; and Jeff Kelly; Dept. Zoology, Univ. Oklahoma, Oklahoma Biological Survey, Norman, OK 73019; Dept. Biological Sciences, Cameron Univ., Lawton, OK 73505; Dept. Zoology, Univ. Oklahoma, Oklahoma Biological Survey, Norman, OK 73019.

[S]Extra-pair paternity and morphological correlates in the Scissor-tailed Flycatcher (*Tyrannus forficatus*) in southwestern Oklahoma.

Molecular paternity data suggest that social monogamy rarely reflects the actual state of mating systems in passerine birds. It has also been suggested that rates of extra-pair paternity (EPP) in sexually dimorphic species should be higher than in monomorphic species. We investigated rates of EPP in a sexually dimorphic species, the Scissor-tailed Flycatcher (*Tyrannus forficatus*), using microsatellite paternity analysis. We also measured standard morphological characteristics to examine relationships between EPP and male and female morphology. We found that EPP rates in Scissor-tailed Flycatchers are among the highest measured in socially monogamous passerines. Of 26 nests, 76.9% contained extra-pair young (EPY) and 53.1% of nestlings were extra-pair. Males that retained all paternity in their nest had more symmetrical tails ($P = 0.037$), measured as the difference in left and right outer rectrix length, than cuckolded males. Females with extra-pair mates tended to have more symmetrical tails ($P = 0.068$) than those with only a single mate. For social fathers, the proportion of within-pair young (WPY) was related to tail length ($P = 0.081$) and tail symmetry ($P = 0.047$). The proportion of EPY had no relationship with social male morphology. The proportions of WPY and EPY were unrelated to female morphology. Extra-pair males were heavier than social males ($P = 0.05$, $N = 6$). It has been hypothesized that tail length is an important part of mate choice in this species due to its exaggerated length in some individuals; our data suggest that symmetry and body size are more important in retaining paternity and gaining extra-pair matings. CO5: Thu, 10 Mar 14:45

Allison Karlien Lang and Eric K. Bollinger, Biological Sciences Dept, Eastern Illinois Univ., Charleston, IL 61920.

[S]The effect of host to parasite egg ratio on cowbird egg ejection by American Robins.

The Brown-headed Cowbirds' (*Molothrus ater*) nesting behavior known as "nest parasitism" refers to the practice of laying eggs in the nests of other birds rather than in a nest they build themselves. This system has been studied extensively, and many species of host birds have been categorized as either cowbird egg-ejectors or egg-acceptors. American Robins (*Turdus migratorius*) have been repeatedly categorized as cowbird egg-ejectors: when parasitized by a cowbird, a robin will remove the foreign egg from its nest. This study addresses the mechanism by which American Robins recognize which egg(s) to eject. Varying host-to-parasite egg ratios were created in naturally occurring robin nests by adding artificial cowbird eggs or removing American Robin eggs. In 32 nests sampled, robins ejected all artificial cowbird eggs, excluding 4 nests in which robin eggs hatched prior to ejection. On average, ejection took place within one day of manipulation and the host-to-parasite egg ratio had no significant effect on the latency to ejection. This suggests that American Robins can recognize their own eggs and successfully eject eggs they determine to be foreign. Future directions include the use of a remote video recording system to observe details of the egg ejection behavior of American Robins. CO22: Fri, 11 Mar 16:00

K. M. Langin, Dept. Biology, Colorado State Univ., Fort Collins, CO 80523, T. S. Sillett, Smithsonian Migratory Bird Center, National Zoological Park, Washington, DC 20013, W. C. Funk, Dept. Biology, Colorado State Univ., Fort Collins, CO 80523, S. A. Morrison, The Nature Conservancy, San Francisco, CA 94105, and C. K. Ghalambor, Dept. Biology, Colorado State Univ., Fort Collins, CO 80523.

[S]Morphological and genetic divergence in the Island Scrub-Jay: local adaptation within a single-island endemic?

Divergent selection is considered to be the main driver of avian divergence between island and mainland populations. Examples of within-island divergence are much more rare. In mobile taxa like birds, that rarity is generally attributed to high levels of gene flow, which can constrain local adaptation – especially at small spatial scales. However, recent theoretical and empirical work suggests that populations can evolve divergent phenotypes despite substantial gene flow. We tested for local adaptation in the Island Scrub-Jay (*Aphelocoma insularis*), a species that is confined to a single 250 km^2 island and is the most range-restricted bird in North America. Previous work on mainland species of *Aphelocoma* jays has documented local adaptation in bill morphology associated with divergent feeding requirements in oak and pine habitats. Our data are consistent with those patterns and have revealed habitat-related variation in bill morphology at remarkably small spatial scales (< 5 km), as jays in all three of the island's pine stands had longer bills than jays in adjacent oak habitat. Surprisingly, our preliminary microsatellite data have also detected spatial genetic structure – and hence limited gene flow – between populations connected by contiguous habitat. Taken together, our results provide a rare example of small-scale morphological and genetic divergence across the geographic range of a bird species with no pronounced physical barriers to dispersal. CO11: Fri, 11 Mar 9:15

Carly N. Lapin, Matthew A. Etterson, and Gerald J. Niemi, Depts. Biology and Integrated Biosciences and Natural Resources Research Inst., Univ. Minnesota, Duluth, Minnesota 55812.

Breeding habitat of the rare Connecticut Warbler (*Oporornis agilis*) is related to patch size.

The Connecticut Warbler (*Oporornis agilis*) is a rare and declining Neotropical migrant that breeds in the north-central United States and south-central Canada. To better understand the habitat needs of this species, we analysed habitat and landscape at three spatial scales (buffer radii of 100 m, 500 m, and 1,000 m) using 369 observations of Connecticut Warblers in 18 years among 86 sites in 28 forest stands of northern Minnesota. We regressed combinations of habitat variables with two response variables, Connecticut Warbler abundance (the total number ever recorded at a site or stand) and Connecticut Warbler frequency (the number of years recorded out of 18 years) using a zero-inflated negative binomial distribution and logistic regression, respectively. A subset of models with $\Delta AICc \leq 4.0$ was retained and model-averaged predictions were calculated for each combination of buffer size and response variable. When comparing model-averaged predictions to observed data, the best models were those using Connecticut Warbler frequency at the 1,000 m buffer ($r^2 = 0.52$). At the 1,000 m scale, Connecticut Warblers were positively associated with a combination of large patches of upland coniferous and lowland black spruce forest, and were negatively associated with upland deciduous forest. These models were used to create a map of predicted Connecticut Warbler breeding habitat among the areas sampled in northern Minnesota. CO12: Fri, 11 Mar 8:45

Adrienne J. Leppold and Rebecca L. Holberton, PhD. Univ. Maine, Orono, ME 04469.

[S]The Gulf of Maine migration mystery: filling in the gaps.

Data collected from radar, ceilometry, and mist-netting studies in the 60's and 70's provided us with ample evidence that birds migrate through the Gulf of Maine region during both spring and fall. However, these studies were conducted at the northern and southern reaches of the Gulf with little information about migration timing and intensity, key flyway and stopover locations throughout the region, and the species of birds using them. In fall 2009, a collaborative banding study by the USFWS, University of Maine, and National Audubon revealed a major but previously undocumented flyway for an estimated 1/4 - 1/2 million songbirds over a small area in mid-coast Maine. With recent pressure on inland, coastal, and island sites in the Gulf of Maine region for energy-related development projects, the need for a better understanding of how migrants use the region's topography is especially timely. Here, we will discuss how this flyway discovery led to the formation of the Northeast Regional Migration Monitoring Network (NRMMN) comprising multiple state and federal agencies, academic institutions, and NGO's and the expansion of monitoring efforts in 2010 to include banding, ground censusing, surveillance radar, passive acoustic monitoring, and sampling of individual birds for isotope signatures, etc. This unprecedented coordination of monitoring techniques resulted in documenting higher densities of birds through mid-coast Maine than reported at other long term monitoring sites in the Northeast. We will summarize these unexpected findings and highlight their importance in the context of the increased development pressure in the region. CO27: Sat, 12 Mar 9:15

Iris I. Levin and Patricia G. Parker, Dept. Biology, Univ. Missouri - St. Louis and Whitney R. Harris World Ecology Center, St. Louis, MO 63121 and the WildCare Center, St. Louis Zoo, St. Louis, MO 63110.

[S]A tale of two seabirds: population genetics of Galapagos Great Frigatebirds (*Fregata minor*) and Nazca Boobies (*Sula granti*).

Seabirds are considered highly mobile, able to fly great distances with few apparent barriers to dispersal. However, it is often the case that seabird populations show strong population differentiation despite their potential vagility, indicating that habitat preference, natal philopatry or mate choice may present non-geographic barriers to dispersal. We studied the population genetics of two resident Galapagos seabirds: the pan-tropical Great Frigatebird (*Fregata minor*) and the endemic Nazca Booby (*Sula granti*). Using 8 microsatellite loci per species and F-statistic and Bayesian analyses, we were able to understand patterns of gene flow throughout the Galapagos archipelago. Despite very short natal dispersal distances (10-100m) in the Nazca Booby, we found no (or weak) evidence for population genetic structure within the archipelago in either seabird species. This has important implications for the spread of pathogens and parasites throughout the archipelago, as birds appear to be moving between colonies more than one might expect based on natal dispersal alone. CO3: Thu, 10 Mar 11:30

Fang-Yee Lin, Dept. Fisheries and Wildlife Science, Virginia Polytechnic Inst. and State Univ., VA 24040, Pei-Fen Lee, Dept. Ecology and Evolutionary Biology, National Taiwan Univ., Taiwan 100, and Dean Stauffer, Dept. Fisheries and Wildlife Science, Virginia Polytechnic Inst. and State Univ., VA 24040.

[S]To assess avian assemblage responses to 100-year lowland forest isolation in Taiwan.

We estimated avian assemblage responses to 100-year lowland forest isolation in Taiwan, a subtropical island with abundant avian biodiversity. We hypothesized that isolation caused by urbanization and agricultural developments may hinder the dispersal of some forest species to cross open-field matrix from source to forest islands, reducing the rescue effect to cause local population extinction when the habitat is going degraded. We identified isolated forests with satellite imagery first, and then set several continuous forests as control groups. We sampled three to four transects (total N = 27) at each isolated forest and its control group to record presence/absence of forest-dwelling birds. We found there is distinct difference of avian communities between isolated and continuous forests. There is lower Simpson diversity index and species richness at isolated forests. In addition, forest generalists are more dominant than forest specialists that are prone to avoid open-field matrix at isolated forests. And then we used variance decomposition technique to identify the relative effects of factors at physical-level, connectivity-level, and landscape-level on determining the community structures of birds in our study areas. Our results showed that connectivity-level factors are the most influential ones to explain the variance of avian communities (14.905%), although landscape-level factors also play a role (10.052%). We suggested we should pay attention to improve structural connectivity as well as habitat quality for island-wide conservation of avian biodiversity in Taiwan. PO2: 16

M. P. Lombardo, M. Baiz, K. Bibby, L. Bol, L. Hightower, R. McLaughlin, D. Near, and L. Spadacene, Dept. Biology, Grand Valley State Univ., Allendale, MI 49401.

Sex differences in parental anti-predator responses during the nestling period in Tree Swallows.

Parental effort influences the survival of nestling birds. Previous research demonstrated that the patterns of parental effort differed between the sexes in Tree Swallows. We examined sex differences in parental responses to a potential human predator in 2009, and to a mounted raccoon model in 2010, during both the first and second halves of the nestling period. During each trial we recorded the number of attacks by each parent, brood size, weather conditions, and time of day. Parents treated the human and model raccoon predator the same. There was no significant difference in the number of attacks made by males and females, but both sexes attacked more frequently during the second half of the nestling period. Females attacked consistently across the 5 min observation periods while males did not. Females that attacked often during the first half of the nestling period also did so in the second half. Males did not show this pattern. Parental nest defense efforts did not appear to be coordinated and the sexes differed in nest defense efforts relative to mate presence. Male nest defense efforts may be related to physical quality as estimated by the number of louse holes in their wings and tails. The attack rates of individuals were not repeatable between years. Attack rates were not influenced by brood size, weather conditions, or time of day. These results suggest that while both adults increased defense as nestlings got older, male and female patterns differed. CO29: Sat, 12 Mar 11:00

Teresa J. Lorenz, Coll. of Natural Resources, Univ. Idaho, Moscow, ID 83844, and Kimberly A. Sullivan and Amanda V. Bakian, Dept. Biology, Utah State Univ., Logan, UT 84322.

[S]Spring-summer space use by Clark's Nutcrackers in Washington State.

Clark's Nutcrackers (*Nucifraga columbiana*) are important seed dispersers in western North America for several species of pine and they are coevolved mutualists for one species, whitebark pine (*Pinus albicaulis*). Despite their role as agents of reforestation there have been few formal studies of nutcracker space use. Such information is important for resource managers in the Northwestern U.S., where whitebark pine, the nutcracker's mutualistic partner, is declining. We measured spring-summer (February-August) home range size, habitat use, and forage site selection by a population of nutcrackers in Washington State. Average home range size was 1239.47 ha (SD ± 1780.24 ha, n = 20) and nutcracker home ranges contained more Douglas-fir (*Pseudotsuga menziesii*)/grand fir (*Abies grandis*) but less whitebark pine habitat (Wilks' Lambda = 0.16, F[5, 14] = 14.73, P < 0.001) compared to availability. During 3482 minutes of observation nutcrackers did not forage equally in all habitat types (χ^2 = 3183.26, P < 0.001); 2% of nutcracker foraging bouts occurred in whitebark pine habitat types, whereas 82% of foraging bouts occurred in low elevation Douglas-fir/grand fir and ponderosa pine forests. Although prior studies show that whitebark pine habitat is important in autumn, our results suggest that low elevation forest types may be more important during spring and summer for some populations. CO19: Fri, 11 Mar 14:45

Casey A. Lott, Stephen F. Railsback, Colin J.R. Sheppard, Richard A. Fischer, Stephen R. Crawford, and Douglas A. Miller, American Bird Conservancy, Boise, ID 83712.

A web-available, individual-based model for exploring Least Tern river management systems.

We developed an individual-based model of Least Tern reproduction that simulates tern population response to alternative habitat conditions, flow regimes, or management scenarios. A web-based version of the model, with an intuitive graphical user interface, allows non-expert users to investigate alternative management practices. Target users include: river managers, biologists, ornithologists, and stakeholders; anyone with interest in developing their understanding of Least Tern-management interactions on engineered rivers. Users build simulation experiments in which they vary initial conditions (e.g., habitat or flow inputs, predator intensities, tern population size) and compare model outputs (e.g., reproductive success, causes of mortality) among simulations. The model has complete observability (rather than the partial or biased observability that typifies most tern-river study systems). Similarly, experimental conditions are not limited to the observed habitat or flow conditions that occur during short term research studies. Consequently, this model provides tremendous opportunities for learning via repetitive experimentation and strong inference. Our poster will illustrate the major properties of the model (nesting sandbars, flow inputs, virtual birds and predators) and provide background on how we have developed, tested, and applied a first version of the model to learn about a specific tern-river-management system: the population of Least Terns nesting below Keystone Dam on the Arkansas River. We believe that the development of individual-based models to explore bird-management interactions, as well as web-based user interfaces that encourage widespread model exploration, is a major potential growth area in ornithology. We will run live demonstrations of the model on laptops during the poster session. PO12: 76

Peter E. Lowther, The Field Museum, Chicago, IL 60605.

Effects of periodic cicada emergence on House Sparrow breeding success.

Suburban colony of House Sparrows have been monitored since 1988. Major emergence of brood XIII of *Magicicada* spp. periodic cicadas occurred in 1990 and 2007. Adult cicadas were noted above ground for about 35 days; the peak of cicada numbers overlapped second broods of sparrows. During the presence of cicadas, sparrow nesting success was enhanced in terms of nestling mass and survivorship. Clutch size tended to be larger for the time of year; sparrow egg size remained the same. This natural experiment in providing a superabundant food source replicates Anderson (1977, Condor 79: 205-208) with essentially similar results. CO30: Sat, 12 Mar 11:00

Jennifer Ma, Stacy McNulty, and Colin Beier, Dept. Environmental and Forest Biology, State Univ. New York Coll. of Environmental Science and Forestry, Syracuse, NY 13210.

[S]Songbird richness and abundance across a gradient of terrestrial calcium availability in the Adirondack Park, New York.

We focused on the presence of songbird species to develop insight on acidification impacts in the Adirondack Park in New York. We hypothesized that higher calcium levels in the soil would attract a greater number of individuals and species, thus supporting the claim that rich calcium sites provide sanctuary for biodiversity and need to be protected. We assessed the richness and abundance of songbirds by conducting single-observer point counts in relatively high (n = 2), medium (n = 2), and low (n = 2) calcium levels from June to July 2009 in the

Central and Southern Adirondacks. We conducted 3 point counts (n = 18) in each region; each site was visited twice in one breeding season. Percent ground and canopy cover were recorded at every site as an index of habitat variation. We detected 29 species, averaging 31.8 ± 7.2 (SD) birds/point and 17.5 ± 2.4 (SD) species/point. Overall abundance was positively correlated to calcium levels ($F = 7.3$, $P < 0.01$), including two calcium-dependent species: the Black-throated Blue Warbler ($F = 3.67$, $P = 0.03 \pm 1.2$ SD) and Ovenbird ($F = 5.8$, $P < 0.01$). Overall species richness was not positively correlated to calcium levels ($F = 0.92$, $P = 0.5 \pm 2$ SD). Percent ground cover and canopy cover were not different between sites ($F = 1.87$, $P = 0.174 \pm 0.3$ SD; $F = 2.55$, $P = 0.09 \pm 0.05$ SD, respectively), indicating some habitat homogeneity among sites. These data indicate that calcium can influence the structure and relative abundance of songbird populations in the Adirondacks. However, future research with larger sample sizes encompassing a broader range of calcium availability should be considered. PO12: 77

Monika Maier and Kimberly Sullivan, Dept. Biology, Utah State Univ., Logan, UT 84322.

[S]Not just a walk in the park: Clark's Nutcracker in declining habitat.

We tested whether Clark's Nutcracker (*Nucifraga columbiana*) in GNP avoid sites with low cone density. There has been substantial loss of whitebark pine (*Pinus albicaulis*) in Glacier National Park (GNP), due to an invasive fungal pathogen. Research suggests that the unhealthy state of whitebark pine in GNP will lead to a decline in the prevalence of its primary seed disperser, Clark's Nutcracker, which could further impede whitebark pine regeneration. We visited eight "hotspots" and five "coldspots" before and during or after seed harvest in summer 2010, where we counted the total number of cones on each of five randomly selected whitebark pine trees including the number of cones showing signs of foraging by nutcrackers. We determined the density and composition of each stand. During every visit, we recorded Clark's Nutcracker sightings. Nutcrackers occurred in high- and low- density stands and in stands with both many and few cones. Time-to-sighting results indicate that nutcrackers are likely to occur in all areas of the park where whitebark pine produces cones. Areas previously designated as coldspots may not have been visited enough for people to report seeing nutcrackers there. It does not appear that Clark's Nutcrackers will be the limiting factor for whitebark pine regeneration. It took a substantial amount of time to detect a nutcracker. Surveys for nutcrackers in low-population areas will be very labor intensive. We propose using surveys of whitebark pine cones as a proxy for Clark's Nutcracker presence. CO19: Fri, 11 Mar 15:00

Mia N. Malloy and Adam J. Davis, Dept. Poultry Science, Univ. Georgia, Athens, GA, 30602.

[S]The University of Georgia Avian Biology Study Abroad Program in Costa Rica.

Students enrolled in the College of Agricultural and Environmental Sciences at the University of Georgia traditionally had not participated in study abroad programs at rate similar to the rest of the student body at the University. This lack of study abroad involvement by students in the College was related to the shortage of study abroad opportunities with content geared towards them. Therefore, an Avian Biology Study Abroad Program was created in 2008 to complement and enhance the avian biology major. Costa Rica was chosen as the destination for the program because it has many diverse but distinct ecosystems that allow over 850 species of birds to thrive in this small country. The developed program takes full advantage of this relatively small geographical area in order to illustrate to students the incredible array of physiological and anatomical adaptations as well as nutritional strategies that the bird species of Costa Rica have to limit their competition with one another. By examining and analyzing the natural habitats and evolutionary adaptations of avian species in coastal, forest (rain, cloud and tropical dry) and the lowland regions of Costa Rica, student participants see over 300 species of birds, as well as a diverse array of mammals, insects and plants. Student enrollment has been at the maximum from year one. By the end of the program, students have honed their bird identification skills, reinforced principles learned in the classroom through field observation and gained respect for Costa Rican culture and the need to preserve natural resources. PO12: 75

Kristen Martin and Nicola Koper, Natural Resources Institute, Univ. Manitoba, Winnipeg, MB R3T 2N2, Canada.

[S]Detection of Yellow Rail, *Coturnicops noveboracensis*, using multiple-visit, call-broadcast surveys.

Yellow Rail (*Coturnicops noveboracensis*) is a species of conservation concern in the United States and Canada as a result of population declines throughout its range, likely associated with wetland habitat loss. To survey for secretive wetland bird species such as Yellow Rail, it is often recommended that multiple-visit, call-broadcast surveys be used to maximize detection. However, little is known about the effectiveness of these survey methods for Yellow Rail. We conducted Yellow Rail surveys at 109 points within 44 wetlands in south-central Manitoba, Canada in May-July 2010. Each survey consisted of an initial passive listening period followed by a Yellow Rail call-broadcast period. We surveyed each point twice: once between 23 May to 15 June, and again between 16

June to 5 July. Over the two rounds of surveys, the use of call-broadcast increased the number of Yellow Rails detected by 12.1%. The use of a second survey visit resulted in a 26.3% increase in the number of wetlands at which Yellow Rails were detected. Overall, Yellow Rails were detected at 54.5% of the 44 wetlands surveyed. Using occupancy estimation modeling, Yellow Rail detection probability was found to be 0.63 (95% CI = 0.44 to 0.82). Accounting for this imperfect detection probability, it was estimated that the true rate of site occupancy was 63.3%, a 16% increase over the naïve site occupancy rate. Future studies evaluating Yellow Rail distribution or habitat suitability should employ multiple-visit, call-broadcast surveys to maximize detection and increase survey accuracy. PO11: 70

John P. McCarty, Dept. Biology, Univ. Nebraska at Omaha, Omaha, NE 68182, Joel G. Jorgensen, Nebraska Game and Parks Commission, Lincoln, NE 68503, and L. LaReesa Wolfenbarger, Univ. Nebraska at Omaha, Omaha, NE 68182.

Buff-breasted Sandpiper (*Tryngites subruficollis*) use of agricultural fields in the Rainwater Basin, Nebraska, and implications for conservation.

The Buff-breasted Sandpiper is a trans-continental migrant shorebird of high conservation concern that migrates from central South America to the Arctic each spring and fall. Until recently, the species' migration through midcontinental North America was poorly understood. Since 1997, we have studied migratory shorebirds in the Rainwater Basin (RWB), Nebraska. Our research started as an informal inventory of migratory species that identified how migratory shorebirds, including the Buff-breasted Sandpiper, were using the region's agricultural fields during stopover. Further research showed that a large proportion of the Buff-breasted Sandpiper's world population used RWB agricultural fields during spring migration and preferred fields that had been planted with soybeans the previous year. Results from capturing and radiotagging showed that Buff-breasted Sandpiper had high fat loads when captured and suggested that an individual bird's stopover may be brief, less than a few days. Buff-breasted sandpipers spent the majority of their time foraging in agricultural field and visited wetlands to bathe, preen, and engage in social interactions. Our results show that agricultural fields serve as pivotal stopover habitat for the Buff-breasted Sandpiper and other migratory shorebird species. Whether agricultural habitats serve as a suitable replacement to native habitats and are compatible with the species' and its conservation is yet to be determined. S3: Fri, 11 Mar 9:45

Katherine McCarville, Upper Iowa Univ., Fayette, IA 52142.

A new interpretation for the classical avian fossil locality at Fossil Lake, Oregon.

The locality at Fossil Lake, Oregon, contains thousands of specimens from many taxa including abundant avian remains that may be pertinent to Neogene avian evolution and adaptation to climate change in North America. However, full realization of the potential significance of the locality rests on successfully resolving the longstanding controversy regarding its age. A new and extensive collection from Fossil Lake has been made by the South Dakota School of Mines and Technology Museum of Geology. The large number of specimens and the unusual degree of stratigraphic and spatial control imposed by the collecting methodology provide an unparalleled opportunity to study this historically well-known locality. CO6: Thu, 10 Mar 15:15

Chris McCreedy and Charles van Riper, School of Natural Resources, Univ. Arizona, Tucson, AZ 85705.

[S]Drought-delay impacts on Black-tailed Gnatcatcher *Polioptila melanura* and Verdin *Auriparus flaviceps* productivity in the Sonoran Desert.

From 2004 to 2009, we found first egg dates to be negatively correlated with winter precipitation for all species monitored (N = 14) in Sonoran Desert xeric riparian wash habitats in southeastern California and western Arizona. Nest initiation was delayed for three to four weeks for several species during the droughts of 2006 and 2007, and nest success was strongly correlated with winter precipitation for several species. We tested three competing hypotheses (food limitation, depredation, and parasitism) by delaying first egg dates during a wet winter (2010) for 47 pairs of Black-tailed Gnatcatchers (*Polipotila melanura*) and 60 pairs of Verdins (*Auriparus flaviceps*) for three weeks, to match first egg dates recorded during droughts in 2006 and 2007. Black-tailed Gnatcatcher control pairs' first nests had significantly higher nest success than treatment pairs' first nests. Over the entire season, treatment pairs for both species experienced low productivity (measured by fledges/female) akin to rates recorded during droughts. While drought-caused delay in egg-laying may be ultimately caused by food limitation's effects on body condition, higher depredation rates (Verdin) and both higher parasitism and depredation rates (Black-tailed Gnatcatchers) experienced by delayed pairs result in low productivity during drought. CO4: Thu, 10 Mar 11:00

David B. McDonald and Dai Shizuka, Dept. Zoology, Univ. Wyoming, Laramie WY 82071.

A social network approach to dominance.

Dominance interactions can affect almost every aspect of a bird's future. Traditional approaches to analyzing dominance have tended to rely on complex, sometimes nearly impenetrable algorithms that are difficult to implement and that are rarely useful for addressing other questions. In the simpler traditional approaches, wins and losses count equally, regardless of the identity or history of the winner and loser. We propose a social network approach that has at least four major advantages: 1) fairly straightforward implementation using well-established algorithms for which software implementation already exists (e.g., open-source R codes); 2) once the data are in social network form, a multitude of other, unrelated questions are easily addressed (e.g., is the social order fairly linear and transitive, or do many intransitive a-beats-b-beats-c but c-beats-a cycles exist? Are more interactive birds likely to be winners or losers?); 3) because social network approaches explicitly include indirect as well as direct interactions, they can take proper account of who beats whom (e.g., did the winner beat a high roller or a wimp?). 4) As the dominance matrix fills in over time, one can address additional questions such as the importance of winner effects, audience effects and avoidance. Examples from published data sets and unpublished data on interactions among lek-mating Long-tailed Manakins suggest that dominance rankings based on social network paths are intuitively pleasing and have a well-grounded quantitative interpretation. Bring your datasets. CO29: Sat, 12 Mar 11:45

Bailey D. McKay, Herman L. Mays, Yuchun Wu, Hui Li, Yao Cheng-te, Isao Nishiumi, and Fasheng Zou, Univ. Minnesota and Bell Museum, Saint Paul, MN 55108.

[S]The challenge of delimiting recent lineages: the Chinese/Taiwan Bulbul (*Pycnonotus sinensis/taivanus*) complex as a case study.

Historical lineages are widely regarded as important components of biological diversity that should be preserved through conservation action. Generally, historical lineages are identified using neutral genetic markers, such as mitochondrial DNA sequences. However, neutral markers are "lagging" indicators of evolutionary divergence, so neutral markers are expected to be poor indicators of lineage boundaries when divergence is recent. In this study, we used neutral genetic characters in conjunction with plumage characters to delimit recently evolved lineages within the Chinese/Taiwan Bulbul (*Pycnonotus sinensis*/*taivanus*) complex. The Chinese Bulbul consists of four subspecies distributed in south China, western Taiwan, and the southern Ryukyu islands; the Taiwan Bulbul is monotypic and endemic to southeast Taiwan. Fixed plumage differences identified three lineages: *sinensis/formosae/orii*, *hainanus*, and *taivanus*. In contrast, fixed genetic differences identified two lineages: *sinensis/hainanus* and *formosae/taivanus/orii*. Discord between genetic and plumage characters can be explained by selection on the plumage characters driving them to fixation faster than the neutral genetic markers, which are lagging indicators of divergence. In all, four lineages (*sinensis, hainanus, formosae/orii*, and *taivanus*) can be identified using a combination of plumage and genetic characters. We tested the validity of these four lineages with 13 nuclear intron sequences and found that grouping individuals in this arrangement maximized the likelihood of species tree estimation and was a significantly better fit to the nuclear data than any alternative arrangement. We suggest these four lineages, whether they are called species or subspecies, are the proper units for future evolutionary studies, classifications, or conservation efforts. We conclude that mitochondrial DNA or any other neutral maker is insufficient alone to identify historical lineages. Characters under selection, such as plumage characters, are likely to be more informative when divergence is recent. CO11: Fri, 11 Mar 9:45

Matt McKim-Louder and Jeffrey P. Hoover, Dept. Natural Resources and Environmental Sciences, Univ. Illinois, Champaign, IL, and Inst. Natural Resource Sustainability, Illinois Natural History Survey, Champaign, IL.

[S]Assessing the effects of season, brood parasitism, and individual quality on first-year apparent survival in a Neotropical migratory songbird.

Survival and local recruitment are among the most important demographic parameters in population ecology. However, because first-year (i.e. 1-year-old) migrants are thought to return to breed at great distances from their natal location, the factors that influence variability in first-year survival have not been thoroughly investigated in migratory songbirds. To identify the factors that affect survival between fledging and the first breeding attempt of migratory songbirds, we used information gathered from a large (4,875 ha) Prothonotary Warbler (*Protonotaria citrea*) nest box study system in which we had previously documented patterns of short-distance natal dispersal. Using mark-recapture methods, we investigated the effects of season (fledging date), presence of a cowbird nestmate, brood size (number of warbler nestlings in the brood), and nestling body condition on the apparent survival of juvenile warblers. Incorporating natal dispersal distance into a multistate model framework, we accounted for variation in detection and transition probabilities, to estimate the effect of covariates on apparent survival. We analyzed the encounter histories of 6,093 warbler nestlings that fledged between 2004 and 2009 and

used AIC for model selection. Overall, first-year apparent survival declined with fledging date (20 May = 0.19; 20 July = 0.04) and was lower when a cowbird nestmate was present. There was limited support for an increase in apparent survival of individual nestlings with improved body condition. To date, this is the first study to demonstrate the importance of season, brood parasitism and nestling condition on first-year survival and local recruitment in a migratory passerine. CO22: Fri, 11 Mar 16:15

David Mehlman, USFS Center for Bottomland Hardwoods Research, Stoneville, MS 38776.

Roost site of Vervain Hummingbird (*Mellisuga minima*) discovered.

Roost site selection is an overlooked aspect of avian ecology; roosts are devilishly difficult to find. Observation of a roost site of a male Vervain Hummingbird raises questions about the selection process employed by hummingbirds in relation to thermoregulatory and predation avoidance needs of roosting hummingbirds. PO5: 38

Cassandra L. Mehls and Kent C. Jensen, Dept. Wildlife and Fisheries Sciences, South Dakota State Univ., Brookings, SD, Mark A. Rumble, Rocky Mountain Research Station, Rapid City, SD, and Michael C. Wimberly, GISc Center of Excellence, Brookings, SD.

[S]Resource selection of Ruffed Grouse in the Black Hills National Forest of South Dakota and Wyoming.

The ruffed grouse (*Bonasa umbellus*) is both a popular upland game bird as well as the management indicator species for aspen (*Populus tremuloides*) in the Black Hills National Forest. Due to this status there is a vested interest between the U.S. Forest Service and the South Dakota Department of Game, Fish and Parks to assess the populations and habitat requirements of ruffed grouse in the Black Hills. The objective of our study was to assess habitat features at multiple spatial scales that are correlated with the distribution of ruffed grouse in order to identify which are the most appropriate to manage for the species. Measurements taken from the field and using a Geographic Information System were compared between grouse locations (use) and paired random points (nonuse) (n = 32) to assess local and landscape features that contribute to the presence of ruffed grouse. At the local scales, ruffed grouse selected drumming sites located away from roads and in close proximity to aspen patches that had; >70% coverage, high stem densities and an irregular shape. At the landscape scales, ruffed grouse again were selection for aspen with >70% coverage, but also for patches of aspen in multiple structural stages that are located on average 250 meters apart from each other. Pine cover that exceeded 70% at the landscape scale had a negative influence on selection. The results of this study indicate that management efforts to increase the extent of aspen communities in the Black Hills should be encouraged to benefit ruffed grouse. CO28: Sat, 12 Mar 10:45

Melissa Meierhofer, Dept. Biology, Ripon Coll., Ripon, WI 54971.

[S]Fecal testosterone metabolites, begging behavior, and growth of Eastern Bluebird nestlings.

Testosterone is an anabolic steroid that has been found to have direct effects on developing tissue. Whether high testosterone during nestling development improves growth through direct anabolic effects, indirectly because nestlings with high testosterone beg more and get fed more often by their parents, or a combination of both factors has not been examined. Therefore, I examined the relationship between fecal testosterone concentrations, growth parameters, and begging behavior in the Eastern Bluebird. If testosterone acts directly on growth, then high testosterone should correlate with accelerated growth of nestlings while begging behavior shows no relationship. I collected fecal samples and recorded nestling mass and wing chord at 31 nest boxes on days 6, 10, and 14 after hatch from May-August 2010. Growth rates of broods were estimated for each nest box using linear regression. Maximum decibel levels and duration of begging bouts were measured from nestling vocalizations recorded on days 6 and 10 for 10-20 minutes, and no significant relationships were found between growth rates and begging behavior. However, there was a positive relationship between maximum amplitude of the vocalization and average mass of nestlings. Male and female concentrations did not differ significantly from each other (Student's $t = 2.04$, $p = 0.35$). No significant relationships were found between testosterone and growth rates. Future research needs to distinguish if both of the mechanisms, testosterone on tissue and testosterone through begging, increases growth. PO4: 34

Cathleen D. Monson, Kelly J. McKay, Robert R. Bryant, Richard A. Sayles, Walter M. Zuurdeeg, Brian P. Ritter, Shirley A. VanMeter, Jason L. Monson and Brian L. Blevins, BioEco Research and Monitoring Center, Hampton, IL 61256.

Summary and results of the Milan Bottoms Bald Eagle night roost survey project.

Human development and activities continue to increase and encroach on the floodplain habitats of the Upper Mississippi River. For example, economic development is occurring immediately adjacent to the Milan Bottoms Complex in Rock Island County, Illinois. Evidence suggests that this area functions as a major night roost

location for wintering Bald Eagles. Therefore we conducted a standardized night roost survey here during three consecutive winters (2005-2008), in order to document the importance of this site to wintering eagles. Each week, one evening and one morning survey were carried out from early December through late March (17 weeks). In 2005-2006, a total of 10,386 observations were recorded of eagles entering or exiting the night roost. Of these, 32% were adults, 36% were immatures, and 32% were unaged. In contrast, only 2,553 eagle observations were reported in 2006-2007, including 44% adults, 32% immatures, and 24% unaged. Eagle numbers increased in 2007-2008 to 6,957 observations. Among these, 39% were adults, 27% were immatures, and the remaining 34% were unaged. During the first three years of this project, the majority of night roosting eagle observations occurred in December and January, with steadily decreasing numbers in February and March, respectively. The upstream end of Milan Bottoms (i.e. the widest track of floodplain forest habitat) appears to be the most heavily utilized portion of the study area for night roosting purposes. CO20: Fri, 11 Mar 15:15

Tyler W. Moore, Dept. Biology, Hampden-Sydney Coll., Hampden-Sydney, VA 23943, Michael D. Collins, Dept. Biology, Rhodes Coll., Memphis, TN 38112, and Adrienne J. Leppold and Rebecca L. Holberton, School of Biology and Ecology, Univ. Maine, Orono, ME 04473.

[S]Differential migration of passerines during spring and fall in the Gulf of Maine (USA).

We examined data collected from Metinic Island in the Gulf of Maine during the fall 2009/2010 and spring 2010 migration seasons. We examine how age, sex, and fat score influence individual passage time among passerines. We captured a total of 5008 individuals of 97 species. In 16 of 20 species (80%), older birds tended to arrive earlier than younger birds in the spring; five species were significantly different. In contrast, we found earlier movements by younger birds in the fall in 16 of 18 species (89%); two species were significant. For 12 of 14 species (86%), males tended to arrive before females in the spring (three species differed significantly). Sexes did not differ significantly during fall passage. We found significant differences between fat score and capture date in the spring; birds with more fat tended to arrive before leaner birds in three species (American Redstart [*Setophaga ruticilla*], Black-throated Green Warbler [*Dendroica virens*], and Common Yellowthroat [*Geothlypis trichas*]). In the fall, leaner birds arrived before fatter individuals in two species (Common Yellowthroat and Myrtle Warbler [*Dendroica coronata coronata*]). Our findings indicate that, within species, individuals differ in the timing of migration based on age, sex, and fat content and that the influence of these factors differs between spring and fall migration. Selective pressures have likely caused differential migration to evolve within passerine species. PO8: 58

Robert K. Murphy and Gregory W. Wright, Dept. Biology, Univ. Nebraska-Kearney, Kearney, NE 68845, and Arun K. Pandey, EDM International, Ft. Collins, CO 80525.

Mortality of migrant Sandhill Cranes at power lines over the Platte River, central Nebraska.

During spring 2006-2009, we investigated mortality of Sandhill Cranes (*Grus canadensis*) stemming from collisions with two 69-kilovolt powerlines above a major night roost of the species on Nebraska's Platte River, and assessed effectiveness of 'Firefly' diverters in reducing collisions. Based on ground-searches for carcasses and corrections for associated biases, we estimated about 190 ± 40 cranes were killed each spring before Fireflys were installed, compared to 65 ± 20 each spring afterwards. Using binoculars and night-vision scopes, we directly observed 218 collisions by cranes with one of the powerlines as the cranes returned to their roost during 74 evenings in 2008-2009. Most collisions occurred when flocks of more than 1000 cranes suddenly flushed from their roost within 0.5 km of the powerline after dusk. About one-half of cranes that collided fell to the ground, either dead or crippled; another one-fourth exhibited hampered flight. Cranes reacted sooner to avoid the powerline with Fireflys than to unmarked powerlines in a nearby, prior study. Wires of the powerline were instrumented with bird strike indicators (BSIs) in 2009. BSI records correlated highly with observed collisions by cranes during evenings and indicated a seasonal total of 328 bird collisions with the powerline. Likely most were by cranes. Our results might suggest Fireflys reduce the likelihood that a crane will collide with powerlines at the site, but rigorous experimental design incorporating replication is needed to reliably assess and provide broader inference on effectiveness of Fireflys. BSIs should be further evaluated and incorporated into such assessments. CO16: Fri, 11 Mar 11:15

Robert K. Murphy, Div. Migratory Birds, US FWS - Southwest Region, Albuquerque, NM 87103.

Recent policy actions by the U.S. Fish and Wildlife Service on managing risks to and "take" of eagles in renewable energy landscapes

In September 2009, the U.S. Fish and Wildlife Service published a Final Rule under the Bald and Golden Eagle Protection Act authorizing permits to "take" (e.g., disturb or kill) eagles where the take is associated with but not the purpose of an otherwise lawful activity. Since then, wind energy facilities have expanded dramatically in the

core range of Golden Eagles (Aquila chrysaetos) in the western United States. Golden Eagles are particularly vulnerable to collisions with wind turbines and the documented level of take is increasing. On 18 February 2011, the Service published the Draft Eagle Conservation Plan Guidance Module 1: Wind Energy Development (Guidance) to support issuance of programmatic permits allowing limited, incidental take of eagles at wind energy facilities, provided offsetting conservation measures that meet regulatory requirements are carried out. Measures must avoid and minimize take of eagles to the maximum degree technically achievable, and any remaining take must be offset through compensatory mitigation such that the net effect on the eagle population is, at a minimum, no change. Those with interests in the biology and conservation of eagles, renewable energy development, and avian-wind energy interactions are urged to provide constructive criticism on the Guidelines during the current 90-day public comment period. This presentation is an overview of salient features of the draft Guidance, particularly its scientific underpinnings and adaptive management approach. PO11: 71

Desiree L. Narango and Amanda D. Rodewald, School of Environment and Natural Resources, Ohio State Univ., Columbus, OH.

[S]Variation in nestling provisioning behavior of urban and rural Northern Cardinals (*Cardinalis cardinalis*).

Studies of urban habitats provide a unique opportunity to evaluate behavioral consequences of novel environmental conditions. Using Northern Cardinals (*Cardinalis cardinalis*) as a model species to examine urban-associated changes in foraging behavior, we quantified provisioning rates to 5-7 day old nestlings at nests (n = 78) distributed along an urban - rural landscape gradient in Columbus, Ohio in 2010. Adults made more feeding visits per nestling in urban compared to rural forests. When controlling for urbanization, total feeding visits per nestling decreased when nests were parasitized with Brown-headed Cowbirds (*Molothrus ater*); however nests were more likely to be parasitized in urban sites. In rural sites, time males spent singing was positively associated with male feeding rates but this relationship was not found at urban sites. Female feeding rate was negatively associated with nest success in rural sites but not in urban sites. We found no evidence that male feeding rates were related to plumage color, body condition, or body size at either urban or rural sites. This preliminary work suggests that birds may use different behavioral strategies in rural and urban landscapes. Future work will look at song characteristics, plumage and the relationships between provisioning behavior and productivity over an urban gradient. PO4: 35

Mduduzi Ndlovu, Graeme Cumming and Phil Hockey, Percy FitzPatrick Institute, Univ. Cape Town, South Africa.

[S]Phenotypic flexibility in African waterfowl.

The long-term persistence of populations under climate change will depend on their ability to respond favourably to changing environments. Ducks undergo an annual flightless moult and this vulnerable moulting stage that will be strongly influenced by environmental change. To better understand the potential for fine-scale adaptation, we investigated the degree to which the body condition, organ mass (pectoral muscle, gizzard, liver and heart) and flight feather growth of Egyptian Geese *Alopochen aegyptiaca* (actually a duck) living in variable environments showed phenotypic flexibility over the c.37 days of flightless moult. We further explored the generality of our results from the Egyptian Geese study and investigated how body condition and pectoral muscle size of South African Shelduck *Tadorna cana*, Spur-winged Goose *Plectropterus gambensis* and Yellow-billed Duck *Anas undulata* change during flight-feather moult. Egyptian Geese mean body mass and condition declined at the start of moult and continued to do so until flight feathers were at least two-thirds grown. Non-moulting Egyptian geese had high pectoral muscle mass which decreased with the onset of moult but started to increase before overall body mass increased. Gizzard mass showed the opposite trend; liver mass increased throughout moult; and heart mass stayed constant. Feathers grew fastest at intermediate lengths. Moulting Spur-winged Geese and South African Shelduck showed a decline in body condition coupled with the atrophy and subsequent hypertrophy of pectoral muscles which is analogous to the phenotypic flexibility displayed in Egyptian Geese. The high degree of phenotypic flexibility suggests that they will adapt well to local change. Yellow-billed Ducks maintained a constant body condition and breast size throughout moult. Body weight and organ mass dynamics during flight feather moult vary among duck species. Each species may have evolved a moult strategy that is best suited to its own annual cycle and the environmental conditions in which it lives. CO9: Thu, 10 Mar 16:00

F. L. Newell, A. D. Rodewald, and M. H. Bakermans, School of Environment and Natural Resources, Ohio State Univ., Columbus, OH 43210, P.B. Wood, J. Sheehan, G.A. George, M.E. McDermott, P.M. McElhone, K.A. Perkins, and M.B. Shumar, WV Coop. Fish and Wildl. Research Unit, Div. Forestry and Natural Resources, West Virginia Univ., Morgantown, WV 26506, D.A. Buehler, P.D. Keyser, T.A. Beachy, and T.J. Boves, Dept. Forestry, Wildlife, and Fisheries, Univ. Tennessee, Knoxville, TN 37996, and J.L. Larkin, A. Evans, and M. White, Dept. Biology, Indiana Univ. Pennsylvania, Indiana, PA 15705.

A comparison of breeding density estimates from fixed-radius point counts, distance-sampling, and territory mapping for forest songbirds.

Surveys provide an important tool for understanding bird-habitat relationships. Breeding density remains the least labor intensive first-step to identify quality habitat which can be critical for management. Surveys also are important for long-term monitoring of bird populations. We compared three common methods for estimating breeding density of forest songbirds. Point count and territory mapping data on seven priority species of conservation concern were collected as part of a large-scale cooperative experimental study examining response of Cerulean Warblers to forest management in the central Appalachians. A total of 28 plots (each divided into 10 ha treatment and buffer units) in 7 study areas across West Virginia, Tennessee, Kentucky and Ohio were surveyed from 2005 - 2010. Density estimates obtained from territory mapping were compared to both fixed radius point counts and distance-based point counts that accounted for detection probability. Estimates produced by the three methods were generally correlated. However, compared to territory mapping estimates, both point count approaches tended to overestimate at low densities but underestimate at high densities. Most harvesting treatment effects were detected by less labor intensive point count methods, although some Type II errors occurred with both analytic approaches. Distance-sampling also appeared sensitive to edge effects. These findings suggest that the appropriateness of alternative methods may depend upon study objectives. Researchers are encouraged to carefully consider tradeoffs among density estimation, ability to detect treatment effects or trends, and data collection effort. S1: Thu, 10 Mar 10:30

Son Nguyen, Katrina Hucks, Chris Butler, and Erica Becker, Univ. Central Oklahoma, Oklahoma City, OK 73120.

The effects of temperature, light, and sugar concentration on hummingbird feeder solutions.

In the US, there are an estimated 48 million people that are engaged in bird-watching. These numbers mean that there are potentially millions of people who may be feeding hummingbirds. Although many people are feeding hummingbirds, nothing is published about how rapidly the solution clarity declines depending upon sugar concentration, exposure to sunlight, and temperature. We set up twelve hummingbird feeders. Six of which were in the shade, with three being a 3:1 ratio of sugar and the other half being a 4:1 ratio. The second set of six were set in direct sunlight from sunrise to sunset. These were also divided into three 3:1 feeders and three 4:1 feeders. Temperatures recorded at Will Rogers World Airport, Oklahoma City, OK were used in the analysis. There was a significant difference in clarity depending upon the amount of sunlight and temperature while there was no difference in clarity with changes in concentration. We found two microorganisms growing inside of the feeders; *Methylobacterium extorquens* and a yeast. Our results suggest that the clarity of the hummingbird feeder solution does not significantly change until approximately a week has passed. We suggest that hummingbird feeders in the southern US be changed weekly during the summer. PO6: 44

Erin L. O'Brien, Edward Grey Institute of Field Ornithology, Univ. Oxford, Oxford, UK, and Russell D. Dawson, Univ. Northern British Columbia, Prince George, BC V2N 4Z9, Canada.

Selection on female preference maintains extra-pair paternity in the absence of consistent indirect benefits.

In socially monogamous birds, females often engage in extra-pair copulations with males that possess high-quality ornamental traits, although the fitness benefits for females are not always clear. We hypothesize that extra-pair mating may simply be a consequence of the expression of female preferences for these traits. If female mate preference is subject to selection, the maintenance of female multiple mating requires only that females possessing heritable high-preference traits (those with extra-pair paternity) have higher fitness relative to low-preference females (producing only within-pair offspring), irrespective of the paternity status of offspring that contribute to this higher fitness. We used patterns of paternity in mountain bluebirds (*Sialia currucoides*) to classify females as high- or low-preference, according to whether they produced mixed-paternity broods. Male bluebirds who obtain extra-pair fertilizations display brighter, bluer plumage, suggesting that this trait may be a target of female preference. High-preference females were more likely to recruit young locally compared to low-preference females, indicating that selection may indeed be acting on female responsiveness to male plumage ornamentation in this population. A food supplementation experiment combined with maternal half-sibling comparisons further demonstrated that specific fitness benefits for females of mating with highly ornamented males are context-dependent, and selection on female extra-pair mating can therefore not be driven by consistent

indirect genetic benefits of extra-pair fertilizations in this population. In combination, these results indicate that selection acting on female preference for elaborate male plumage ornamentation may be sufficient to maintain female multiple mating in the absence of consistent differences in fitness of extra-pair offspring relative to their maternal half-siblings. CO33: Sat, 12 Mar 14:30

Carl H. Oliveros, Isla Biodiversity Conservation, Las Pinas City, Philippines, Dept. Ecology and Evolutionary Biology, Univ. Kansas, Lawrence, KS 66045, and Cynthia Adeline A. Layusa and Jameson B. Reynon, Isla Biodiversity Conservation, Las Pinas City, Philippines.

[S]Monitoring the population of the Calayan Rail.

The Calayan Rail *Gallirallus calayanensis* is a near-flightless species endemic to Calayan Island in Northern Philippines under threat from habitat loss and hunting. We carried out multiple playback surveys of the species from 2005 until 2010 across 542 census stations throughout the island to study its population trend. In each census station the number of rails present was counted for the duration of a 7 minute and 20 second period of call playbacks and pauses. Results show a wide but patchy distribution of the species with high densities recorded around Longog Valley. Rail detection rates fell from 27% in 2005 to 19% in 2008 and 2009 before climbing back to 27% in 2010. The rail abundance index followed a similar trend throughout the six-year period starting at 0.46 rails/station in 2005 and eventually rising to 0.540 rails/station in 2010. A maximum of 277 rails were counted in the 2010 survey period. Fluctuations in the rail population demonstrate the fragility of the species. Continued annual monitoring surveys of the species are highly recommended to guide conservation efforts in the area. A proposed wildlife sanctuary in Longog Valley will be beneficial to the species in the long term. CO13: Fri, 11 Mar 9:00

Timothy Olson and John Kricher, Biology Dept., Wheaton Coll., Norton, MA 02766.

Black-capped Chickadee (*Poecile atricapillus*) foraging behavior in mixed needle/broad-leaved forest and on a barrier beach in Massachusetts.

This study examines Black-capped Chickadee (*Poecile atricapillus*) foraging behavior in a mixed needle-leafed/broad-leafed forest and a scrub pine dominated barrier beach, quantifying changes in foraging behavior including vertical and horizontal foraging selection within a tree, and needle-leaf versus broad-leaded foraging preference in both ecosystems. The study occurred from 1 February to 12 April 2010. All trees were divided into 6 different vertical strata designated A-F, and divided into 3 sections horizontally 1-3. In both locations chickadees spent most time foraging in needle-leafed trees. In Wheaton Woods 43 chickadees were observed foraging for a total of 847.9 seconds (59.7% of total) in needle-leafed trees and 25 were observed foraging for a total of 571.3 seconds (40.3% of total) in broad-leafed trees. On Sandy Neck 123 chickadees were observed foraging for a total of 1764.3 seconds (90.0%) in needle-leafed trees and 12 were observed foraging for a total of 195.1 seconds (10.0%) in broad-leafed trees. In Wheaton Woods chickadees were observed foraging in level A 15.63%, level B 28.92%, level C 28.50%, level D 6.07%, level E 2.31%, and level F 18.58% of total observed foraging time throughout the study. On Sandy Neck chickadees were observed foraging in level A 24.62%, level B 27.10%, level C 25.44%, level D 10.58%, level E 3.04%, and level F 9.21% of total observed foraging time throughout the study. A 1-proportion T-test for combined data between the two sites showed that chickadees did not forage randomly but selected the outer tips of the branches ($p < 0.01$). PO6: 45

Joseph C. Ortega and Catherine P. Ortega, Dept. Biology, Fort Lewis Coll., Durango, CO 81301.

Contributing variables to nest survival, and the breeding biology, of the Western Wood-pewee (*Contopus sordidulus*), a habitat generalist, in southwest Colorado.

We studied the breeding biology and nest survival (N = 118 nests) of the Western Wood-pewee (*Contopus sordidulus*) in southwest Colorado from 1992 to 1998, and in 2001 and 2004, to examine the possible effects of a number of nest-site variables on nest survival for this widespread, habitat-generalist, species. Using Program MARK, we found that a model with variation in daily survival rate of nests according to year and date (within the breeding season) was the most parsimonious model. However, nest age (which also requires variation in daily survival rate) and the ratio of nest height (m) to nesting substrate height (m) were also apparently important variables. Interestingly, models assuming a constant daily survival rate were more parsimonious than those that allowed for variation in daily survival rate when not examining either date within the breeding season and/or nest age (of which both variables utilize variation in daily survival rate). Also, while grazing regime was of intermediate importance, habitat, nest substrate, nest height (m), and nest substrate height (m) were not important variables contributing to a model's weight in explaining daily survival rate of a nest. CO30: Sat, 12 Mar 10:45

Jessica A. Oswald, Dept. Biology, Florida Museum of Natural History, Univ. Florida, Gainesville, FL 32611.

[S]Late Pleistocene passerines of the Talara Tar Seeps in northwest Peru: indicators of climate change.

Historical climate and geological change are major forces determining present day species distributions. The distribution of South American passerines, during the transition from the cool, dry last glacial period (~110,000 to 10,000 years before present) to the current warm, wet interglacial period has been a matter of contention among ecologists and evolutionary biologists alike for decades. To reconstruct one South American glacial period passerine community, I am using 13,900 ^{14}C year old fossils collected from the Talara Tar Seep on the northwest coast of Peru. This now arid region is climatically under the influence of El Niño/La Niña-Southern Oscillation events and tied to very specific precipitation regimes today. Thus far, I have identified a number of passerine species that are indicative of tropical dry forests and grasslands, which are no longer found near Talara. These species include: the Collared Anshrike, *Thamnophilus bernardi*, the Yellow-billed Cacique, *Amblycercus holosericeus*, the Peruvian Meadowlark, *Sturnella bellicosa*, the Shiny Cowbird, *Molothrus bonariensis*, and the Scrub Blackbird, *Dives warszewiczi*. Based upon these results, tropical dry forests and grasslands were more extensive, at least in northwest Peru, during the late Pleistocene. Today these forests are actively being destroyed and grazed because of high human and livestock concentrations in this biogeographic region. This has led to the endangerment of a number of endemic bird species dependent on these forests. Ultimately, understanding how these bird species responded to climate change in the past will result in inferences to be made about how they will respond to future climate change. CO6: Thu, 10 Mar 14:30

David L. Otis, USGS Iowa Cooperative Fish and Wildlife Research Unit, Iowa State Univ., Ames, IA 50011, and David A. Miller, USGS Patuxent Wildlife Research Center, Laurel, MD 20708.

Trade-offs in vital rates of Mourning Doves, *Zenaida macroura*.

The Mourning Dove (*Zenaida macroura*) is a partial migrant with breeding range that includes the entire contiguous United States. It is a super-abundant species valued in many states as a game bird and more generally by the public as a songbird. Range-wide banding and wing collection surveys initiated in the past decade are yielding data that permit exploration of mechanisms responsible for hypothesized trade-offs in vital rates. Initial analyses of monitoring data suggest important regional-scale spatial variation in survival rates, particularly for hatching year birds. Corresponding spatial patterns in annual recruitment rates provide evidence of trade-offs as a function of latitude, but the functional form of the relationship is different in the western, central and eastern longitudes of the breeding range. We present these demographics and discuss alternative explanations for observed variation, based on assumptions about effects of exploitation, cost of migration, and reproductive life history attributes. CO16: Fri, 11 Mar 10:30

Falyn Owens and Philip Stouffer, School of Renewable Natural Resources, Louisiana State Univ. Ag Center, Baton Rouge, LA 70803.

[S]Do site preparations in Louisiana loblolly clearcuts impact breeding disturbance-dependent birds?

Disturbance-dependent bird species throughout the United States have recently declined due to fire suppression, lack of active management, and urbanization. In Louisiana, these species use recently harvested forest stands which provide early-successional habitat. However, changes in management practices within these young forest stands may affect their suitability for these bird communities. Recently, Weyerhaeuser Company has instituted wider row spacings for planted loblolly stands for economic reasons, providing an opportunity to examine breeding bird response to a combination of tree-row spacing (14 ft. vs. 20 ft) and woody debris placement (scattered vs. piled). During summer 2006-2010, we determined relative abundance, species richness, and breeding success for birds breeding within study plots. Testing all of these metrics, we found no evidence that bird communities were impacted by any of the experimental stand establishment treatments. Additionally, vegetation metrics did not differ among treatments. It appears that birds responded across treatments to increases in vegetative biomass and structure over time as plants became established and nesting sites increased, regardless of either tree-row spacing or woody debris placement. PO2: 17

Sara J. Oyler-McCance and Jennifer A. Fike, USGS Fort Collins Science Center, Fort Collins, CO 80526, and Michael Phillips and Paul Lukacs, Colorado Division of Wildlife, Fort Collins, CO 80526.

Use of molecular tagging to estimate demographic parameters in Gunnison Sage-grouse.

Gunnison Sage-Grouse (*Centrocercus minimus*) have been severely impacted by loss and fragmentation of habitat. As a result, its populations are small and isolated. Successful conservation efforts require an accurate method for inventorying and monitoring population sizes. Traditionally, wildlife managers have used lek counts as a way to monitor Sage-Grouse population sizes, yet many have criticized this method, suggesting it is unreliable for estimating population sizes and trends. As an alternative, traditional mark-recapture methods have

been attempted and showed that lek counts significantly underestimated true population sizes. However, these traditional methods require intensive capturing and marking of animals, which is particularly difficult with Gunnison Sage-Grouse. Because each individual animal has a unique molecular fingerprint that remains with it throughout its lifetime, biologists have begun using DNA as an individual mark for mark-recapture studies (molecular tagging). The objective of this study is to examine the feasibility of this molecular application for population size estimation of Gunnison Sage-Grouse. Specifically, we are using mark-recapture methods to estimate population sizes on five different leks within the Gunnison Basin using DNA extracted from fecal pellets collected on those leks. This analysis will compare population size estimates made using lek counts with those using molecular tagging methodologies and provide information needed to successfully monitor and manage Gunnison Sage-Grouse. S2: Thu, 10 Mar 11:15

Joseph Oyugi, Biology Dept., Wright Coll., Chicago, IL 60630.

Variation in bird communities within a *Brachsytegia* woodland: a comparative study of disturbed and undisturbed forest patches.

The Arabuko-Sokoke Forest in the eastern Kenyan is one of the few remaining indigenous forests in Kenya, and one of the largest extant fragments of a coastal forest that once covered much of the East African coast. The forest is ranked by Birdlife International as the second most important forest for bird conservation in mainland Africa and forms part of the Eastern Arc Forest Ecosystems – one of the globally recognized biodiversity hotspots in eastern Africa. However, the forest is under severe pressure due to selective logging, pole harvesting for building, fuel wood collection and unplanned tourism activities. These activities have different impacts on the forest and have the potentials of altering the forest structure and negatively affect forest birds including other biodiversity within the forest. We used mist netting to assess bird species composition in disturbed and relatively undisturbed forest patches within the *Brachystegia* woodland of the Arabuko-Sokoke Forest between June – August 2010. A total of 16 bird species comprising 4 forest specialists (F) and 12 forest generalists (F) were recorded from 8 mist netting session (4 sessions in disturbed and undisturbed forest patches respectively). Both disturbed and undisturbed patches exhibited similarities in species richness (12 vs. 12 bird species). However, 4 forest specialists and 8 forest generalists were recorded in undisturbed patches, 2 specialist species and 10 forest generalists were netted in disturbed areas. The overall bird species composition did not differ significantly across these forest patches, but differences in species composition of different strengths were evident across the sites. PO1: 07

Jamie L. Palmer, Thomas F. McCutchan, Sharon L. Deem, Dan Hartman, Patricia G. Parker, Dept. Biology, Univ. Missouri - St. Louis, St. Louis, MO 63121.

[S]Seroprevalence of malarial antibodies in Galapagos Penguins (*Spheniscus mendiculus*).

Galapagos Penguins (*Spheniscus mendiculus*), which are endemic to the Galapagos Archipelago, live in very small colonies within a single population that has very low genetic diversity. These characteristics suggest *S. mendiculus* may be an immunologically naïve species that could be susceptible to infectious diseases like avian malaria, which is caused by the blood parasite *Plasmodium* spp. Avian malaria has caused high morbidity and mortality in captive penguin species around the world and in some populations of wild penguins. The mosquito *Culex quinquefasciatus* is a known vector of the parasite elsewhere and has been established on the Galapagos Islands since late 1980's. PCR screening of *S. mendiculus* populations confirm the presence of *Plasmodium* spp., with 13/143 individuals testing positive. Given that *S. mendiculus* is endangered and El Niño Southern Oscillation (ENSO) events have a strong negative effect on their population size, if their exposure to Plasmodium is recent, then these infections may be damaging to the survival of the species. Through indirect enzyme-linked immunosorbent assays (ELISA), I tested the 143 *S. mendiculus* samples from 2008 for seroprevalence of Plasmodium antibodies to determine the extent of exposure. Results show that out of 143 adult penguins, 137 tested positive for malarial antibodies, giving a seroprevalence of 95.8%. The range in antibody levels among individuals indicates varying stages of infection. This suggests much higher levels of exposure than are suggested by PCR estimates of prevalence. CO9: Thu, 10 Mar 15:45

Timothy H. Parker, Biology Dept., Whitman Coll., Walla Walla, WA 99362.

Meta-analysis in a model species suggests plumage color may not be a signal of individual quality influencing mate choice.

For decades behavioral ecologists have sought evidence that sexually-selected traits evolved as honest signals of mate quality. The Blue Tit (*Cyanistes caeruleus*), with over 700 published statistical tests relating to plumage color, is among the species that have received substantial attention. Despite this, evidence that plumage color evolved as an honest signal of mate quality remains limited in this species. For instance, color may not even

influence mate choice, with only a handful of significant relationships in the predicted direction (n = 9 of 102 tests), and many other relationships either counter to prediction (n = 22), sometimes significantly so (n = 3), or not reported sufficiently to determine direction of effect (n = 59). Evidence that color signals adult quality is also mixed, with a similar proportion of significant relationships in the predicted direction (n = 9 of 97 tests), and many other relationships either counter to prediction (n = 30), sometimes significantly so (n = 4), or not reported sufficiently to determine direction of effect (n = 26). Further, there is evidence of publication bias; other results inconsistent with hypotheses appear to have gone unpublished. Thus we are not in a position to conclude that blue tit color predicts individual quality, or even that color currently influences mate choice. Given results such as these and the recent attention to the lack of appropriate null hypotheses in this field, it may be time to question the assumption that sexually selected ornaments have typically evolved as signals of mate quality. CO33: Sat, 12 Mar 15:00

David C. Pavlacky, Jr., Jennifer A. Blakesley and David J. Hanni, Rocky Mountain Bird Observatory, Brighton, CO 80603.

Hierarchical occupancy estimation and multi-scale habitat use of Brewer's Sparrows in the Southern Rockies/Colorado Plateau Bird Conservation Region.

Large-scale monitoring often has a limited ability to evaluate the status of bird populations at local scales. We used data from an ongoing, large-scale monitoring program to investigate local and regional habitat use of Brewer's Sparrows (*Spizella breweri*) during the 2008 breeding season for the Colorado and Wyoming portions of Bird Conservation Region 16. Our objectives were to 1) determine what habitat features were important for local and regional occupancy, 2) evaluate the effect of land ownership/management, and 3) predict the large-scale distribution of Brewer's Sparrows. We estimated Brewer's Sparrow occupancy at two spatial scales, and accounted for incomplete detection and availability using a removal design and multi-scale occupancy model. Small-scale occupancy corresponded to local territory occupancy, whereas large-scale occupancy represented regional occupancy of the landscape. The probability of detecting Brewer's Sparrows in the point count intervals declined through the breeding season. Local territory occupancy was lower on US Forest Service land than BLM and all other lands. In addition, territory occupancy showed a positive linear effect of sagebrush canopy cover, negative threshold effect of tree canopy cover, negative linear effect of shrub height and a quadratic effect of grass height. Regional occupancy demonstrated a positive linear effect of sagebrush cover and a positive threshold effect of sagebrush patch size. By distinguishing between areas with low or high territory occupancy, multi-scale occupancy estimation provides a more comprehensive understanding of species occurrence. Modeling habitat occupancy at two spatial scales may be useful for linking population responses to habitat management and prioritizing conservation at local and regional scales. CO25: Sat, 12 Mar 9:00

Kristina L. Paxton and Frank R. Moore, Dept. Biological Sciences, Univ. Southern Mississippi, Hattiesburg, MS 39406, and Matthew D. Johnson, Dept. Wildlife, Humboldt State Univ., Arcata, CA 95521.

[S]Morphological, physiological, and behavioral differences characterizing two migratory populations of Swainson's Thrushes *Catharus ustulatus* with distinctly different migratory journeys.

Migration requires a complex, highly integrated set of adaptations including morphological, physiological, and behavioral traits. The differential costs of migration among intra-specific populations traveling different distances is likely to select for divergent migration strategies aimed at balancing the competing demands of time and energy associated with migration distances. We conducted a comparative study in a controlled captive setting of naive Swainson's Thrushes, *Catharus ustulatus*, captured from populations in California and Alaska which have distinct migratory pathways differing considerably in the distance between breeding and over-wintering sites (~3 fold difference). We quantified differences in morphology, migratory behavior, and digestive efficiency between the two populations. During fall migration, we found significant differences in the duration and intensity of nightly activity, the rate of feeding, and energy stores between the two populations. The findings from this study provide important insights into the underlying innate response of birds to the physiological demands of migration, as well as help us to predict the adaptive response of migratory birds to the rapidly changing world. PO8: 59

Brian D. Peer, Dept. Biological Sciences, Western Illinois Univ., and Robert A. McCleery, Dept. Wildlife Ecology and Conservation, Univ. Florida.

Adaptive modulation of cowbird host defensive behavior in relation to its cost and the likelihood of parasitism.

Natural selection should favor adaptive modulation of host defenses against avian brood parasitism in response to their costs and the likelihood of parasitism. In North America, hosts of the parasitic Brown-headed Cowbird (*Molothrus ater*) demonstrate an astonishing lack of defenses and most evidence to date has suggested that this is a consequence of evolutionary lag. We evaluated how the Dickcissel (*Spiza americana*), an ancient cowbird host,

responded to natural and experimental parasitism by using an information theoretic approach to evaluate a suite of nine candidate models. Parasitism frequencies varied significantly over the three year study from 24%-44% (n = 301 nests) and Dickcissels were more likely to attempt to eject cowbird eggs in years when parasitism was higher. The best candidate model consisted of three parameters: treatment, cost, and an interactive effect between treatment and cost. Dickcissels were more likely to reject naturally laid cowbird eggs and plaster cowbird eggs than real cowbird eggs we added to nests. Dickcissels damaged and accidentally ejected their own eggs when attempting to eject cowbird eggs; they incurred more costs when attempting to eject real cowbird eggs we added to nests than naturally laid, or plaster cowbird eggs. To our knowledge, this is the first study to demonstrate that a cowbird host's response is influenced by parasitism frequency and that a host is more likely to accept rather than attempt to eject a cowbird egg when the costs of doing so are prohibitively high. CO22: Fri, 11 Mar 16:30

Mario B. Pesendorfer, School of Biological Sciences, Univ. Nebraska-Lincoln, and Scott Sillett, Migratory Bird Center, Smithsonian Conservation Biology Institute, National Zoological Park, Washington, DC.

[S]Scatter-hoarding of acorns by Island Scrub-Jays, *Aphelocoma insularis*, on Santa Cruz Island.

Several members of the family Corvidae (crows, jays, magpies and allies) have mutualistic relationships with nut-bearing trees, such as oaks (*Quercus* spp.) and pines (*Pinus* spp.). The birds transport and cache a large number of nuts throughout the landscape and often retrieve only a fraction, thus providing seed dispersal for the trees. In a system with a single disperser, this scatter-hoarding behavior largely determines the spatial distribution of seeds, which lays the template for subsequent community-level processes that determine the establishment of seedlings. Here, I present data on the scatter-hoarding activity of Island Scrub-Jays (*Aphelocoma insularis*) when caching the acorns of the endemic Island Scrub-Oak (*Quercus pacifica*) on Santa Cruz Island, CA. We observed transportation distances up to 280 m (mean ± SD: 49m ± 52m). 80% of the caches were made in the shade, mostly in leaf litter or dirt below other plants. As the only long-distance dispersers of acorns, *A. insularis* likely plays a vital role in oak recruitment, and in the restoration of degraded oak habitats on Santa Cruz Island. Their scatter-hoarding behavior accelerates the establishment of oak seedlings in suitable areas, which will eventually create new habitat for the jays and other animals. Many oak forests are threatened by deforestation and augmenting the jays' activities provides a cheap way to for managers to support the restoration of oak and pine habitats. CO1: Thu, 10 Mar 9:30

Michelle L. Petersen, Dept. Biological Sciences, Florida Atlantic Univ., Boca Raton, FL 33431, Dale E. Gawlik, Dept. Biological Sciences, Florida Atlantic Univ., Boca Raton, FL 33431, and Mark I. Cook, Everglades Division, South Florida Water Management District, West Palm Beach, FL 33406.

Foraging habitat parameters: preferences of Everglades wading birds.

The number of wading bird nests in the Everglades has decreased by 70% since the 1930s; however, these trends are species specific. Declines coincide with the construction of massive water-control works in South Florida, which disrupted the natural hydroperiod, sheet flow, recession rate and water depth within the Everglades. The altered hydrology changed the availability of food items, which is believed to have affected the spatial distribution and movement of foraging birds across the Everglades landscape. Elucidating species-specific foraging habitat preferences will be essential to the recovery of the endangered Wood Stork (*Mycteria americana*) and other imperiled wading bird species in Florida. We used foraging data from the Systematic Reconnaissance Flight Survey to generate habitat selection models for the Wood Stork, White Ibis (*Eudocimus albus*) and Great Egret (*Ardea alba*) during the breeding seasons (January to May) 2002-2009. We modeled wading bird abundance on a 4 km^2 cell-level across the entire greater Everglades basin. Our species-specific models were a function of hydrologic, land use, and soil nutrient parameters comprising a hierarchical Poisson regression model. Results indicate that hydrologic parameters had the strongest affect on Great Egret foraging patterns. Wood Stork and White Ibis foraging patterns were influenced by hydrologic, land use and soil nutrient parameters. Receding water levels were positively associated with Great Egret and White Ibis density, whereas an increase in water levels of 3 cm decreased numbers of Wood Storks. Differences in responses among species underscore the need for developing species-specific models. CO10: Thu, 10 Mar 16:45

Margaret R. Petersen, David C. Douglas, and Sarah McCloskey, USGS Alaska Science Center, Anchorage, AK 99508, and Heather Wilson, US Fish and Wildlife Service, Migratory Bird Management, Anchorage, AK 99503.

Interannual winter site fidelity evident among most Pacific Common Eiders breeding in northwest Alaska.

The Pacific Common Eider (*Somateria mollissima v-nigrum*) winters in the peripheral margins of the arctic ice pack. Eiders feed on benthic invertebrates whose species distribution changes little among years. Winter site fidelity would be advantageous since conditions conducive to winter survival are predictable. However, winter sea ice often varies markedly within and among years at local scales. Some shallow nearshore areas rarely freeze

completely and birds are typically found within these polynyas. We used satellite transmitters to determine winter site fidelity of Common Eiders. Birds were marked at Cape Espenberg and wintered along the Bering Sea coast. We used a Multiresponse Permutation Procedure to test if the spatial distribution of individual birds changed between consecutive winters. We also used the kernelud function in the ADEHABIT library of R with a prescribed CVh smoothing parameter to determine the 95% and 50% UD contours for each individual during the first winter. Twenty-one of 22 (96%) of the Common Eiders returned to same polynya they used the previous year. The locations from 61% of these individuals had similar spatial distributions among years. Nineteen of 20 individuals were relocated at least once during the second year within the 95% UD of their previous year. Only one eider among the 22 demonstrated a complete lack of winter fidelity. Factors influencing site suitability for wintering Pacific Common Eiders include the development and extent of shorefast ice as well as conditions that promote persistent polynas. CO30: Sat, 12 Mar 11:45

Anna C. Peterson and Gerald J. Niemi, Natural Resources Research Inst., Univ. Minnesota Duluth, Duluth, MN 55811.

[S]Wind turbine development and conservation of airspace in a major migration corridor.

A narrow strip of land paralleling the northern shore of Lake Superior, The North Shore Migration Corridor (NSMC), hosts a massive migratory bird movement that has previously been underestimated. The NSMC is also a priority area for wind turbine development, and habitat and airspace within the corridor are also experiencing increased pressure from other forms of development. Our three-year study of migratory bird movement found that over 120 species utilized the NSMC, and estimates of individuals range into the millions. Time of day, seasonalilty, wind direction, recent weather patterns, and topography all played a role in the magnitude of migratory activity and flightpaths. Migrant movement was nonrandom with more birds moving close to shore and on ridgelines. In addition, most migrant movement occurred at a fight height between the forest canopy and 100 meters, a height that directly corresponds with wind turbine and communication tower height. Further analyses will reveal how migrants move through the NSMC and utilize airspace and stopover habitat. The results of our research will guide development of wind turbines and other structures by identifying migrant flyways and timing of movement, and by prioritizing areas for airspace and habitat conservation. CO26: Fri, 11 Mar 11:30

Stephen L. Peterson and David N. Koons, and Robert F. Rockwell, Utah State Univ., Logan, UT 84321.

[S]Past and present impacts of habitat degradation by Lesser Snow Geese on avian biodiversity along the Hudson Bay Lowlands.

Increased growth of the mid-continent population of lesser snow geese (*Chen caerulescens caerulescens*; LSGO) has led to the degradation of coastal saltmarsh habitats along the Hudson Bay coast. This habitat degradation may lead to altered avian community composition across regional landscapes that LSGO utilize and degrade. Study plots are located on intertidal flats of La Pérouse Bay, 30 kilometers east of Churchill, Manitoba, Canada. Vegetative cover was measured across multiple paired sites of degraded and marginally intact habitat by using a modified step-point method. Distance sampling surveys were conducted to estimate changes in occupancy, richness and relative abundance of all avian species. We examined nesting densities of once common Savannah sparrows (*Passerculus sandwichensis*; SAVS) by searching for nests across all sites. The barren ground component has increased in most of the study plots, dramatically on one site from 26% in 1976 to 63% in 1999, with the trend continuing into 2010 with 75% barren ground. A reduction in shrub cover has led to a decrease in SAVS nest numbers. In one study plot SAVS nests have decreased from 24 in 1976 to 6 found in 2010. Avian species which were detected in 2010 will be compared to avian surveys done in 1999-2000 to determine if species occupancy and richness has declined, increased or stayed the same relative to the vegetation in each plot. The proposed research project will further our knowledge of how degradation of habitat by one species (LSGO) can affect the entire avian community composition of a localized area. CO25: Sat, 12 Mar 9:30

Martin J. Pfeiffer, Natural Resource Specialist, Carson National Forest, Taos, NM 87571 and Anna M. Pidgeon, Dept. Forest and Wildlife Ecology, Univ. Wisconsin - Madison, Madison, WI 53706.

Effects of recreational trails on passerine abundance and nest success in southern Wisconsin forests.

Approximately 50% of outdoor recreationists believe that their activities do not harm wildlife. However, there is little data supporting this claim, and the studies that address this question suggest that non-consumptive outdoor recreation may have negative impacts on wildlife. Trails are an important point of access and often a significant component of recreational opportunities in the forest. We examined the effects of recreational trails on breeding songbirds in the forests of the Baraboo Hills in south-central Wisconsin. We compared songbird species richness, abundance, and reproductive success with human presence on trails and the width of trail corridors and surfaces. We found that all three songbird metrics were associated with trail characteristics. Avian species richness

increased with the width of the trail corridor. Abundances of American Robins and Brown-headed Cowbirds were higher and the abundance of Acadian Flycatchers was lower in plots with greater human presence than in plots with minimal human presence. Human activity was the best predictor of nest success for both the Acadian Flycatcher (P = 0.002) and American Robin (P = 0.042). Modeled daily survival rates for American Robin nests declined from 0.978 on plots with minimal human activity to 0.916 on the plot with the most human activity. Similarly, daily survival rates for Acadian Flycatcher nests declined from 0.983 on plots with minimal human activity to 0.804 on the busiest plot. Our findings suggest that recreational trails through the forest may have effects similar to those found at forest edges: increased species richness, differences in abundances, and diminished reproductive success. CO2: Thu, 10 Mar 8:45

Emily N. Pipher and Nicola Koper, Natural Resources Institute, Univ. Manitoba, Winnipeg, MB R3T 2N3, Canada.

[S]Effects of grazing intensity and years grazed on songbird nesting success in northern mixed-grass prairies.

Grassland bird species are declining at an unprecedented rate, mostly due to the loss and degradation of breeding habitat. Prairies are commonly used as rangelands, but few studies have examined how cattle grazing may influence the nesting success of prairie songbirds. Nesting success is most highly influenced by the predator community. Different predators are associated with different vegetation characteristics, which can be altered by grazing at varying intensities. Cattle were introduced into Grasslands National Park of Canada in 2008 as part of an adaptive management experiment. In 2009-2010, we used rope-drags to find nests in 26 plots (each 300 m^2) in pastures with stocking rates ranging from 0 - 0.81 AUM/ha, which were grazed for 0, 2-3 or >15 years. We monitored nests of seven songbird species. Modified logistic regression analyses indicated a nonlinear effect of grazing intensity on nesting success of Sprague's Pipits in 2009, which had lowest success at low stocking rates, but highest success at moderate stocking rates. Chestnut-collared Longspur nesting success in 2009 was negatively correlated with years grazed, but positively correlated with stocking rate. Vesper Sparrow nesting success in 2010 was negatively correlated with years grazed. There was no effect of grazing observed when data were combined among years. The inconsistency of our results suggests cattle grazing does not have a strong direct effect on nesting success of grassland songbirds, and may not be a factor in declining songbird populations in this habitat. CO2: Thu, 10 Mar 9:45

John A. Pourtless IV and Frances C. James, Dept. Biological Science, Florida State Univ., Tallahassee, FL 32306.

[S]An interpretation of the tenth skeletal specimen of *Archaeopteryx*. The tenth skeletal specimen of *Archaeopteryx* is the first to be available for study in the United States.

Some of its character states have been interpreted as indicating that *Archaeopteryx* was more theropod-like than previously realized. These character states include: a tetraradiate palatine; an ascending process of the astragalus; an arctometatarsal tarsus; a medially directed, non-retroverted hallux; and a hyperextensible second pedal digit, as in dromaeosaurids. The new specimen has also been used to bolster the argument that *Archaeopteryx* was primarily terrestrial. We examined the specimen to assess these interpretations in relation to information from other specimens. The palatine is tetraradiate, but this is an archosaurian plesiomorphy. The brace of bone on the anterior tibia resembles the pretibial cartilage, an avian neomorph, not the theropod ascending process. The hallux is more medially directed than in anisodactyl ornithurines, but it is opposable. The tarsus is not arctometatarsal and there is only minimal development of hyperextensibility in the second pedal digit. The morphology of the pectoral girdle and forelimb confirms that *Archaeopteryx* was a flighted bird. Several other important characteristics of the specimen conflict with the view that *Archaeopteryx* was a feathered theropod, including: absence of axial pneumaticity, absence of the tail-stiffening system found in tetanurine theropods, and the sprawling position of the hindlimbs. We found no evidence that *Archaeopteryx* was terrestrial. We conclude that previous interpretations of *Archaeopteryx* have been affected by the common theory that *Archaeopteryx* and other basal birds were primarily terrestrial and morphologically close to coelurosaurian theropod dinosaurs. CO6: Thu, 10 Mar 15:00

Larkin A. Powell, School of Natural Resources, Univ. Nebraska-Lincoln, Lincoln, NE 68583.

Cross-property agreements on ranch lands provide scale for avian conservation.

Private lands are critical to conservation planning for grassland birds, and our profession needs innovative models that support effective management of populations and sustainable agricultural practices. Cattle farmers in Namibia, in southern Africa, have joined together to form conservancies in which landowners retain ownership rights but form agreements with neighbors about consumptive use limits, habitat management, water management, and ecotourism development. Namibian conservancies have 5-58 farms and range from 75,650-500,000 ha. Cross-property agreements, such as Namibia's conservancies, provide scale for grassland management. Heterogeneity can be established at multiple scales, which could support diverse communities and

protect rare species. Zonation within a large conservancy-type area could allow more intensive agriculture or energy development in concentrated zones that provide traditional economic payouts to the group, while allowing other zones to be used for wildlife management and ecotourism activities. Marketing strategies for ecotourism can be conducted more effectively on behalf of a set of landowners with a large land base than for a single, smaller ranch property. The landowners may also find NGO's and management agencies willing to provide more time and expertise to facilitate management plans, given the history of decisions of the landowner group. Avian conservation biologists should consider cross-property agreements as a potential approach to landscape management of grasslands in North America. S3: Fri, 11 Mar 9:15

John E. Quinn, Univ. Nebraska-Lincoln, School of Natural Resources. Lincoln, NE 68583, Ron J. Johnson, Clemson Univ., Dept. Forestry & Natural Resources. Clemson, SC 29634, and James R. Brandle, Univ. Nebraska-Lincoln, School of Natural Resources. Lincoln, NE 68583.

Avian conservation in temperate agroecosystems: consideration of spatial scale and management outcomes.

Avian conservation efforts in North American temperate grasslands have largely focused on restoring native prairie habitat. The dominant land cover, however, remains arable cropland and managed pasture. Consequently, consideration of the role of agroecosystem management is warranted. Current conservation and restoration efforts in working farmland are primarily local and driven by individual landholders' decisions. Yet avian diversity is shaped by local and landscape effects, suggesting a need for more comprehensive efforts in working towards wildlife friendly farmland. Using data from the eastern Great Plains, we describe the abundance patterns of two groups of farmland-associated species in response to variation in land use and land cover patterns at field, local, and landscape scales. The habitat requirements of one group, grassland birds, varied with spatial scale. In contrast, shrubland birds responded predominantly to local variation. With consideration of observed patterns, we propose how limited conservation resources could be better allocated in working landscapes. We suggest differentiating our conservation efforts between species that benefit from local practices and those that may require a broader and more organized effort between farmers, landowners, and conservationists. S3: Fri, 11 Mar 8:45

Benjamin S. Rashford and Eric Cropper, Agricultural and Applied Economics, Univ. Wyoming, Laramie, WY 82071, and Richard Voldseth, School of Natural Resource Sciences, North Dakota State Univ., Fargo, ND 58108.

Climate change, agriculture and wetlands: Implications for waterfowl conservation in the Prairie Pothole Region.

Conversion of native land-cover to intensive agriculture is the primary cause of waterfowl habitat loss in the Prairie Pothole Region (PPR). Given the link between agriculture and habitat, effective conservation requires understanding 1) agricultural land-use change – to target conservation; and 2) effective conservation strategies – to select ecologically and economically effective strategies that maintain waterfowl within agro-ecosystems. Moreover, understanding the relationship between agriculture and habitat is growing more critical in the face of climate change. This presentation will discuss two papers exploring relationships between climate change, agricultural land-use, and waterfowl conservation. The first examines relationships at the landscape scale. Specifically, we integrate an econometric model of agricultural land-use with a wetland simulation model to determine whether climate induced land-use change exacerbates or mitigates the effect of climate change on wetlands. Results suggest that climate change will reduce wetland productivity and intensify agricultural land-use in the northwest PPR. These changes imply that much of the historically productive waterfowl habitat will be seriously degraded. Landscape-level habitat conservation therefore should be targeted across space and time to conserve waterfowl habitat in the face of climate and land-use change. The second paper examines relationships at the site-specific scale. Specifically, we embed wetland and waterfowl simulation models within an economic decision framework to determine cost-effective management activities to mitigate climate impacts on waterfowl. Results suggest that intensive management activities (e.g., nest boxes) can mitigate short-term climate effects on waterfowl. The costs to mitigate, however, are highly variable over space due to heterogeneity in climate predictions. S3: Fri, 11 Mar 10:30

Christine Rega and W. Gregory Shriver, Dept. Entomology and Wildlife Ecology, Univ. Delaware, Newark, DE 19716, and Vince D'Amico, US Forest Service NRS-04, Univ. Delaware, Newark DE 19716.

[S]Forest breeding bird response to a multiflora rose invasion: a long term study.

The effects of non-native invasive plants on bird communities are not well understood and the long-term data sets that might elucidate these patterns are rare. The objective for this study was to relate the effects of a multiflora rose (*Rosa multiflora*) invasion to changes in the forest breeding bird community over a 45-year time period (1965 - 2010). In 1965, a long-term forest ecology study was initiated at the University of Delaware in a 16 hectare forest fragment (Ecology Woods). Bray et al. (1965) conducted an intensive inventory of understory

vegetative cover, while Linehan et al. (1967) estimated forest breeding bird territory density for all breeding species in Ecology Woods. From 2008 – 2010, we resampled the Ecology Woods using similar methods to compare changes in vegetation composition and breeding bird territory density. During this 45 year time period, two species responded differently to the multiflora rose invasion. Wood Thrush (*Hylocichla mustelina*) territory density declined 1.68 % annually, while Gray Catbird (*Dumetella carolinensis*) territory density increased 1.47 % annually. Multiflora rose was not detected by Bray et al. (1965), but we detected the presence of this highly invasive species at 25 % of 160 sampled sites in 2008. Gray Catbird nest sites had 36 % multiflora rose cover; Wood Thrush nests were never detected in multiflora rose. Multiflora rose invasion may partially explain the decline of the Wood Thrush and the increase in the Gray Catbird. This analysis provides a long-term perspective on the potential effects of non-native invasive plants on forest breeding bird dynamics. CO2: Thu, 10 Mar 9:00

Sarah E. Rehme, Nebraska Cooperative Fish and Wildlife Research Unit, School of Natural Resources, Univ. Nebraska-Lincoln, Lincoln, NE 68583, Craig R. Allen, USGS Nebraska Cooperative Fish and Wildlife Research Unit, School of Natural Resources, Univ. Nebraska-Lincoln, Lincoln, NE 68583, Keith A. Hobson, Environment Canada, Saskatoon, SK S7N 3H5, Canada, and Larkin A. Powell, School of Natural Resources, Univ. Nebraska-Lincoln, Lincoln, NE 68583.

[S]Can nestling songbirds reveal adult breeding site fidelity?

Grassland birds have experienced the most significant and consistent declines of any group of North American birds. Determining avian productivity at grassland sites can focus conservation efforts but is especially difficult to measure. Avian ecologists can avoid the difficulties of estimating productivity by assessing site fidelity. Current extrinsic markers are inadequate for tracking small songbirds, and many ecologists use intrinsic stable isotopes ratios of hydrogen in feathers (ΔDf) to infer songbird movements. Maps of adjusted precipitation values (ΔDp) are used as reference values for determining feather origin, but ΔD values are poorly mapped in the Great Plains. As an alternative, we determined if songbird nestling ΔDf values can be used to measure breeding site fidelity by establishing a distribution of reference values. We collected grassland songbird adult and nestling feathers in 2008 and 2009 at two sites that differ in size on the Great Plains for stable isotope analysis. We used bootstrapping procedures to develop a distribution of expected values based on nestling ΔDf values and on GIS-map reference values. We calculated the proportion of adult local birds at each site using each method. Site fidelity was higher at the small site using nestlings as reference values but not different between sites using ΔDp maps reference values. Our results demonstrate that songbird nestlings can be used to measure breeding site fidelity for a region. Additional research is needed to understand the relationships among behavior, habitat and movements of grassland songbirds in relation to breeding site fidelity. CO8: Thu, 10 Mar 15:45

Mery Casady and **Letitia M. Reichart**, Dept. Biology, Univ. Nebraska at Kearney, Kearney, NE 68849, and Andrew K. Birnie and Jeffrey A. French, Dept. Psychology, Univ. Nebraska at Omaha, Omaha, NE 68182.

Measuring fecal corticosterone in wild Whooping Cranes (*Grus americana*).

Non-invasive measures of hormones in animals can be a useful tool for understanding physiological mechanisms that may lead to changes in behavior, survival and reproduction. Specifically, measures of fecal corticosterone metabolites (CORT), the primary stress hormone in birds, have been correlated with environmental changes, such as food abundance, habitat alteration, and human disturbance. In this study we provide the first measure of fecal CORT for individuals from the wild population of Whooping Cranes (*Grus americana*). Habitat alteration and urbanization on the wintering grounds are major threats to the wild population of Whooping Cranes, thus it is important to determine a possible method to assess physiological health of the population using a non-invasive technique. During winter 2009-2010, fresh fecal samples (N = 32) (i.e., less than one hour old) were collected from accessible areas where whooping cranes were observed within and around Aransas National Wildlife Refuge, Texas. We used an ethanol extraction to isolate endogenous CORT from fecal samples. The enzyme-immuno-assay (EIA) was validated by showing parallel immunoactivity of endogenous CORT to that of the assay standards. Fecal CORT was measureable in wild whooping cranes where mean CORT concentration was 2.14 ng/g feces ± 1.96 SD). Measures of fecal CORT ranged from 7.08 – 0.16 ng/g feces, although there was no significant difference between samples collected from different locations ($F_{8,23} = 0.898$, $P = 0.534$). Future studies will determine whether measures of fecal CORT vary with respect to foraging behavior and structure of whooping crane social groups. PO2: 18

Kristen Ruegg, Center For Tropical Research, UCLA Inst. Environment and Sustainability, Los Angeles, CA 90095.

Migratory connectivity in the age of genomics.

Defining biologically meaningful demographic units of migratory birds and tracking these units throughout the annual cycle is a challenge to conservation efforts. Genetic techniques have been used in the past to define population units, but the spatial scale of genetic units is often too coarse to be useful for demographic analyses. With the advent of "next generation" sequencing techniques we are now able to generate orders of magnitude more sequence data and this has the potential to increase the resolution of genetically defined populations. We use genome-wide sequencing techniques to discover >10,000 single nucleotide polymorphism (SNPs) in two migratory bird species, the Swainson's thrush (*Catharus ustulatus*) and the Wilson's warbler (*Wilsonia pusilla*). By screening 1,000+ individuals from across the breeding, wintering and migratory range of these two species, we will resolve individuals at finer spatial scales then previously possible. CO33/10 11:45

Terrell D. Rich, U.S Fish and Wildlife Service, Boise, ID 83709.

Using species vulnerability assessment to reduce uncertainty in setting bird conservation priorities in North America.

There are a variety of ways to predict the effects of climate change on species, habitats and ecosystems. The objective of species vulnerability assessment (SVA) is to determine if there are species or species groups that are more vulnerable than we might otherwise have thought. The strength of SVA is that it seeks to evaluate the capacity of species to adapt to any major stressor, whether climate change or something else. SVA also separates the uncertainty about a species' capacity from the uncertainty in climate-habitat models. This should help sharpen our modeling and conservation focus. I examined 10 species traits, e.g., mean clutch size and migration distance. Each of these traits can be scored and total scores then used to array species or groups of species along the vulnerability axis. There are complete data for 668 North American bird species. Principle components analysis shows that the 10 species traits are largely independent. Vulnerability scores are consistent with those from the 2010 State of the Birds analysis, but not highly correlated ($r^2 = 0.30$). Vulnerability scores are also consistent with Partners in Flight species assessment scores ($r^2 = 0.55$) and with IUCN risk categories. Among major bird groups, waterbirds and shorebirds are the most vulnerable, followed by landbirds and waterfowl. Among families with more than 8 species, the Alcidae are most vulnerable. However, the Trochilidae are second, scoring as more vulnerable shorebirds and other waterbirds. The latter is the sort of unexpected result we need to examine more carefully. CO13: Fri, 11 Mar 9:45

Alexis Richardson and Nicola Koper, Natural Resources Institute, Univ. Manitoba, Winnipeg, MB R3T 2N2, Canada.

[S]Changes in the songbird community since time burned in grazed and ungrazed pastures.

The decline of prairie songbirds is thought to be linked in part to the removal of natural disturbance processes such as burning and grazing from the ecosystem. To investigate the impact that a wildfire has over time on the songbird community in both grazed and ungrazed pastures in the northern mixed-grass prairie (Grasslands National Park of Canada in southern Saskatchewan) research assistants and I conducted songbird surveys during the breeding season each year from 2007, the first year post burn, through 2010. Vegetation characteristics including height, density, and litter depth were also recorded for each plot in July. Horned larks (*Eremophila alpestris*), chestnut-collared (*Calcarius ornatus*) and McCowns longspurs (*Calcarius mccownii*) were all most abundant in burned plots while Baird's sparrows (*Ammodramus bairdii*) and Sprague's pipits (*Anthus spragueii*) were most abundant in unburned plots. Sprague's pipit were negatively associated with burning, but not grazing, with the effects from burning declining each year and no longer significant four years post burn. Conversely, chestnut-collared longspurs showed a positive association with burning and grazing with the effects from burning decreasing over time but the effects from grazing remaining fairly constant. In general the effects of burning were larger than those from grazing and tended to decrease over time with only vegetation height still showing any significant association with burning in 2010. CO10: Thu, 10 Mar 16:00

Gary Ritchison and Tyler Rankin, Dept. Biological Sciences, Eastern Kentucky Univ., Richmond, KY 40475.

Nest-site selection by Sharp-shinned Hawks in Kentucky.

Because Sharp-shinned Hawks (*Accipiter striatus*) are the most secretive of North America's forest-breeding raptors, little is known about their breeding biology, including their preferred nesting habitat. In 2009 and 2010, we searched 248 forest stands in Kentucky and found 11 nests, all located in pines (*Pinus* spp.). Nests were at a mean height of 18.6 ± 1.4 m in trees with a mean height of 23.7 m and mean dbh of 38.2 cm. Nests were in mixed coniferous/deciduous forests, with a mean canopy cover of 77.6%. Comparison of the characteristics of nest sites and randomly selected unused sites revealed significant differences (P = 0.021). Discriminant analysis revealed that five variables (foliage cover, mean tree height, basal area, % deciduous canopy cover, and distance from edge) permitted the best discrimination between used and random sites. Sharp-shinned Hawks nested in areas

closer to edges and in areas with denser stands of taller conifers and denser understories. All nests were in stands of young (~25-50 years), even-aged conifers about 18 to 25 m in height, with the dense cover provided by conifers likely providing protection from predators. Nest sites were also close to edges where stands of dense pines transitioned into areas with more, shorter deciduous trees and less foliage cover than nest sites. These adjacent areas may have provided better foraging habitat for nesting Sharp-shinned Hawks because small birds, their primary prey, are more abundant in mixed stands than in the dense stands of conifers where they nested. PO1: 08

Erin A. Roche, Dept. Biology, Univ. Tulsa, Tulsa, OK, Terry L. Shaffer, Michael J. Anteau, Mark H. Sherfy, Marsha A. Sovada, Jennifer H. Stucker, and Mark T. Wiltermuth, USGS Northern Prairie Wildlife Research Center, Jamestown, ND 58401.

Do you see what I see? Detecting Least Tern and Piping Plover fledglings on the Missouri River.

Populations of the federally endangered Interior Least Tern (*Sternula antillarum*) and threatened Piping Plover (*Charadrius melodus*) breed on the upper Missouri River, making it a region of considerable conservation focus. The U. S. Army Corps of Engineers annually assesses productivity of these breeding populations by counting fledging-age chicks. However, young of both species are highly mobile with cryptic coloration, and the effort required to accurately document the number of individuals who eventually fledge is unclear. We collected data on individually color-marked chicks to investigate the influence of time of day and visit frequency on detection probability along the Garrison (2006-2007 LETE, 2007 PIPL) and Gavins Point (2006-2009 LETE, 2008-2009 PIPL) River reaches, Lewis and Clark Lake (2007-2008 LETE), and Lake Sakakawea (2006-2009 PIPL). We estimated daily detection rates with Cormack-Jolly-Seber models in program RMark and ranked our models via QAICc. If Piping Plover sites are visited at least 3 times near but prior to fledging, surveyors have a > 90% probability of detecting individual fledglings. However, twice the number of visits to a Least Tern site prior to fledging is required to attain similar detection probabilities. Surveying during mid-day enhances the likelihood of detecting fledglings. Our findings suggest that reliability of fledgling counts based on marked birds is influenced by frequency and timing of monitoring. Differences in detectability of Piping Plover and Least Tern chicks should be considered when designing a dual-species monitoring program. S4: Sat, 12 Mar 11:30

Christopher M. Rogers, Dept. Biological Sciences, Wichita State Univ., Wichita, KS 67260.

Season-long fecundity, brood parasitism and nest predation in the Cerulean Warbler in southwestern Michigan.

A recent model parameterized by within-season sampling of Cerulean Warbler nest survival and fledgling output showed five cerulean populations to be sinks, with annual reproduction consistently less than annual mortality. Here season-long fecundity was measured for two years in one of these populations in a large forest tract surrounded by anthropogenic non-forest ecosystems in southwestern Michigan. In the 2007 and 2008 breeding seasons, fledgling survival required for a nondeclining population was well above previously published values for landbirds. Brood parasitism by Brown-headed Cowbirds was rare; had it been more common it would have seriously reduced cerulean reproductive success. Nest predation was the main cause of nest failure, and a territory-based predator index suggested the Blue Jay was an important potential nest predator on Cerulean Warblers in both study years, in accordance with two earlier studies. The close agreement between model-estimated and direct-determined source-sink status suggests that a recent demographic model relying on within-season sampling, is adequate for assigning source-sink status of at least a single-brooded landbird. In addition, although distinguishing among historical hypotheses explaining landbird population decline is difficult, this study identifies ways of conserving declining species. Based on previous research, annual adult survival rate of the Cerulean Warbler is typical of non-declining parulid warblers, suggesting adequate migration and overwintering habitat quality. Thus the low reproduction indicated by both recent modeling and direct measurement of season-long fecundity, is a demographic variable of conservation interest, and indicates that increasing landbird breeding grounds productivity should be an important goal. S1: Thu, 10 Mar 15:00

Vanya G. Rohwer and Paul R. Martin, Dept. Biology, Queen's Univ., Kingston, ON K7L 3N6, Canada.

[S]Fitness consequences and selective mechanisms favoring local nest morphologies in Yellow Warblers: nest transplant experiments between subarctic and temperate populations.

Phenotypic traits that vary geographically within species are commonly thought to represent adaptations to different selective pressures that favor trait specialization. We use reciprocal nest transplant experiments to investigate the fitness benefits and selective pressures favoring divergence in Yellow Warbler nest morphologies between populations breeding in northern Manitoba (subarctic) and southeastern Ontario (temperate). Nests from southeastern Ontario that were transplanted to northern Manitoba had colder nest temperatures during incubation compared to local nests. Given that nest temperature has important fitness consequences to embryo and nestling

development, we suggest that cold breeding temperatures favor the large, well-insulated nest type observed in northern Manitoba. In contrast, nests from northern Manitoba transplanted to southeastern Ontario experienced no difference in nest temperature or in fledgling success compared to local nests. The lack of fitness benefits associated with large northern nests in southeastern Ontario suggests that trade-offs in the time and energy allocated to nest building, and the likelihood of re-nesting, appear to favor the smaller nest type observed in southeastern Ontario. CO5: Thu, 10 Mar 14:30

Eric J. Ross, Dept. Science and Environmental Policy, California State Univ., Monterey Bay, Seaside, CA 93955, Derek M. Schook, Dept. Forest, Rangeland & Watershed Stewardship, Colorado State Univ., Fort Collins, CO 80521, Susan E. Alexander, Dept. Science and Environmental Policy, California State Univ., Monterey Bay, Seaside, CA 93955, Fred G. R. Watson, Dept. Science and Environmental Policy, California State Univ., Monterey Bay, Seaside, CA 93955, Timothy H. Parker, Biology Dept., Whitman Coll., Walla Walla, WA 99362.

[S]Geographic structure of song sharing in the Dickcissel (*Spiza americana*) determined by cross correlation.

We investigated the geographic distribution of vocal culture in the Dickcissel (*Spiza americana*). Previous research, based on human classification of song elements, indicated that Dickcissels share song types with neighbors, song sharing declines to an asymptotically low level over several kilometers, and songs often differ dramatically between sites. Here we used cross correlation analyses to quantitatively re-assess song sharing across >500 individuals at a 10 km^2 site in Kansas. We found a highly significant decay in song sharing with geographic distance. Since Dickcissel males do not recruit in the vicinity of their natal territories, this suggests, as did previous analyses, that male Dickcissels learn their song from territorial neighbors after recruitment. However, our plots of pairwise cross-correlation coefficients and maps of song sharing for focal birds illustrated substantial variation in song sharing of all song elements at any distance between males. The relatively simple introductory ('dick') phrases were often similar between both near and distant pairs. The more complex ending ('cissel') phrase, tended to show strongest resemblance only between near neighbors, but we still observed moderately high levels of similarity between birds many km apart. These results suggest that although males likely learn songs from territorial neighbors after dispersal, some other process, such as occasional movement of adults, leads to the dispersal of song types throughout the site. Some of the variance we observed appears to be an artifact of cross correlation; however, the similarity of our results to those based on qualitative element classification improves confidence in our conclusions. CO14: Fri, 11 Mar 10:30

Janet M. Ruth, USGS Fort Collins Science Center, Arid Lands Field Station, Albuquerque, NM 87131, and Robert H. Diehl and Rodney K. Felix, Jr., Univ. Southern Mississippi, Hattiesburg, MS 39406.

Bird migration and stopover habitat use in the Southwest.

To ensure full life-cycle bird conservation, we need to understand migrant behavior en route and how birds use habitat during stopover. Birds traversing the Southwest are known to use riparian stopover habitats; we know less about how migrants use other habitats and how density varies across the region seasonally and annually. Using weather radar data, we found that in fall there was greater passage of migrants through the central part of the borderlands; in spring there was some suggestion of greater passage in the eastern borderlands. Density patterns are consistent with the existence of more than one migration system through western North America and seasonally different migration routes for at least some species. Presence of bats in the data complicates some interpretations. We combined radar and land cover data to determine migrant stopover habitat use. There were significant differences in bird densities among habitat types at all radar sites in at least one of three seasons studied. Upland forest habitat in parts of Arizona and New Mexico supported higher migrant densities than other habitat types, especially in fall. Developed habitat in areas with little upland forest habitat also supported high migrant densities. Scrub/shrub and grassland habitats supported low to intermediate migrant densities, but because these habitat types dominate the region, they may support larger numbers of migrants than previously thought. This may be especially true for non-forest species. Further research is needed to address issues of target identity and to confirm the importance of these habitat types to migratory birds. CO23: Fri, 11 Mar 16:15

Victoria Saab, USFS Rocky Mt. Research Station, Bozeman, MT 59717, Erin Towler, National Center for Atmospheric Research, Boulder, CO 80307, and Karen Newlon, Montana Natural Heritage Program, Helena, MT 59620.

Temperature effects on daily survival rates of nesting Lewis's Woodpeckers *Melanerpes lewis* in the past, present, and future.

We monitored Lewis's Woodpecker (*Melanerpes lewis*) nests in recently burned ponderosa pine (*Pinus ponderosa*) forests (N = 716) and aspen (*Populus tremuloides*) woodlands (N = 76) of southern Idaho during 1994-2004 to model daily survival rates (DSR) of nests in relation to abiotic (temperature, precipitation),

temporal (time since fire, nest initiation date) and habitat factors (tree and surrounding vegetation characteristics at nest sites). Habitat features were not important determinants of DSR. Rather, daily maximum temperature and temporal factors had the strongest influence on DSR in both vegetation types. Increasing daily maximum temperatures had a positive effect on DSR in aspen habitat, but had a negative effect on DSR in recently burned forests. We further assessed the sensitivity of the nest survival models to future climate change scenarios. We used maximum temperature sequences to reflect future "warm" and future "hot" forecasts for the years 2045-2055, informed by a high resolution regional climate change model. DSR values in recently burned forests were largely insensitive to the warming scenarios. Preliminary results for aspen woodlands showed that warming produced a modest increase in DSR for early nesters, but for late nesters the shift was more substantial, with the average DSR increasing from 0.982 (historic) to 0.987 (hot scenario). Results suggest that aspen forests might play an increasingly important role in maintaining nesting habitat for Lewis's woodpecker under warming scenarios. However, temperature thresholds for the persistence of aspen woodlands are unknown. Future work requires examining the vulnerability of aspen forests to varying climate scenarios. CO4: Thu, 10 Mar 11:15

Rebecca Jo Safran, Dept. Ecology and Evolutionary Biology, Univ. Colorado, Boulder, CO 80309.

The dynamics of physiology-trait relationships: implications for honest signal theory.

An implicit assumption underlying several models within current sexual selection theory is that the physiological costs of sexual signals are static or fixed. In particular, the handicap and good genes indicator models of sexual selection both indicate that the physiological underpinnings of morphological traits used to assess potential mates and competitors are constant such that conspecifics can infer a number of physiological attributes associated with that signaling trait. However, in two separate studies conducted on barn swallows *Hirundo rustica*, we show that physiological variables typically studied along-side morphological signals (circulating testosterone and antioxidants) are dynamically – rather than statically – related to various aspects of an individual's morphology. Here, we summarize empirical findings related to the physiological underpinnings of a known sexual signal – ventral color – in barn swallows and suggest a new framework for interpreting morphology-signal dynamics, central to assumptions within several models of sexual selection. CO9: Thu, 10 Mar 16:45

Lance B. McNew, A. J. Gregory, S. M. Wisely, and **B. K. Sandercock**, Division of Biology, Kansas State Univ., Manhattan, KS 66506.

Comparative demography of Greater Prairie-Chickens: regional variation in vital rates, sensitivity values, and population dynamics.

Intensification of agricultural production has led to declines in grassland and farmland birds worldwide. Ongoing declines in Greater Prairie-Chickens (*Tympanuchus cupido*) in east-central Kansas have been linked to land use and land cover changes associated with increases in the frequency of spring burns and stocking densities. We examined the demographic performance of female Prairie-Chickens at three sites in Kansas over a 4-year period. We identified the demographic mechanism for ongoing population declines: losses to predation led to low survival of nests, broods, and attending females and resulted in poor demographic performance at all three sites. Prospective and retrospective analyses indicated that the finite rate of population change (lambda) was most sensitive to adult survival in declining populations. Unexpectedly, the finite rate of population change was also sensitive to nest survival at the most fragmented and least intensively grazed study site. Regional differences in patterns of landscape fragmentation and land use may be impacting the relative influences of different vital rates on population viability of Prairie-Chickens. We conclude that populations of Prairie-Chickens in eastern Kansas are unlikely to be viable without gains from immigration, and that anthropogenic effects on population demography may be influencing the regional life-history strategies of a short-lived upland game bird. S2: Thu, 10 Mar 9:30

Amy Scarpignato and T. Luke George, Dept. Wildlife, Humboldt State Univ., Arcata, CA 95521.

Home range and habitat use of breeding Common Ravens in Redwood National and State Parks, California.

Very little is known about the distribution and habitat use of breeding Common Ravens (*Corvus corax*) in Redwood National and State Parks (RNSP) despite their identification as important nest predators of the California state-threatened Marbled Murrelet (*Brachyramphus marmoratus*). We used radio telemetry to examine home range and habitat use of breeding Common Ravens (N = 8) in RNSP during the 2010 breeding season. We used fixed-kernel density estimates to determine utilization distributions and estimate 95% home range and 50% core-use areas. We calculated the amount of 3-dimensional overlap between adjacent ravens and between years for the same individual to determine site fidelity. We used Resource Utilization Functions to examine raven resource use within the home range. Average home range size of ravens in RNSP was 166 hectares, with a range from 82-381 hectares. Average core-use area was 29 hectares, with a range from 5-71 hectares. There was high

individual variation among raven home range size and habitat use, but the majority of high use areas were centered on human use areas. While we found little overlap between adjacent ravens, the areas of overlap were also centered on human use areas. It appears that each raven pair depends on anthropogenic food sources within their home range and excludes other birds from these areas. Removal of anthropogenic food sources within and adjacent to old-growth habitat may reduce raven use of murrelet nesting habitat in RNSP. CO15: Fri, 11 Mar 11:45

Taza Schaming, Dept. Natural Resources and Cornell Lab of Ornithology, Cornell Univ., Ithaca, NY 14853.

[S]Evaluating Clark's Nutcracker, *Nucifraga columbiana*, population status, habitat use and detectability with occupancy surveys.

Resource managers recognize the immediate need for determining an effective survey method for Clark's Nutcrackers (*Nucifraga columbiana*) because some populations are apparently declining, likely due to the high mortality of whitebark pines (*Pinus albicaulis*). The population status and habitat use of nutcrackers are poorly understood, in part due to the lack of a reliable method of surveying populations. My objectives were to carry out occupancy surveys that incorporate detectability to determine if (1) habitat is a significant cause of heterogeneity of detectability of nutcrackers, (2) occupancy probabilities corrected for detectability improve occupancy estimates, and (3) occupancy surveys are a reliable means to survey nutcrackers. My results demonstrate that it is necessary to correct for imperfect detectability when surveying nutcrackers, in order to increase reliability of occupancy and abundance estimates. The likelihood of detecting nutcrackers varies seasonally, and is conditional on time of day, local habitat, and point count radius. After accounting for the potential bias in detectability, model results suggested that nutcracker occupancy varied seasonally, and was variably impacted among seasons by survey time, tree density, local importance of whitebark pine, and number of whitebark pine cones per hectare. Results from surveys that do not control for detectability would likely be biased, and inaccurate conclusions about population status or trends could result. Occupancy surveys that incorporate detectability represent the best method thus far for monitoring nutcrackers accurately. It is vitally important to implement programs to investigate metapopulation dynamics of nutcrackers because this species is potentially on the cusp of a drastic decline. PO2: 19

Wendy M. Schelsky and Jeffrey P. Hoover, Illinois Natural History Survey, Univ. Illinois, Champaign, IL 61820, and Scott K. Robinson, Univ. Florida, Gainesville, FL.

Female relatedness to social mate increases cuckoldry and between-year breeding dispersal in a wild bird population.

Mating with close relatives is costly because it may lead to inbreeding depression. In socially monogamous species, female promiscuity may alleviate mating with relatives whereas between-year breeding dispersal may provide an additional means of avoiding closely related mates. In this study, we tested the hypotheses that female Prothonotary Warblers (*Protonotaria citrea*) would be more likely to cuckold a closely-related mate, and that their between-year breeding dispersal would increase the more related they had been to their social mate. Females were experimentally manipulated to fail in their breeding attempts so that territory quality did not limit their propensity to disperse. The probability of females cuckolding their social mate increased with relatedness to their social mate. In addition, the proportion of offspring in a female's nest sired by an extra-pair male also increased with relatedness. Cuckoldry provided a within-season means of increasing offspring heterozygosity which tended to increase offspring condition. Between-year patch fidelity for females that cuckolded their mate was nearly twice as high compared to those females that did not cuckold their mate. Between-year breeding dispersal distances, however, were best predicted by and increased with a female's relatedness to her previous social mate regardless of whether they cuckolded him or not. Between-season divorce was associated with longer dispersal distances and was effective at reducing the likelihood of females re-pairing with a closely related mate. In Prothonotary Warblers, female promiscuity and between-year breeding dispersal are effective adaptations to alleviate pairings with close relatives and decrease the risks of inbreeding. CO33: Sat, 12 Mar 14:45

Scott W. Schmidt and Robert B. Blair, Dept. Fisheries, Wildlife, and Conservation Biology, Univ. Minnesota, St. Paul, MN 55108.

[S]Bird distributions across a residential-hardwood forest edge.

We measured the distribution and abundance of avifauna across a residential-hardwood forest edge in Roseville, MN, USA to identify the effects adjacent natural and residential areas have on bird distributions. The two 20 ha edge study sites consisted of five transects, each separated by 100 m. The study also included two control sites: a residential and hardwood forest habitat. We recorded species identity and distance to observer and then calculated individual species abundance using fixed circular plots. In our results we did a cross-comparison of species

richness for our study sites, and categorized individual species response according to significant habitat preference or avoidance. We found that the adjacent land uses affected species diversity and the distribution of individual species. While there was not a significant difference in species richness between the hardwood forest control site and the forest patch in the edge site, it is evident that the presence of forest habitat is important for biodiversity. We found that none of the native species detected in our study possess a unique identity with residential habitat. In the edge site we identified forest specialist species that showed a significant response to the edge and avoided the adjacent residential area. Conversely, we identified residential habitat specialists that avoided the adjacent forest. A category of habitat generalists showed no significant response to the edge. We conclude that understanding edge effects across human-made edges may be important for conservation planning within urban landscapes. PO10: 67

Terry L. Shaffer, Mark H. Sherfy, Michael J. Anteau, Jennifer H. Stucker, and Marsha A. Sovada, USGS Northern Prairie Wildlife Research Center, Jamestown, ND 58401, and Erin A. Roche, Univ. Tulsa, Dept. Biology, Tulsa, OK 74101.

Status and trends of Missouri River Least Terns and Piping Plovers: How much do we know?

The upper Missouri River is an important breeding area for the federally endangered Interior Least Tern (*Sternula antillarum*) population and the federally threatened northern Great Plains population of Piping Plovers (*Charadrius melodus*). Breeding population size (BPOP) and fledgling numbers have been monitored annually by the U.S. Army Corps of Engineers since 1986 (low-intensity monitoring). We used intensive survey techniques and probability-based sampling (high-intensity monitoring) to investigate monitoring accuracy on the Garrison (2006-2007) and Gavins Point (2008-2009) River reaches and Lake Sakakawea (2006-2009). BPOP and fledgling numbers of both terns and plovers were substantially undercounted by low-intensity monitoring on the Garrison Reach, but there was no consistent pattern of over- or under-counting on the Gavins Point Reach. We used nest monitoring and chick survival data to estimate upper and lower bounds on fledgling numbers, and found that low-intensity fledgling counts may have substantially underrepresented productivity on the Gavins Point Reach, especially for Least Terns. Estimates of plover breeding population size at Lake Sakakawea from high-intensity monitoring were imprecise but suggested that low-intensity monitoring undercounted breeding plovers there. Accuracy of low-intensity monitoring varied substantially among breeding areas, years, and species, but tended to improve when nesting activity was concentrated on relatively few sites due to habitat conditions. Our findings imply that low-intensity monitoring does not furnish consistently reliable information on numbers of breeding adults or fledglings of either species. Low-intensity monitoring may be adequate for tracking population trends within some breeding areas but assessment of system-wide trends will be considerably more challenging. S4: Sat, 12 Mar 14:30

Megan Shave, Biology Dept., Stonehill Coll., Easton, MA 02357, and John Kricher, Biology Dept., Wheaton Coll., Norton, MA 02766.

[S]Comparative foraging behavior of two generalist tyrant flycatcher (Aves: Tyrannidae) species in Belize.

This study presents a comprehensive and quantitative comparison of the foraging behaviors of two generalist tyrant flycatcher (Tyrannidae) species, the Social Flycatcher (*Myiozetetes similis*) and the Great Kiskadee (*Pitangus sulphuratus*), within a single habitat in Belize, Central America. I recorded data for each observed foraging movement according to the five components of foraging behavior outlined by Remsen and Robinson (1990): Search, Attack, Foraging Site, Food, and Food Handling. Within these components I recorded a total of eleven foraging measures: search time, return-to-perch frequency, attack maneuver, sally distance, sally angle, perch height, substrate, prey type, prey size, prey handling, and prey fate. Given the morphological differences between the two species, I expected differences in frequencies within the foraging measures overall, and I found significant differences between the two species for nine of eleven measures. However, I also found similarities between the two species for some of the categories within foraging measures; in particular, both species utilized the ground for foraging more frequently than any other substrate and captured small invertebrate prey at similarly high frequencies. Also, although the results supported both species' classifications as foraging generalists, certain preferences differed somewhat from the previously-described foraging profiles of each species, which likely reflects the influence of habitat features, particularly human-modified features, on flycatcher foraging behavior. Additional behavioral observations, including inter- and intraspecific interactions, instances of kleptoparasitism in *P. sulphuratus*, and both species' responses to a temporary superabundant food source, provide further insight into the foraging behaviors and natural histories of these two species. CO1: Thu, 10 Mar 9:45

J. Sheehan, P.B. Wood, G. George, M. McDermott, J. Mizel, P. McElhone, K. Perkins, and M. Shumar, WV Coop. Fish and Wildl. Research Unit, Div. Forestry and Natural Resources, West Virginia Univ., Morgantown, WV 26506, D. Buehler, P. Keyser, T. Beachy, and T. Boves, Dept. Forestry, Wildlife, and Fisheries, Univ. Tennessee,

Knoxville, TN 37996, J. Larkin, A. Evans, and M.White, Dept. Biology, Indiana Univ. Pennsylvania, Indiana, PA 15705, A. Rodewald, M. Bakermans, and F. Newell, School of Environment and Natural Resources, Ohio State Univ., Columbus, OH 43210, and S. Stoleson, USFS Northern Research Station, Irvine, PA 16329.

Avian community and species response to hardwood forest management for Cerulean Warblers.

We studied three silvicultural methods (single-tree selection, shelterwood, and heavy even-aged harvest) as potential tools to manage Cerulean Warbler populations on seven study areas in four Appalachian states in 2006-2010. We analyzed pre-harvest and four years post-harvest point count, territory mapping, and vegetation response data on stands treated with the three harvests, and an untreated control, to examine the broader implications of single-species management for Cerulean Warblers in the region. Differences in harvest method and intensity led to differences in habitat structure and composition, with positive and negative consequences for other avian species. Four years post-harvest, the bird community changed most in the shelterwood and heavy even-aged treatments, particularly due to positive responses of shrub-associated species such as Hooded Warbler, Kentucky Warbler, and Indigo Bunting. Some forest interior species declined (e.g., Ovenbird) in all treatments, while others (e.g., Worm-eating Warbler) declined only in the heavy even-aged treatment. Most species remained at or near pre-treatment levels in the selection harvest treatment, although some increases (e.g., Hooded Warbler) and declines (e.g., Wood Thrush) also were evident. Stand-specific variation in habitat and avian measures also were found, likely due to factors such as topography and within-region differences in vegetation and avian composition. Forest management for cerulean warblers can benefit other avian species or assemblages of management interest, and potential effects on other species should be considered. S1: Thu, 10 Mar 9:45

Mark H. Sherfy,Michael J. Anteau, Terry L. Shaffer, Marsha A. Sovada, Jennifer H. Stucker, Colin M. Dovichin, and Megan L. Ring, USGS Northern Prairie Wildlife Research Center, Jamestown, ND 58401.

Movements and foraging by Least Terns and Piping Plovers nesting on Central Platte River sandpits.

Federally listed Least Terns (*Sternula antillarum*) and Piping Plovers (*Charadrius melodus*) nest on riverine sandbars on many major midcontinent river systems. On the Central Platte River, availability of sandbar habitat is limited, and both species nest on excavated sandpits in the river's floodplain. However, the extent to which sandpit-nesting birds use riverine habitats for foraging is unknown. We radiomarked 16 Piping Plovers and 23 Least Terns nesting on 5 Central Platte River sandpits in 2009-2010 and monitored their movements using a network of fixed telemetry dataloggers. Piping Plovers were detected primarily by the datalogger located in their nesting sandpit, whereas Least Terns were more frequently detected on dataloggers outside of the nesting sandpit. Telemetry data and behavioral observations showed that Least Terns tended to concentrate at the Kearney Canal Diversion Gates, where forage fish were apparently readily available. Fish sampling data suggested that forage fish were more abundant in riverine than in sandpit habitats, and behavioral observations showed that Least Terns foraged more frequently in riverine than in sandpit habitats. Piping Plovers tended to forage in wet substrates along sandpit shorelines, but also used dry substrates and sandpit interior habitats. The greater mobility of Least Terns makes a wider range of potential foraging habitats available during brood-rearing, making them able to exploit concentrations of fish outside the nesting colony. Thus, our data suggest that different spatial scales should be considered in managing nesting and foraging habitat complexes for Piping Plovers and Least Terns. S4: Sat, 12 Mar 15:00

Ryan Shipley, Andrea Contina, Nyambar Batbayar, Eli Bridge and Jeff Kelly, Oklahoma Biological Survey, Univ. Oklahoma, Norman, OK 73019.

[S]Why is there a gap in the breeding range of the Painted Bunting *Passerina ciris*?

The Painted Bunting *Passerina ciris* is a small Neotropical migrant songbird that occurs in two disjunct breeding populations in the United States. The larger population occurs primarily in the Midwest in the states of Texas, Oklahoma, and Arkansas whereas a smaller population exists along the Atlantic coast in North Carolina, South Carolina, and Georgia. Although landscapes vary greatly between these two regions, no obvious climatological or geographic features exclude Painted Buntings from occupying this gap region. To investigate explanations for the disjunction of these breeding populations, we used species distribution modeling to determine if the bioclimatic envelope derived from breeding location data would occupy the region where the species in known to be absent. In addition, we used winter presence data to delineate regions with suitable conditions on the breeding ground during spring arrival and examined historical origins of this gap in the breeding range by modeling current distribution variables onto 2 Last Glacial Maximum (21k.b.p.) paleoclimate models. Our results suggest that a bioclimatic explanation is lacking for the gap between the current breeding distributions and the species exhibits niche tracking within selecting these breeding regions. In addition, the paleoclimate distribution reconstructions suggest that the species' migratory distance was historically shorter than at present, and that two, or possibly three populations may have existed in western Mexico, the Yucatan Peninsula, and southern Florida. These different

glacial refugia may help explain the differences in molting schedules and migratory behavior seen in the 2 present breeding populations. PO9: 64

Daizaburo Shizuka, Dept. Ecology and Evolution, Univ. Chicago, Chicago, IL 60637, Oscar Johnson and David Moldoff, Dept. Ecology and Evolutionary Biology, Univ. California, Santa Cruz, CA 95064, Alexis Chaine, Station d'Ecologie Experimentale du CNRS – Moulis USR 2936, 09200 Moulis, France, and Bruce E. Lyon, Dept. Ecology and Evolutionary Biology, Univ. California, Santa Cruz, CA 95064.

Social structure of wintering migrant sparrows: a social network approach.

Migrant passerines typically spend the majority of the year at their wintering grounds, yet we know little about social behavior of non-breeding individuals. Many species live in social flocks, but whether these loose social groupings lead to coherent and stable social structure of the population is an open question. We studied flock compositions of a free-living migrant population of golden-crowned sparrows (*Zonotrichia atricapilla*) in 2009-2010 and used tools from social network analysis to measure social structure of the population. Specifically, we determined whether golden-crowned sparrows associate non-randomly with conspecifics in flocks at their wintering sites, and whether individuals vary in patterns of social associations. There was significant social organization at a very small spatial scale: three different social groups of sparrows live within a one-hectare area. The spatial pattern of social structure was also evident in social associations at an array of feeders in the study site, and confirmed with radio telemetry of a subset of individuals. The observed social network of sparrows shares many characteristics with social networks of animals, including humans. Namely, the sparrow network displays "small-world properties" a combination of high degree of clustering of individuals and a small average path length (i.e., average 'degree of separation' between any two individuals). Individuals varied in patterns of connectivity to social clusters, reflecting potential variations in social strategies. Our analyses suggest that patterns of social connectivity may play an important role in the evolution of social recognition, social signaling and social dominance among non-breeding birds. CO29: Sat, 12 Mar 11:30

W. Gregory Shriver, Dept. Entomology and Wildlife Ecology, Univ. Delaware, Newark, DE 19717, Kathleen M. O'Brien, USFWS - Rachel Carson National Wildlife Refuge, Wells, ME 04090, Mark Ducey, Dept. Natural Resources and the Environment, Univ. New Hampshire, Durham NH, 03824, and Thomas P. Hodgman, Maine Dept. Inland Fisheries and Wildlife, Bangor, ME 04401.

Long term changes in Saltmarsh *Ammodramus caudacutus* and Nelson *Ammodramus nelsoni* sparrow abundance at Rachel Carson National Wildlife Refuge, Maine, USA.

We evaluated the abundance of Saltmarsh *Ammodramus caudacutus* and Nelson's *Ammodramus nelsoni* sparrows at Rachel Carson NWR, Maine from 2000 - 2010. Saltmarsh and Nelson's sparrows are salt marsh obligate species where they co-occur in southern Maine, both species are high conservation priorities and Saltmarsh Sparrow was recently elevated to "Vulnerable" by IUCN. Because salt marsh birds are not represented by the Breeding Bird Survey, Rachel Carson NWR designed and implemented a monitoring program for these two species at the refuge in 2000. Between 2000 and 2010, we surveyed 110, 100 m radius points from 15 May – 15 August each year at nine salt marsh units. We visited each point at least 2 times per year and counted the number of sparrows detected in a 10 minute time period. We used the Unmarked package in R to estimate the abundance of each species within each marsh and year to determine changes in abundance by species over time and marsh unit. Preliminary results indicated that the average Saltmarsh Sparrow abundance (2.03 + 0.30 SE sparrows / point) across years and marsh units was greater than Nelson's Sparrow (1.75 + 0.19 SE sparrow / point) and variation in abundance by year differed between the two species. Saltmarsh Sparrow abundance was lowest in 2004 (1.52 sparrows / point) and greatest in 2008 (3.01 sparrows / point) while Nelson's Sparrow abundance was lowest in 2000 (1.23 sparrows / point) and greatest in 2006 (3.32 sparrows / point). CO12: Fri, 11 Mar 10:00

T. Scott Sillett, Migratory Bird Center, Smithsonian Conservation Biology Institute, Washington, DC 20013, Jongmin Yoon, Helen R. Sofaer, Kathryn M. Langin, Cameron K. Ghalambor, Dept. Biology, Colorado State Univ., Fort Collins, CO 80523, and Thomas E. Martin, Montana Cooperative Wildlife Research Unit, Univ. Montana, Missoula, MT 59812.

Life history variation in the Orange-crowned Warbler.

Predicting the effects of future climate change on migratory birds requires information about how environmental variation determines the nature of the trade-offs between fecundity and survival that exist among species and populations. A fundamental challenge is unraveling how much of the observed diversity in life history strategies is due to ecological factors versus how much is due to evolved, genetically based factors. A powerful solution is to examine life history variation within a comparative framework while controlling for phylogeny. We studied the ecology and life history of the orange-crowned warbler (*Oreothlypis celata*), one of the few North American

passerine species that exhibits strong, latitudinal variation in migration behavior. Our work focused on breeding populations of three subspecies: *O. c. sordida* on the California Channel Islands (resident or short-distance migrant), *O. c. orestera* in central Arizona (mid-distance migrant), and *O. c. celata* near Fairbanks, AK (long-distance migrant). We found that these populations vary along a "slow-fast" life history continuum. Annual adult survival rates (CA: 0.73 ± 0.03 > AZ: 0.52 ± 0.04 > AK: 0.47 ± 0.1) covaried with clutch size (CA: 3.0 ± 0.05, AZ: 4.4 ± 0.01, AK: 5.0 ± 0.1), breeding season length (CA: 110 d, AZ: 80 d, AK: 50 d), and distance between breeding and wintering areas (CA: 0-300 km, AZ: 1100-1900 km, AK: > 5000 km). These results establish a foundation for investigating how climate variation interacts with ecological factors such as age-specific mortality rates, breeding density, food limitation, and time and energy constraints to shape avian life history strategies. CO8: Thu, 10 Mar 16:45

David L. Slager and Paul G. Rodewald, School of Environment and Natural Resources, Ohio State Univ., Columbus, OH 43210, and Patricia J. Heglund, U.S. Fish and Wildlife Service, La Crosse, WI 54603.

[S]Movement ecology of Northern Waterthrush (*Parkesia noveboracensis*) during spring migratory stopover along the Upper Mississippi River.

Migratory birds must efficiently explore and exploit unfamiliar stopover locations to ensure timely arrival and successful reproduction on the breeding grounds. In spring 2009-2010, we captured, radio-tagged, and translocated transient Northern Waterthrushes (n = 43) at Trempealeau NWR, Wisconsin, USA. We radio-located individuals every 30 min for 2 d and daily thereafter until departure. For birds with complete radio-tracking data for days 1 and 2 (n = 29), we calculated three measures of daily movement. Movement rate, linear displacement, and linearity index decreased over the 2-day period, suggesting early exploration followed by settling at a preferred microsite. Minimum stopover duration was negatively correlated with body condition and decreased over the migration season. Across the season, daily movement rates increased, but linear displacement and linearity index showed no change. These results suggest a within-season shift from an energy-limited schedule to a time-limited schedule as arrival on the breeding grounds becomes more imminent. Despite this transition, no concomitant seasonal changes were evident in Northern Waterthrushes' spatial program. A seasonally rigid spatial program might be expected in a habitat specialist like Northern Waterthrush that defends temporary territories during stopover. The plasticity of spatial programs used by migratory species to exploit resources during stopover may vary considerably depending on the ecology of the species in question. Regardless, several studies now indicate that many species of migrants do not range far from their point of landfall, highlighting the need to identify and conserve high-quality stopover habitats. CO27: Sat, 12 Mar 9:00

Maggi Sliwinski, and Nicola Koper, Natural Resources Institute, Univ. Manitoba, Winnipeg, MB, R3T 2M6, Canada.

[S]Effects of cattle stocking rate and duration of grazing on songbirds of the mixed-grass prairie.

Information on the effects of cattle stocking rates on mixed-grass prairies and wildlife is scarce, even though most remaining native prairie is used for cattle operations. In Grasslands National Park, Canada, a long-term manipulative experiment was implemented to study impacts of stocking rates on wildlife. We conducted songbird surveys from 2006-2010 in nine 300-ha pastures. From 2006-2008, all sites were ungrazed. In 2009-2010, 6 sites were grazed, and 3 sites were ungrazed controls. We used generalized linear mixed models to determine effects of stocking rate and duration (years) on abundances of four songbirds. Abundances of Baird's Sparrows (*Ammodramus bairdii*), Sprague's Pipits (*Anthus spragueii*), and Western Meadowlarks (*Sturnella neglecta*) decreased linearly with stocking rate, while Chestnut-collared Longspurs (*Calcarius ornatus*) increased non-linearly (abundance was higher at low and high stocking rates, lower at medium stocking rates). Each species responded as expected to grazing intensity based on habitat preferences and on evidence that grazing reduces vegetation height/litter. Each species' abundance increased with grazing duration. This response was opposite from expected, except for Chestnut-collared Longspurs, perhaps because 2009-2010 (years with grazing) were the wettest of the study; the additional moisture likely overrode the effects of grazing. For Chestnut-collared Longspurs, there may be a threshold at which their abundance increases without regard to climate, as evidenced by their non-linear response to stocking rate. This study will help determine how to appropriately manage cattle for the benefit of wildlife, and will help us determine thresholds of stocking rate and duration in relation to songbirds. CO15: Fri, 11 Mar 11:15

D. Max Smith and Deborah M. Finch, USDA Forest Service Rocky Mountain Research Station, Albuquerque, NM, Scott H. Stoleson, USDA Forest Service Northern Research Station Irvine, PA, 16329, Katherine Brodhead, Centre for Wildlife Ecology, Simon Fraser Univ., Burnaby, BC V5A 1S6, Canada.

Exotic vegetation and altered disturbance regimes in New Mexico riparian forests: response by Black-chinned Hummingbirds.

Riparian forests support diverse breeding bird communities that include rare and endangered species. Flow restriction, exotic vegetation, and wildfire are identified as threats to riparian habitat quality, but few studies have demonstrated their effects on avian reproduction. We examined Black-chinned Hummingbird (*Archilochus alexandri*) exotic nest plant use and nest survival along rivers that differ in extent of flow alteration and exotic vegetation. At the flow-restricted, exotic-dominated Middle Rio Grande, 50% of nests were constructed in exotic species such as Russian olive (*Elaeagnus angustifolia*) and saltcedar (*Tamarix* spp.). Exotic nest plant use decreased after mechanical thinning of vegetation and increased following wildfire along the Middle Rio Grande. Logistic exposure nest survival estimates did not differ among control, thinned, and wildfire plots, but did vary among nest sites, with survival greater in Russian olive subcanopy (0.58, SE: 0.05) than in cottonwood (*Populus deltoides* subs *wislizenii*) canopy (0.45, SE: 0.04). Along the native-dominated, free-flowing Gila River, 69% of nests were constructed in native boxelder (*Acer negundo*) subcanopy and only 1.5% were constructed in exotic species. Overall nest survival was greater along the Middle Rio Grande (0.55, SE: 0.03) than the Gila River (0.23, SE: 0.04), suggesting that flow restriction and exotic vegetation have not decreased hummingbird productivity. Our results reveal a complex response by birds to disruption of natural riparian processes, evidenced by variation in reproductive parameters within and among river systems. CO28: Sat, 12 Mar 11:15

Thomas B. Smith, Center for Tropical Research, University of California, Los Angeles, CA 90095.

Diversification along ecological gradients in the Tropics.

The mechanisms responsible for diversification in the tropics have long been a central question in evolutionary biology. Two competing hypotheses of speciation predominate: those that emphasize the role of geographic isolation during glacial periods and those that stress the role of ecology and diversifying selection across environmental gradients. With half of the Earth's mature tropical forests already lost, and many rainforest plant and animal species threatened by deforestation and climate change, understanding the mechanisms of diversification are critical for making informed conservation decisions. I explore alternative mechanisms of diversification in rainforest bird and lizard species in sub-Saharan Africa, examining patterns of divergence with gene flow along gradients versus divergence between refugia. Results suggest adaptive diversification is taking place along the forest-ecotone gradient. Additionally, I examine conservation implications of human activities along gradients and show that recent deforestation in the tropics has homogenized gradients, causing a loss of adaptive phenotypic diversity. With as much as two-thirds of the world's terrestrial land area impacted by human activities, I discuss the implications of gradient flattening and its corresponding impacts on adaptive diversity and conservation strategies. PL3: Sat, 12 Mar 13:00

Jason F. Smyth and Christin L. Pruett, Dept. Biological Sciences, Florida Inst. Technology, Melbourne, FL 32901 and Kevin Winker, Univ. Alaska Museum, Fairbanks, AK 99775.

[S]A Bayesian model of island colonization based on Song Sparrow (*Melospiza melodia*) populations in the Aleutian Islands of Alaska.

The Aleutian Islands in Alaska are a unique and little studied ecosystem. Islands isolated by hundreds of miles are home to many endemic subspecies that are phenotypically differentiated from mainland forms. The two subspecies of song sparrow (*Melospiza melodia*) found in the Aleutians, exhibit morphological and behavioral traits not found on the mainland. Understanding how these populations were founded could give insight into how they differ from other song sparrows and inform research on adaptation to insular life. Several colonization scenarios have been proposed based on a sequential loss of genetic diversity along the length of the Aleutians. We tested these scenarios using a Bayesian model to estimate effective population size and bottleneck duration. These estimates were then used to determine the most likely colonization route. My results lend credence to the 'stepping stone' model in which song sparrows hop from island to island instead of colonizing from a single source. Understanding the most likely colonization pattern and relationships among island populations is critical to the future study of adaptive radiation in song sparrows and adaptive evolution to insular ecosystems. CO11: Fri, 11 Mar 9:30

Helen R. Sofaer and Kathryn M. Langin, Graduate Degree Program in Ecology, Colorado State Univ., Fort Collins CO 80523; T. Scott Sillett, Smithsonian Conservation Biology Institute, Migratory Bird Center, National Zoological Park, PO Box 37012, MRC 5503, Washington, DC 20013; and Cameron K. Ghalambor, Graduate Degree Program in Ecology, Colorado State Univ., Fort Collins CO 80523.

[S]Density dependence in two seasons: demographic effects of competition and climate.

Density dependence is central to our understanding of population dynamics. Theory predicts that populations must be regulated by density-dependent mechanisms during at least some time periods or life stages, but detecting and measuring the strength of density dependence is notoriously difficult. For example, population density is likely to interact with ecological conditions such as food availability to affect demographic rates, and these interactions may mask the signal of density dependence. Relatively simple ecological communities, such as those on islands, provide an opportunity to disentangle the effects of density dependence from demographic variation due to fluctuating ecological conditions. Here, we analyze the fecundity and apparent survival of Orange-crowned Warblers (*Oreothlypis celata*) breeding on Catalina Island, California to test for evidence of density dependence. We found that within the island's mediterranean climate, rainfall was the primary driver of food abundance, and was positively correlated with fecundity. After accounting for variation in rainfall, fecundity showed a strong pattern of negative density dependence. In addition, apparent survival was negatively correlated with population density on the wintering grounds, providing a rare example of potential regulatory mechanisms acting in multiple seasons of a migratory bird. CO15: Thu, 10 Mar 16:30

Robert. A. Sparks and David. J. Hanni, Rocky Mountain Bird Observatory, Fort Collins, CO.

Hierarchical distance sampling models.

We used 2010 data from Rocky Mountain Bird Observatory's Integrated Bird Monitoring Program from the Black Hills to build hierarchical distance sampling models. We modeled covariate effects on density using data for two species Ovenbird and Brown Creeper. The benefit of a hierarchical distance sampling model is the accommodation of covariates on both detection probability and abundance parameters. We used a Information Theoretic Approach to select the best model. The top model for Ovenbird included percent of tree cover and the number of dead and down trees (AIC weight = 0.45). Density estimate under the best model for Ovenbird was 18.14 birds/km2 when covariates were held at their mean. The best model for Brown Creeper included relative tree density and elevation (AIC weight = 0.5). Density estimate under the best model for Brown Creeper's was 4.5 birds/km2 when covariates were held at their mean. A density surface map was created for both species to observe predicted density in the Black Hills National Forest. CO25: Sat, 12 Mar 8:45

Jeffrey A. Spendelow, James E. Hines & James D. Nichols, USGS Patuxent Wildlife Research Center, Laurel, MD 20708, Ian C.T. Nisbet, I.C.T. Nisbet & Company, North Falmouth, MA 02556, Carolyn S. Mostello, Massachusetts Div. Fisheries and Wildlife, Westborough, MA 01591, Grace Cormons, Great Gull Island Project, Parksley, VA 23421, Helen Hays, Great Gull Island Project, American Museum of Natural History, New York, NY 10024, and Jeremy J. Hatch, Dept. Biology, Univ. Massachusetts, Boston, MA 02125.

Estimating adult breeding dispersal/fidelity at different geographic scales to evaluate restoration efforts for Roseate Terns.

Prior estimates of adult dispersal/fidelity rates of the endangered Northwest Atlantic Ocean metapopulation of Roseate Terns (*Sterna dougallii*) were derived from mark-recapture/resighting data from four sites 45-250 (mostly >100) km apart that supported the largest breeding colonies in the late 1980s and early 1990s. Restoration efforts since then have established two more colony sites within Buzzards Bay, Massachusetts (BBMA), but local populations also have declined at two of the initial study sites, and one has been abandoned. We update previous work to show how analyses of adult movement rates designed to test several hypotheses at different geographic scales can aid in evaluating the success of restoration efforts. Nocturnal predation of eggs/chicks from 1996-2005 at a colony site in Connecticut was associated with a decrease in local apparent survival due mainly to increased breeding dispersal to a large colony in New York. Hazing adults (to prevent them from becoming oiled during oilspill clean-up procedures) at one BBMA site in 2003 resulted in the colonization of a third BBMA site. While intercolony movement rates treating the BBMA sites as a single unit are similar to rates estimated previously, higher within-BBMA movement rates suggest that successful restoration at the third site is still an ongoing process. CO17: Fri, 11 Mar 15:15

Valerie Steen and Abby N. Powell, USGS Alaska Cooperative Fish and Wildlife Research Unit and Inst. Arctic Biology, Univ. Fairbanks, Fairbanks, AK 99775, and Susan Skagen, USGS Fort Collins Science Center, Fort Collins, CO 80526.

[S]Potential effects of climate change on the distribution of wetland-associated birds in the Prairie Pothole Region, U.S.A.

Freshwater wetlands and wetland-dependent birds are considered at particularly high risk for negative climate change effects. The Prairie Pothole Region (PPR) of the north-central U.S. and south-central Canada contains millions of small prairie wetlands that provide critical habitat to many migrating and breeding wetland-associated birds. To look at the potential effects of climate change on these birds we predicted current and future

distributions of five waterbird species common in the Prairie Pothole Region (PPR) using bioclimatic species distribution models (SDMs). We created fine-scale SDMs for the U.S. PPR using breeding bird survey occurrence records for 1971-2000 and wetland and climate parameters. For each waterbird species we predicted current distribution based on climate records for 1981-2000 and projected future distributions to four future climate scenarios for 2081-2100 and averaged the four to create an ensemble projection. Averaged for all five species, range reduction for the ensemble projections was 64%. However, individual species projections varied widely with one species projected to be absent from 99% of its current range. The results of this study emphasize the need to plan and prepare in an effort to mitigate against species habitat loss under climate change. PO2: 20

Scott H. Stoleson, USFS Northern Research Station, Irvine, PA 16329, Jeffery L. Larkin, Biology Dept., Indiana Univ. Pennsylvania, Indiana, PA 15705, David Buehler and Patrick Keyser, Univ. Tennessee, Knoxville, TN 37996, Paul Hamel, USFS Southern Research Station, Stoneville, MS 38776, Amanda Rodewald, School of Environment and Natural Resources, Ohio State Univ., Columbus, OH 43210, and Petra B. Wood, WV Coop. Fish and Wildl. Research Unit, Div. Forestry and Natural Resources, West Virginia Univ., Morgantown, WV 26506.

From research to management: development of best management practices for Cerulean Warblers.

Populations of the Cerulean Warbler (*Dendroica cerulea*) have declined precipitously in the last century, prompting its status as a species of high conservation concern. Cerulean Warbler preference for extensive tracts of mature hardwood forests creates a potential conflict between its conservation and forest management for timber. To mitigate this conflict, we identified commonalities among research results from the forest management experiment and other studies across the species' range to develop management guidelines for creating, enhancing, and maintaining habitat for Cerulean Warblers. At a landscape level, management should focus on those landforms favored by the species: ridgetops and knolls in uplands, and bottomlands along major waterways. Stand structural characters common among regions include an open, broken, or gappy canopy, well-developed forest strata including understory, and large-diameter trees with spreading crowns. These characteristics can be achieved through active management using partial harvest techniques (e.g., shelterwood cut). Management should manipulate forest composition to favor those tree species preferred by Cerulean Warblers for foraging and nesting. In upland regions these include white oak, sugar maple, tulip poplar and hickories, while in bottomlands management should favor sycamore and box elder over other species. Temporal considerations include ensuring suitable habitat exists nearby if overstory removal is to occur at occupied stands, and avoiding any sort of stand entry during the Cerulean breeding season (April – August). Future conservation efforts should focus on identifying appropriate public and private land managers, and educating them regarding BMP implementation. S1: Thu, 10 Mar 11:00

Jennifer H. Stucker, Deborah A. Buhl, Mark H. Sherfy, and Laurence L Strong, USGS Northern Prairie Wildlife Research Center, Jamestown, ND 58401.

Least Tern foraging habitats on the Missouri River, a multi-scale assessment.

Least Tern (*Sternula antillarum*) foraging habitats are classified as aquatic, but few quantitative studies of these habitats have been conducted. We explored the habitat associations of airborne Least Terns at multiple spatial scales on the Missouri River. We quantified habitat features at random points and locations where terns were observed during focal sampling (2007-2008), and during systematic spot mapping surveys of the river for airborne birds (2006-2008). Multinomial logistic regression and matched pairs logistic regression were used to model habitat characteristics at foraging locations versus paired random locations, while logistic regression was used to compare landscape scale features from landcover maps derived from annually acquired high resolution satellite imagery. For each observation landcover habitats were summarized at multiple scales ($\leq$ 50m radius, $\leq$ 200m radius), and straight-line distances to potentially important habitat features (e.g., trees, wet sand, nesting habitats). Least Tern foraging site use was best explained by shallower water depths than at paired random locations. Foraging sites exhibited substrate variability, and were associated with landforms consistent with bar forms. For the landscape analysis, airborne terns were associated with water and wet sand habitats, however, some habitat relationships varied annually. Differences in habitat use between foraging and flying Least Terns suggest that foraging terns may optimize their distance to wet sand (shallow water) in relationship to other habitat features. Results demonstrate some consistency across spatial scales in foraging habitat selection on this part of the Missouri River. Tern nesting habitat restoration efforts may benefit if foraging habitat availability is considered during planning. S4: Sat, 12 Mar 10:30

Brynne A. Stumpe, Catherine C. Alsford, and Sara R. Morris, Canisius Coll., Buffalo, NY 14208.

[S]Does House Wren singing rate change with stage in breeding cycle?

We studied the relationship between breeding cycle and singing rate in a newly established House Wren (*Troglodytes aedon*) population in Buffalo, New York. Any male heard singing within an hour of sunrise was recorded. Approximately every other day, we checked the condition and stage of the nest and recorded the number of eggs and/or chicks. The stages of the breeding cycle were divided into "Prenest," "Nest," "Laying," "Incubating," and "Chicks." Contrary to our expectation, no significant differences were found in the singing rates between the different stages ($F = 0.033$, $df = 4,58$, $p = 0.998$). When the categories "Nest," "Laying," and "Incubating" were combined into one category, there was still no significant difference in singing rate between stages ($F = 0.002$, $df = 2,60$, $p = 0.998$). Because this was an urban setting that is accessible to visitors, we also investigated the effect of perceived human "traffic" on singing rate. Overall we found the lowest singing rate in the least disturbed areas and the highest rate of singing in the most disturbed areas. However, no statistically significant difference was found between the three levels ($F = 1.619$, $df = 2,25$, $p = 0.218$). Since the wrens in our population started laying later than those in previous studies, males could be singing more during the "Chicks" stage to increase likelihood of double-brooding. It should also be noted that our recordings were made only in early morning and it is possible that our population did change singing rates between stages, but these changes were not apparent in early morning singing. CO14: Fri, 11 Mar 11:00

Ryan J. Stutzman, Susan K. Skagen, and Joseph J. Fontaine, Nebraska Cooperative Fish and Wildlife Research Unit, Univ. Nebraska-Lincoln, Lincoln, NE, USGS Fort Collins Science Center, Fort Collins, CO, USGS Nebraska Cooperative Fish and Wildlife Research Unit, Univ. Nebraska-Lincoln, Lincoln, NE.

[S]Avian migration in the face of an altered landscape.

With increasing habitat loss and alteration impacting biodiversity and ecosystem function worldwide, there is increased uncertainty in the ability of avian populations to successfully complete annual migration. The wetlands of the Prairie Pothole region act as important stopover and breeding habitat for a variety of migratory bird species, including 37 species of shorebirds, many of which are declining. The decline of mid-continental shorebird populations may be linked to the severe wetland alteration, driven primarily by land use change that has occurred in the region. Although it is known that shorebirds use highly altered wetlands, it is unclear if they are showing preference for wetlands in certain land use types and what selective forces may be driving stopover habitat selection. Additionally, it is unknown if using highly altered wetlands is an adaptive choice that leads to efficient foraging and ultimately successful stopover. From April to July of 2010, we conducted local and landscape surveys for migrating and breeding shorebirds across three counties in north-central South Dakota to identify habitat preference in relation to varying land use types and wetland phenology. Using a combination of behavioral observations and direct habitat assessment we measured the relative success of these habitat decisions based on the availability of food resources. We observed 22 species of shorebirds totaling 8961 individuals. Of these, 13 species and 7273 individuals were classified as en-route migrants. Preliminary analysis indicates migratory shorebirds use flooded soybeans fields in high densities. Future work aims to determine the adaptive consequences of this apparent preference. CO23: Fri, 11 Mar 16:30

Kimberly A. Sullivan and Leslie J. Brown, Dept. Biology, Utah State Univ., Logan UT 84322.

The response of breeding passerines to rangeland alteration.

Shrub-dominated ecosystems on private land are important rangeland resources in the western United States. These private lands are frequently treated to improve grazing for livestock. Little is known about the relative effects of chemical, mechanical and burn treatments on breeding passerine sagebrush communities. We compared breeding passerine communities and vegetation at 17 untreated sites and 49 sites treated 2-45 years earlier in Rich County, Utah. Brewer's Sparrows, Sage Thrashers and Green-tailed Towhees reached their highest densities in shrubby untreated and chemically treated sites, especially sites treated 10 or more years ago. Vesper Sparrows and Horned Larks were denser in the open, grassy areas on recent mechanically treated sites. Shrub cover was higher on sites treated by fire and chemicals than mechanically treated sites. Over time, grass and forb cover decreased and shrub cover increased with sites returning to untreated conditions within 20 years. CO15: Fri, 11 Mar 10:30

David L. Swanson, Dept. Biology, Univ. South Dakota, Vermillion, SD 57069.

Ultrasonographic detection of seasonal changes in flight muscle size in small birds.

Changes in flight muscle size are important mediators of phenotypic flexibility in birds, so the ability to track changes in muscle size over time in individual birds is a potentially valuable tool for investigating such phenotypic flexibility. Ultrasonography has been used to track changes in flight muscle size associated with migratory disposition in shorebirds down to a size of approximately 120 g, but has not been previously used to track such changes in small birds, despite variation in flight muscle size being an important contributor to

phenotypic flexibility in these birds. Seasonal phenotypes in small birds wintering in cold climates are characterized by increments of organismal metabolic rates that are coupled to increments in pectoralis muscle mass. I examined seasonal changes in flight muscle mass in house sparrows (*Passer domesticus*, 25-30 g) and tested (1) the degree of correlation between ultrasonographic measures of breast muscle thickness and actual muscle mass and (2) whether ultrasonographic measures of muscle thickness were sufficiently precise to detect seasonal changes in flight muscle size. Ultrasonographic measurements of breast muscle thickness were significantly and positively correlated with muscle mass measurements (R-squared = 0.743). Breast muscle mass (17.5%) and muscle thickness (9.1%) were both significantly greater in winter than in summer. These data confirm that (1) winter increments of flight muscle mass consistently contribute to the winter phenotype in house sparrows in cold climates and (2) that ultrasonographic measures of muscle thickness are effective in detecting seasonal changes in muscle mass in small birds. CO9: Thu, 10 Mar 16:15

Ildiko Szabo, Cowan Vertebrate Collection, Beaty Biodiversity Museum, Univ. British Columbia, Vancouver, BC V6T 1Z4, Canada.

Bird Study Skin Preparation Website available on Beaty Biodiversity Museum Website. Phase 1 - Complete.

Recognizing the immense importance of bird skin collections to current and future generations, this webpage provides some basic tools on how to prepare avian study skins. The series is designed to help the novice who has never prepared an avian skin, people looking for a refresher course, or people who need to prepare voucher specimens to complement their DNA or other studies. The target audience is graduate students working in the field, as well as volunteers and staff at parks, colleges, universities, and museums which hold the appropriate permits. In July 2010, the first six downloadable PowerPoint presentations in this series were launched on the Beaty Biodiversity Museum Website (Museum opened on 16 October 2010). The links portion the site hosts a collection of videos, websites, and PDF's showing alternate methods that have been produced by other institutions. Half of the PowerPoints demonstrate preparation methods. Others in the series deal with sexing using gonads, determining skull ossification, washing skins for ectoparasites, stomach contents, DNA extraction, skeletons, and labeling, data sheets, and the importance of data collection. The series of 13 PowerPoint presentations is scheduled for completion in 2012. PO12: 74

Robert D. Taylor and Mark Deutschlander, Dept. Biology, Hobart and William Smith Coll., Geneva, NY 14456.

[S]Energetics and orientation of Black-capped Chickadees (*Poecile atricapillus*) during irruptive migrations.

Migration is energetically demanding, often requiring obligate migrants to fatten in preparation of seasonal movements. Irruptive migrants, however, migrate in response to declines in food abundance, which may prevent them from preparing energetically for movement. This study evaluates seasonal energetic differences between irruptive Black-capped Chickadees (*Poecile atricapillus*) and obligate annual migrant species, as well as within-species differences between migratory seasons. We hypothesize that chickadees will have a greater energetic condition in the spring than in the fall during only irruptive years. Specifically, we propose a 'fall leaner' hypothesis for irruptive birds, whereby irruptive individuals show decreased energetic condition in the fall as an accompaniment to exodus from resource-poor habitats. This is in contrast to the spring fatter hypothesis, which suggests that obligate migrants carry excess fat during spring migration, i.e., more than needed for migration, as either insurance against poor spring conditions or in preparation for the energetic demands of breeding. Our study will also synthesize data from three sources (banding data from Braddock Bay Bird Observatory, recapture data from the BBL, and citizen-science data from Project Feederwatch) to produce a generalized picture of BCCH geographic movement during irruptions. PO8: 60

Syrena M. Taylor and Christopher M. Heckscher, Dept. Agriculture and Natural Resources, Delaware State Univ., Dover, DE 19901.

[S]Effect of age on Veery song repertoire size.

Current theory is that oscine passerines do not learn new song types after the song crystallization period. The literature states that the Veery song repertoire ranges from 2 - 5 songs per individual. We used a 12-year database of recorded Veery songs from marked individuals to determine mean repertoire size and to test for an effect of age on repertoire size. At our study site, Veeries exhibit dominance hierarchies dependent on age (or time spent within the population). Thus, we hypothesized that repertoire size increases with age. Our reasoning was that males may increase song repertoire in order to successfully manage an increasing number of subordinates. We reason that an increase in repertoire size could result from songs added that were learned prior to the crystallization process but not necessarily used while the individual was socially subordinate. Mean repertoire size was 4.09 songs per individual (range: 3 – 5). However, contrary to our expectations, our preliminary data

suggests that a negative relationship exists between repertoire size and age. We discuss the possible reasons for a negative effect of age on repertoire size. PO6: 43

Jason Thiele and Charles Dieter, Dept. Biology and Microbiology, South Dakota State Univ., Brookings, SD 57007, and Kristel Bakker, Coll. of Arts and Sciences, Dakota State Univ., Madison, SD 57042.

[S]Distribution and habitat selection of the Western Burrowing Owl (*Athene cunicularia hypugaea*) in western South Dakota.

Burrowing owl (*Athene cunicularia*) populations are declining largely due to wide scale habitat loss. The burrowing owl's habitat is variable across its range, and knowledge of its specific needs in different regions is necessary for its conservation. In South Dakota, burrowing owls are associated with black-tailed prairie dog colonies, but it is unclear why owls select certain colonies as nest sites. We surveyed prairie dog colonies in 25 western South Dakota counties from May through July 2010 for burrowing owls using a standardized point count method. We classified each surveyed prairie dog colony into one of three classes (unoccupied, single occupied, or multiple occupied) based on the number of breeding pairs of burrowing owls in the colony. We used ArcGIS to calculate the area of each colony and to estimate the percent cover of trees, grassland, and cropland within 1600 m of each colony. Single occupied and multiple occupied colonies were significantly larger than unoccupied colonies. Larger colonies provide more potential nest burrows and perhaps better foraging opportunities. Percent tree cover was the only landscape factor that differed among the three colony classes. Multiple occupied colonies had less tree cover in the surrounding landscape than unoccupied colonies, indicating that burrowing owls avoid nesting near wooded areas. During the next phase of this study, we will examine burrow-level characteristics of nest and non-nest burrows in all colony classes. We will construct models using various combinations of nest-, colony-, and landscape-level characteristics to determine the most important factors impacting nest site selection. CO15: Fri, 11 Mar 10:45

Jennifer L. Thieme and Amanda D. Rodewald, School of Environment and Natural Resources, Ohio State Univ., Columbus, OH.

[S]Behavioral and reproductive consequences of nest predator.

The proximity of urban green spaces to anthropogenic food sources and non-native predators (e.g. cats) can result in high densities of nest predators. Not only can avian reproductive success decline with rising numbers of predators, but birds also may avoid patches altogether. These consequences of high predator densities can diminish the value of urban habitats. We examined behavioral responses of birds across a range of predator abundances and determined to what extent avian reproductive success was linked to predator communities in urban parks. We surveyed for territorial and reproductive behavior of eight focal species in seven grassland/successional sites in northeastern Illinois, 2009-10. Territory densities varied widely among sites (0 to 7 territories/ha, totaling 548 territories) and increased with increasing numbers of snakes ($\beta = 0.058 \pm 0.057$ SE; top model $W_i = 0.704$), though the 95% CI included zero. Daily nest survival (n = 217 nests) was best predicted by and, surprisingly, increased with abundance of brown-headed cowbird (*Molothrus ater*) ($\beta = 0.277 \pm 0.215$ SE; top model $W_i = 0.898$); however, the 95% CI included zero. Successful territories contained more cowbirds ($t_{63} = -2.804$; $p = 0.023$) and fewer snakes ($t_{59} = 2.309$; $p = 0.024$) than unsuccessful territories. Cowbirds were negatively associated with total predator activity at the plot scale ($\beta = -0.056$, $p = 0.039$). Mesopredator activity failed to explain variation in either territory density ($\Delta AIC = 14.8$) or nest survival ($\Delta AIC = 170$). These results suggest that while birds may be able to see and respond to diurnal predators such as snakes, nocturnal predators such as raccoon or skunk may play a lesser role in predicting territory and nest locations. PO10: 68

Emily H. Thomas, Margaret C. Brittingham, and Walter M. Tzilkowski, School of Forest Resources, Pennsylvania State Univ., Univ. Park, PA 16802, and Scott H. Stoleson, USFS Northern Research Station, Irvine, PA 16329.

[S]Effect of oil and gas development on songbird abundance in the Eastern United States.

Studies on the effects of forest fragmentation on songbirds illustrate both positive and negative effects. Resident, early successional species tend to benefit or adapt while forest dwelling Neotropical migrants are often displaced. The development of oil and gas resources can cause extensive forest fragmentation. My study examines the effects of oil and gas development on songbirds in the Allegheny National Forest. To determine effects, I measured the relative abundance of songbirds at both small and large-scales. I completed point counts at individual wells and paired controls to determine songbird response at the well pad itself. I also examined the overall landscape effect by completing three point counts within 25 hectare sites with various densities of active wells. My results showed that 12 species increased at individual wells, while nine species decreased at individual wells. Also, 11 species increased with overall well density, while two species decreased with overall well density. Species richness increased with well density; however, conservation value scores did not correspondingly

increase. The increase in species richness but not conservation value with well density suggests that although total number of species increases with well density, the species found in areas with no or few wells are considered species of greater conservation concern than the species found in areas with many wells. I suggest that oil and gas developers place wells along existing roads or within previously cleared areas whenever possible to limit the elimination of core forest area and the forest interior songbird species that depend on it. CO26: Sat, 12 Mar 9:30

Nathan E. Thomas, Biology Dept., Shippensburg Univ., Shippensburg, PA, and David L. Swanson, Dept. Biology, Univ. South Dakota, Vermillion, SD.

Intraspecific correlations between minimum and maximum metabolic output in birds: Do intraspecific data support the aerobic capacity model for the evolution of endothermy?

The underlying assumption of the aerobic capacity model for the evolution of endothermy is that basal (BMR) and maximal aerobic metabolic rates are phenotypically correlated. However, because BMR is largely a function of central organs whereas maximal metabolic output is largely a function of skeletal muscles, the mechanistic underpinnings for their phenotypic correlation is not obvious. Interspecific comparative studies in birds generally support a phenotypic correlation between BMR and maximal metabolic output. If the aerobic capacity model is valid, then these phenotypic correlations should also extend to intraspecific comparisons, but such comparisons have not yet been undertaken for birds. We measured BMR, Msum (maximum thermoregulatory metabolic rate) and MMR (maximum exercise metabolic rate) in several small winter-acclimatized passerine birds and examined correlations among these variables for both raw and mass-adjusted data. We found little evidence for phenotypic correlations between BMR and either measure of maximum metabolic output, and also little evidence for correlations between Msum and MMR. These data suggest that central organ and exercise organ metabolic levels are not inextricably linked in individual birds. Why intraspecific and interspecific avian studies show differing results and the significance of these differences to the aerobic capacity model are unknown, and resolution of these questions will require additional studies of potential mechanistic links between minimal and maximal metabolic output. PO7: 55

Lauren E. Throop and Craig W. Benkman, Dept. Zoology and Physiology, Univ. Wyoming, Laramie, WY 82070.

[S]Evidence for Allee effects? How variation in local tree density influences the mutualism between limber pine (*Pinus flexilis*) and the Clark's Nutcracker (*Nucifraga columbiana*).

Limber pine (*Pinus flexilis*), a masting species, provides critical habitat and ecosystem services throughout the Intermountain West but is suffering extensive mortality from climate change and pest epidemics. Our research examines the potential for Allee effects in declining populations manifested through reduced cross-pollination, increased seed predation by red squirrels (*Tamiasciurus hudsonicus*), and decreased seed dispersal by a mutualist, the Clark's Nutcracker (*Nucifraga columbiana*). During one moderate and one mast year, we measured local densities, cone production, cross-pollination rates, red squirrel seed predation, and potential nutcracker seed dispersal for approximately 200 trees across a range of local densities. In the mast year, nutcrackers harvested a higher proportion of total seeds from trees located in sparser areas. These trees produced a slightly reduced proportion of full seeds, but this effect was overwhelmed by reduced seed predation by red squirrels and increased seed harvesting by nutcrackers. We also noted reduced red squirrel seed predation in the mast year, which supports the predator-satiation hypothesis for masting. Our research indicates that nutcrackers are highly effective at exploiting sparsely distributed resources. We saw no evidence for Allee effects over the range of tree densities in our study, indicating that if the declines are not too severe, remaining trees may serve as refugia for natural regeneration. CO19: Fri, 11 Mar 15:15

Romeo Tinajero and Ricardo Rodríguez-Estrella Centro de Investigaciones Biológicas de Noroeste (CIBNOR), La Paz, Baja California Sur, México, and Jesús A. Lemus and G. Blanco Dept. Evolutionary Ecology, Museo Nacional de Ciencias Naturales (CSIC), c/ José Gutiérrez Abascal 2, 28006 Madrid, Spain.

[S]Effects of habitat fragmentation on the community of pathogens of the Harris' Hawk in the desert of Baja California Sur, México.

Emergent infectious diseases are considered a threat for biodiversity in fragmented habitat networks because of parasitic diseases. A controversy exists because some studies have found that there is an increase in parasites with habitat loss and fragmentation but others have not found any relationship. We studied a large community of pathogens (including haematozoans, fungi, bacteria and viruses as determined through PCR assays) in resident birds of the Harris' Hawk, in a fragmented landscape and adjacent natural area in the desert of Baja California Sur, México. In 2009 and 2010 we trapped and managed 46 free-ranging adults and 51 nestlings at nests. We collected blood samples and oral and cloacal swabs (preserved with Amies transport medium). We compared the presence and prevalence of parasites between nestlings and adults in both natural and fragmented areas. We found

a higher richness of blood parasites in adult birds of fragmented areas (16 vs 14). Nestlings from fragmented areas also showed a higher richness of parasites (18 vs. 11 in natural areas). *Pseudomonas aeroginosa*, marek, gumboro, poxvirus, adenovirus, Newcastle virus and trichomonas were only present in fragmented areas. The richness of pathogens in cloacal and oral swabs samples was similar in birds from fragmented and natural areas. Our preliminary results show a higher richness of parasites in fragmented areas that probably is related to a more intense human activity in the area e.g. presence of chicken farms. CO18: Fri, 11 Mar 14:30

Lauren F. Tingco, California State Univ. Los Angeles, CA.

[S]Impact of disturbance on the roosting behavior of Western Snowy Plovers (*Charadrius alexandrinus nivosus*).

Charadrius alexandrinus nivosus (Western Snowy Plover) is federally listed as a threatened species and considered a "species of special concern" by the state of California. It last nested in Los Angeles County in 1945 but continues to winter roost on Los Angeles County beaches. Since 1945, disturbances (activities that caused birds to flush from foraging or resting) from pedestrian traffic, beach grooming, lifeguard vehicles, and introduced predators, have prevented them from nesting on Los Angeles County beaches and has also led to a significant decline in roosting habitat. The overall objective of this project is to better understand the relationship between disturbances, subject reaction, and enclosure type (i.e., enclosed and unenclosed). Observational studies are currently being conducted at six beach sites. Three of the sites have enclosures in place to protect roosting habitat and three do not. Two strata of data will be collected: (site level) and (subject level). Site level data includes information about disturbances near enclosed and unenclosed winter roosting sites. Subject level data includes information about transit time (time spent locating a new roost or returning to original roost from flushing) for individuals in a roost at each site. Preliminary results identify vehicles and pedestrians as the top two disturbances to *C. alexandrinus nivosus*. These results also indicate frequent subject reactions due to direct rather then tangential direction of vehicle and pedestrian disturbances. Results also show that vehicle and pedestrian disturbances are usually followed by wildlife disturbances from American Crows and various gull species. CO21: Fri, 11 Mar 16:15

Pepper W. Trail, National Fish and Wildlife Forensics Lab, U.S. Fish and Wildlife Service, Ashland, OR 97520.

The contemporary feather trade: exploitation of North American birds for the construction of Native American-style regalia.

Over 100 years ago, American conservation achieved a landmark victory with the ban on interstate trade in wild bird feathers. Unknown to many, this trade still continues today, primarily to provide materials for Native American-style regalia, such as headdresses, bustles, and fans. The U.S. Fish and Wildlife Service (FWS) is responsible for enforcing federal laws protecting native birds, including the Lacey Act, the Migratory Bird Treaty Act, and the Bald and Golden Eagle Protection Act. The FWS National Fish and Wildlife Forensics Laboratory conducts analyses in support of these enforcement activities. This report summarizes 67 cases submitted to the Laboratory between 2000-2010 for the identification of feathers and other bird remains associated with the construction of regalia. The evidence included both finished objects and raw materials such as whole carcasses and detached wings, tails, and feet. A total of 81 native North American bird species were identified in the evidence, representing over 2000 individuals and 24 avian families. The number of identified feathers and other remains exceeded 23,000. Three species accounted for over 50% of all individuals identified: Bald Eagle (29%), Golden Eagle (13%), and Red-tailed Hawk (9%). Rounding out the top ten were magpie (*Pica* species) (6%), flicker (*Colaptes* species) (6%), Rough-legged Hawk (6%), Scissor-tailed Flycatcher (5%), Anhinga (4%), American Kestrel (2%), and Ferruginous Hawk (1%). Both finished regalia items and raw materials such as tail feather sets command high prices. This illegal feather trade represents an ongoing threat to eagles and other targeted species of North American birds. PO2: 21

Katerina Tvardikova and Vojtech Novotny, Dept. Zoology, Faculty of Science, Univ. South Bohemia in Ceske Budejovice, Czech Republic, and Inst. Entomology, Biology Centre AS CR, Ceske Budejovice, Czech Republic.

[S]Diversity pattern and significant upward shifts in birds along a complete altitudinal rainforest gradient in New Guinea.

Monitoring of species response to climate change is currently highly relevant as climatic change on biotic communities is usually associated with changes in the distribution of species. Therefore, the elevational gradients can serve as a heuristic tool responding to new demand for biodiversity data from a range of altitudes. We explored the distribution of bird diversity along complete rainforest altitudinal gradient from the lowland floodplains of Ramu River (200 m asl.) to the timberline (3700 m asl.) on the slopes of Mt Wilhelm, the highest peak of Papua New Guinea. The study was completed at eight stations evenly spaced at 500 m altitudinal increment. Each elevation was surveyed by point count method, mist-netting and MacKinnon list technique. By

using simple logistic regression, we compared recent and historical (until 1984) presences or absence of species in studied elevations. We made a total of 22678 individual observations comprising of 256 bird species. We document hump-shaped diversity patter with the highest number of species recorded at 700 m asl. and minimum of species recorded at 3700m. The two neighbouring elevations in lowlands (200 and 700 m asl.) were the most similar (Jackard = 0.72) and shared 64 species. The mid-elevations were the most different (1700 and 2200 m asl., Jackard = 0.36, 34 shared species). The general upward trend between historical and recent observations is statistically significant [ANOVA, F1 = 13.843, p = 0.0002]. More than 45% species shifted their presence to higher elevation, whereas only 5.5 % of species was recorded at lower than historical elevation. CO20: Fri, 11 Mar 14:30

Jonathon J. Valente, Richard A. Fischer, Michael P. Guilfoyle, and Sam S. Jackson, U.S. Army Engineer Research and Development Center, Environmental Laboratory, Vicksburg, MS 39180, Michael D. Kaller, School of Renewable Natural Resources, Louisiana State Univ. Agricultural Center, Baton Rouge, LA 70803, and John T. Ratti, Dept. Fish and Wildlife Resources, Univ. Idaho, Moscow, ID 83844.

Bird community response to vegetation cover and composition in riparian habitats dominated by Russian olive (*Elaeagnus angustifolia*).

Riparian systems in the western United States provide important habitat for bird communities during all times of the year. In recent decades, invasive plants, such as Russian olive (*Elaeagnus angustifolia*) and saltcedar (*Tamarix* spp.), have achieved broad distribution and local dominance in many western riparian areas, raising concerns over the loss of ecological function within these systems. We investigated the effects of total woody vegetation cover and the relative proportion of Russian olive cover on riparian bird communities along the Snake and Columbia Rivers (southeastern Washington) during 2005 and 2006. Our results indicated that riparian habitats dominated by Russian olive can support diverse and abundant bird communities in both the summer and winter. Bird density and species richness were best explained by a quadratic relationship to total woody vegetation cover in both seasons, as was breeding bird community composition, with greatest density and richness values occurring around intermediate cover levels. However, we found no indication that the proportion of the woody vegetation comprised of Russian olive strongly influenced bird community metrics. Abrupt eradication of Russian olive from riparian systems where the plant is abundant will reduce the overall habitat value for birds by eliminating significant structural complexity. To maximize bird density and richness in such areas, managers should strive for 50-70% total woody vegetation cover and, where possible, explore if and how re-establishment of native plants improves habitat value for birds. CO31: Sat, 12 Mar 15:00

Carol Vleck, David Vleck, and Christopher Foote, Dept. Ecology, Evolution & Organismal Biology, Iowa State Univ., Ames, IA 50011, and David Winkler, Dept. Ecology & Evolutionary Biology, Cornell Univ., Ithaca NY 14853.

Effects of carrying an instrument package on telomere length and innate immune function in Tree Swallows.

We placed 1 g data logger backpacks on Tree Swallows, *Tachycineta bicolor*, at breeding sites in Iowa and New York, monitored return of backpacked birds and matched controls in the following year and tracked changes in telomere length and innate immune function. A 1 g load is about 5% of swallow body mass and at the upper end of the range usually assumed to have minimal effects on behavior and survivorship. In 2008- 09 in IA, 43% of backpack (n = 9) and 44% (n = 12) of control birds returned. In 2009-10 in IA and NY, 23% of backpack (n = 10) and 32% (n = 12) of control birds returned. As an index of oxidative damage we measured changes in mean telomere lengths using DNA extracted from erythrocytes. We assessed innate immune function of plasma using a bactericidal assay and a hemagglutination/hemolysis assay for natural antibody (NAbs) and complement. Bacterial killing capacity did not vary with time or treatment. There was a significant (p = 0.05) or nearly significant (p = 0.06) interaction between treatment and beginning or ending values for complement and NAbs respectively. Returning control birds had higher values than in the previous year, whereas returning backpack birds had lower values. Telomere lengths declined significantly more (p = 0.03) in backpack birds (mean loss = 573 base pairs) than in controls (mean loss = 163 base pairs). A moderate instrumentation load carried for a long period may be a significant handicap adversely affecting telomere length and natural immunity, although we have not yet detected effects on survival. CO24: Fri, 11 Mar 16:30

Margaret A. Voss, Michael A. Campbell, and Beth A. Potter, School of Science, Penn State Erie, Behrend Coll., Erie, PA 16563.

Using the avian nest as a model system to explore biodiversity.

Biodiversity is a multidimensional concept that is difficult to address through an array of discrete undergraduate biology courses. We are designing a project that focuses on the microbial diversity found in bird nests to integrate

courses across an undergraduate biology curriculum (i.e., Field Biology, Animal Behavior, Genetics, Microbiology, Molecular Biology, and Evolution). Avian nests are complex in structure, species specific, and designed to augment embryonic development through maintenance of a stable microclimate. The choice of plant material used in construction, the content and structure of the nest lining, and parental incubation behavior interact to regulate microbial flora. Students in field and microbiology classes collected bacterial samples from nests and eggs and to date, have collected over 100 bacterial isolates. Students in an upper division molecular biology class used molecular techniques to identify the bacterial isolates using DNA sequences from the 16S rRNA gene. Each student sequenced three purified clones, analyzed the resulting sequence data using basic bioinformatic tools, and constructed global multiple alignments. Students in the molecular biology and evolution classes then used the multiple alignment data to generate phylogenetic trees. We present preliminary results suggesting that microbial composition of both egg and nest change with stage of incubation. This ongoing student research project requires both field and lab techniques and integrates courses across the biology curriculum, clearly demonstrating the continuum and codependence of the disciplines required to understand biodiversity. PO12: 73

Lindsey A. Walters, Dept. Biological Sciences, Northern Kentucky Univ., Highland Heights, KY 41099, and Nathan Olszewski and Kevin Sobol, Dept. Biology, Canisius Coll., Buffalo, NY 14208.

Starting over: nest relocation and nestling provisioning in House Wrens after nest predation.

Nest predation is an important contributor to avian nest mortality. Because higher rates of provisioning are likely to increase predation risk, parents are expected to decrease their provisioning rates when they are nesting in a riskier location. We were provided an opportunity to test this hypothesis after our study population of House Wrens (*Troglodytes aedon*) experienced a mass predation event that destroyed most of the nests in our population in a single night. We monitored nest relocation and provisioning behavior of banded males that attempted a second brood after nest predation. Some of the depredated males attempted a second brood in the same nest box, while others moved to a different nest box. If these birds were sensitive to predation risk, we predicted that compared to males that moved, males nesting again in the same location would have lower provisioning rates in response to the increased risk of using a previously depredated site. Consistent with our prediction, we found that male House Wrens that moved to a different nest box after nest predation provisioned their nestlings at higher rates than those that stayed at the same box for their second breeding attempt. In addition, nestlings of males that moved had larger tarsus lengths than nestlings of males that stayed. These results support the hypothesis that predation risk can influence avian reproductive strategies. CO4: Thu, 10 Mar 11:45

Kristin Wakeland, Patrick Mathews, and Alan Maccarone, Friends University, Wichita, KS 67213

Waterbird diversity at a man-made stopover wetland in an urban environment.

Arrivals and departures of six Orders of waterbirds at a man-made, urban wetland in Wichita, Kansas, were documented from March-May 2010 and August-October 2010. A total of 96 h of observations at two ponds, 3 m and 2 m deep, were made four times weekly over the course of 12 weeks for both the Spring and Fall migration. A total of 53 different species were documented, which consisted of 22 species of Charadriiformes, 18 species of Anseriformes, 7 species of Ciconiiformes, 3 species of Gruiformes, 2 species of Podicipediformes, and 1 species of Pelicaniformes. The most common species were mallard (*Anas platyrhynchos*), Canada Goose (*Branta canadeis maximus*), and Killdeer (*Charadrius vociferous*). The order of appearance and abundance in the spring migration showed that the species of Anseriformes arrived first, followed by the Charadriiformes, and finishing with the Ciconiiformes; the reverse was true for the Fall migration. Species diversity is consistent with larger, natural wetlands along the Mississippi flyway, which suggests the urban, man-made wetland is a suitable habitat for a stopover location. CO11: Sat, 12 Mar 8:45

Gregory T. Wann and Cameron L. Aldridge, Natural Resource Ecology Laboratory, Colorado State Univ., Fort Collins, CO 80523, and Clait E. Braun, Grouse Inc., Tucson, AZ 85750.

[S]Long-term trends in survival and population growth of White-tailed Ptarmigan in Colorado.

Few studies have examined long-term population trends in species endemic to alpine ecosystems due to a general paucity of data available for animals occurring in these habitats. We analyzed a 45-year time series of demographic data for a population of White-tailed Ptarmigan (*Lagopus leucura*) in Colorado to examine trends in survival and population growth. In addition, the relationship between body condition and survival was examined as annual winter cumulative precipitation was found to affect body mass in our population. Overall apparent survival of males ($\varphi = 0.65 \pm 0.01$) was higher than that of females ($\varphi = 0.58 \pm 0.01$). Juveniles (first year of breeding) and adults had similar survival, and the best fit model selected using the Akaike Information Criterion included time dependence without age effects. Apparent survival estimates in the top time-dependent model

varied widely (φ: 0.23-0.82). A Pradal model was used to estimate population growth ($\lambda = 1.03 \pm 0.001$) and suggests that our study population appears to be stable, although models including temporal effects indicated very high variability in annual estimates. These results suggest high annual variability in our study population with respect to survival and growth estimates and highlight the need for a better understanding of how stochastic events such as climate influence the population dynamics of White-tailed Ptarmigan. Studies investigating the influence of climate on vital parameters in alpine species such as ptarmigan are urgently needed and currently underway. CO16: Fri, 11 Mar 11:00

Andrew Weber and Margaret Brittingham, School of Forest Resources, Pennsylvania State Univ., Univ. Park, PA 16802.

[S]Habitat use by grassland obligate birds in South Central Pennsylvania.

In Pennsylvania, many grassland birds have declined 80% or more since the mid-1960s. Reasons include decreased hayfield area, mowing during nesting season and landscape change due to farm abandonment. The Conservation Reserve Enhancement Program (CREP), a farmland conversion program, has increased grassland habitat over the last decade. We quantified the effects of CREP-enrolled fields on grassland birds across southeastern Pennsylvania and determined which field-types grassland birds are using in an agricultural landscape. Grasshopper Sparrows (*Ammodramus savannarum*) and Indigo Buntings (*Passerina cyanea*) were found less frequently on CREP fields than expected by availability of CREP. Field Sparrows (*Spizella pusilla*) and Song Sparrows (*Melospiza melodia*) were found somewhat more frequently on CREP fields while Bobolink (*Dolichonyx oryzivorus*), Eastern Meadowlark (*Sturnella magna*), Common Yellowthroat (*Geothlypis trichas*) and Red-winged Blackbird (*Agelaius phoeniceus*) were found more frequently on CREP fields than expected. Bird abundances were positively correlated with amount of agricultural fields enrolled in CREP for Common Yellowthroats, Bobolinks, Red-winged Blackbirds and Eastern Meadowlarks. This suggests that some grassland obligate bird species are benefitting from the conversion of less productive agricultural land into grasslands while other species are not utilizing these grasslands. It is important to know whether CREP is providing beneficial habitat to all grassland obligates, and if not, ways to improve CREP fields and non-CREP agricultural habitats for grassland birds. In a largely agricultural landscape, it is important to determine which habitats these grassland species respond positively to, and how to manage for those types of habitats. PO2: 22

Enrique Weir, The Crane Trust, Wood River, NE 68883.

Wet meadows distribution, use by cranes and other migratory birds, and hydrological influence at South Central Nebraska: a literature and information summary and evaluation.

Wet meadow is described as grassland with waterlogged soil near the surface but without standing water most of the year. Through the 1990's a 74 – 80% of wet meadows in the Platte River Valley have been converted to croplands or farms. We evaluated 50 year's existing information about the relation of wet meadows for cranes and other birds, the influence of the river in the hydrology of wet meadows, and the gaps in knowledge that need to be studied. EndNote-X3 was used for the organization of the information. Wet meadows are highly variable in regards to ground water level and depend of the river stage. The abundance of wildlife is highly variable in regards to the ground water regime. Most information available at wet meadows is on soil invertebrates and the use by sandhill cranes during staging season. The use of wet meadows by whooping cranes and other migratory birds is unclear. There are no system level studies in which wet meadows are studied from a holistic perspective. As an open system, many elements of the surrounding landscape will influence what happens in a wet meadow; therefore an understanding of this landscape and conditions is necessary for a more scientific knowledge of wet meadow structure and functioning. An understanding of how the different components of wet meadow are related to each other may help us better understand its natural functioning, the importance for birds, and to develop a better restoration's habitat to emulate the natural wet meadow system. CO28: Sat, 12 Mar 11:00

Melinda J. Welton, Gulf Coast Bird Observatory, Franklin, TN 37064, D. L. Anderson, Museum of Natural Science, Louisiana State Univ., Baton Rouge, LA 70803, G. Colorado, School of Environment and Natural Resources, Ohio State Univ., Columbus, OH 43210, E. M. Carman, San Jose, Costa Rica, T. Beachy, Dept. Forestry, Wildlife, and Fisheries, Univ. Tennessee, Knoxville, TN 37996, E. S. Perez, Fundación Defensores de la Naturaleza, Guatemala Ciudad, Guatemala, D. Mehlman, Migratory Bird Program, The Nature Conservancy, Santa Fe, NM 87501, J. D. Vargas, San Jose, Costa Rica, and L. D. Chavarría, Reserva El Jaguar, Jinotega, Nicaragua.

Migration distribution and risks: the next frontier.

Cerulean Warbler (*Dendroica cerulea*) has one of the longest migrations of any small passerine, traveling approximately 4,000 km between breeding grounds in eastern North America and nonbreeding residency in northern South America. However, unlike that of many migratory birds, Cerulean Warbler ecology is poorly

understood during these potentially limiting segments of the annual cycle. In 2004-2009 teams of resident and foreign biologists conducted 183 line-transect surveys in Belize, Guatemala, Honduras, Nicaragua, and southern Mexico, during the last week in March and the first two weeks of April. Results generally confirm Ted Parker's 1994 hypothesis that Cerulean Warblers stop in low mountains on the Caribbean coast of northern Central America in early April. However, in contrast to Parker's observations of Ceruleans between 600 and 750 m in Belize, a majority of sightings in this project were below 500 m, while the frequency of encountering Cerulean Warblers was much higher in Belize, southern Mexico and central Guatemala than elsewhere. Recent observations place large numbers of Cerulean Warblers (1 to 14 individuals in mixed-species foraging flocks) in Costa Rica's Caribbean foothills from late-August to mid-September, opening an exciting new avenue to investigate fall migration. The relatively low numbers of Cerulean Warblers encountered during spring migration (130 individuals during 702 hours of surveys) call into question Parker's suggestion that the entire population of Cerulean Warblers stops over in the Caribbean-facing mountains of northern Central America. A new hypothesis consistent with all results to date, based on winds-aloft, will be presented. S1: Thu, 10 Mar 15:30

Walter Wehtje, The Crane Trust, Wood River, NE, 68883, Felipe Chavez-Ramirez, Gulf Coast Bird Observatory, Lake Jackson, TX 77566, and David Brandt, Gary Krapu, and Aaron Pierce, USGS Northern Prairie Wildlife Research Center, Jamestown, ND 58401.

Using satellite telemetry to gain new insights into Whooping Crane (*Grus americana*) stopover locations and migration behavior.

The whooping crane (*Grus americana*) is one of the rarest bird species in the world. The only wild population migrates 4,000 km between their breeding grounds in Wood Buffalo National Park (WBNP), NWT and their wintering grounds at Aransas National Wildlife Refuge (ANWR), TX. Due to the low numbers of birds in this population (< 300), most information regarding their migration patterns have come from opportunistic sightings along the migration corridor. Because most whooping crane mortality occurs during migration, understanding this portion of the birds' life history is very important for recovering the species. Beginning in December 2009, 12 whooping cranes were fitted with Northstar© platform telemetry transmitters (PPTs) at ANWR and WBNP. As of January 2011, 11 of these birds were alive and providing up to four GPS fixes/day. Data collected during the fall 2010 migration showed that departure dates from WBNP, staging periods in south-central Saskatchewan, total migration time and arrival dates at ANWR varied greatly among these birds. In general the migration route used by these birds corresponded well with published analyses based upon observer networks and previous VHF telemetry conducted in the early 1980s. In contrast with earlier studies, no chicks marked in 2010 were lost during their first fall migration. The telemetry data provided insight into routes taken and alternate staging areas and stopover sites utilized by the cranes. We expect to mark additional chicks in 2011 and 2012 as well as adults on the wintering grounds. PO2: 23

Douglas W. White and E. Dale Kennedy, Biology Dept., Albion Coll., Albion, MI 49224.

Time of fledging in House Wrens, *Troglodytes aedon*, derived from temperature loggers.

Fledging is a key ecological divide marked by changes in mobility, feeding, and predation risk. Yet, fledging date and duration of nestling period are characteristically inferred from periodic visits, not continuous monitoring. Knowledge of exactly when in the day nestlings fledge remains anecdotal. For House Wrens breeding in nest boxes in Michigan in 2004-2010, we used temperatures recorded by iButton data loggers to estimate when the last nestling left its box. In our sample of 307 broods, fledging frequency peaked 1-3 hours after sunrise. Median completion time for fledging was 171 minutes after sunrise; fledging ended in 67% of nests by 4 hours after sunrise and in 81% of nests by 6 hours after sunrise. Small broods finished fledging significantly earlier in the day than large broods (150 vs. 199 minutes after sunrise). Broods with 17-19 day-old nestlings fledged significantly earlier in the day than broods with younger nestlings (120 vs. 230 minutes after sunrise). Median fledge time did not differ significantly between early and late season broods, broods with low and high hatching asynchrony, or boxes with low and high infestations of mites. Based on census and temperature records, some young often fledged an hour or more before their last nest mate. Where risk of nest predation is primarily nocturnal, morning fledging might give young a longer first day to adjust to life beyond the nest. Future studies, perhaps using video recordings, are needed to identify the cues or behaviors that trigger fledging. CO5: Thu, 10 Mar 15:15

Teri Wild, Dept. Biology and Wildlife, Univ. Alaska, Fairbanks, AK 99775, Steve Kendall, U.S. Fish and Wildlife Service, Yukon Flats National Wildlife Refuge, Fairbanks, AK 99701, Nikki Guldager, U.S. Fish and Wildlife Service, Arctic National Wildlife Refuge, Fairbanks, AK 99701, and Abby Powell, USGS Alaska Cooperative Fish and Wildlife Research Unit, Univ. Alaska, Fairbanks, AK 99775.

[S]Breeding Smith's Longspur habitat associations and predicted distribution in the Brooks Range, Alaska.

Smith's Longspur *Calcarius pictus* is a species of concern, yet few studies have been conducted on their breeding grounds in Alaska. To develop effective conservation measures, we need an understanding of population abundance and distribution. We conducted point count surveys for breeding Smith's Longspur at six sites in the Brooks Range in 2006-2009 to document density, distribution, and habitat associations. We also used survey data to predict their distribution across the Brooks Range. Vegetation cover and environmental variables were analyzed using nonmetric multidimensional scaling (NMDS). Vegetation associations included a spectrum of sedge-herbaceous and sedge-shrub tundra. We created distribution models from presence information and environmental variables using boosted trees. The distribution prediction resulted in 76% accuracy and AUC of 0.83. Important environmental variables included elevation, minimum temperature, distance to river, slope, and landcover. We predicted a patchy distribution across the Brooks Range. Presence sites were associated with east- and south-facing shallow slopes, near rivers, at elevations up to 2000m above sea level. CO12: Fri, 11 Mar 9:00

Rachel Wildrick and Rebecca Safran, Univ. Colorado at Boulder, Boulder, CO 80305.

[S]Ecological predictors of age-related increases in reproduction in Barn Swallows.

Differential allocation between costly parental care and self-preservation is a well-known trade off in evolutionary theory. Across a variety of taxa, a pattern exists where younger individuals tend to reproduce less than older individuals. Here, we focus on ecological hypotheses to explain predominant patterns in age-related reproduction: the role of an individual's changing morphology over time, site fidelity, breeding experience and pair bond duration. We present data from a three-year study in a population of North American barn swallows to analyze how within-individual changes in morphology, social mate, and previous breeding experience and site fidelity affect patterns of seasonal reproductive success. These analyses will enable us to determine the mechanism underlying age-related improvements in reproductive performance using longitudinal data on breeding individuals in our population. PO5: 39

Lauren Wilkerson and Michael Patten, Dept. Zoology, Univ. Oklahoma, Norman, OK 73019.

[S]Parental investment in the cooperative-breeding Acorn Woodpecker (*Melanerpes formicivorus*).

We looked at the relative amount of parental investment breeding Acorn Woodpeckers (*Melanerpes formicivorus*) place in their older as opposed to their younger offspring and how this is modified when both age groups occur together. Acorn Woodpeckers live in cooperative breeding groups in which fledglings remain for up to several years as helpers to assist their parents in the raising of subsequent broods. Helpers assist in nest provisioning and nest and territory defense. Despite this helpers are still offspring of the breeding birds and as such could still benefit from parental investment. Since helpers are nutritionally independent we focused on mobbing behavior as an index of parental investment. We incited mobbing behavior in family groups of Acorn Woodpeckers with a mounted Cooper's Hawk (*Accipiter cooperii*) and compared the mobbing times, number of bows, number of hops, and closest approach distances of individually marked birds. Base line values of parental investment in helpers and fledglings were obtained by comparing the mobbing responses of breeders in families with helpers only and with fledglings only to families with neither helpers nor fledglings. Finally, these family types were compared to families with both helpers and fledglings to see if any interactions occurred. PO5: 40

Matthew Wilkins, Dept. Ecology and Evolutionary Biology, Univ. Colorado, Boulder, CO, Karaardıç, Ali Erdoğan, Dept. Biology, Akdeniz Univ., Antalya, Turkey, and Rebecca Safran, Dept. Ecology and Evolutionary Biology, Univ. Colorado, Boulder, CO 80309.

[S]Geographic variation in the song of the Barn Swallow, *Hirundo rustica*.

An impressive number of studies on the barn swallow have illuminated the relationships between aspects of male phenotype, measures of quality, and seasonal reproductive success. Yet, work in recent years has shown that sexual selection pressures vary greatly among subspecies populations. For example, females of the North American barn swallow (*H. r. erythrogaster*) select mates based on dark ventral plumage rather than the long tail streamers preferred by females of the European subspecies (*H. r. rustica*). Moreover, a combination of streamer length and ventral plumage are selected among the Middle Eastern subspecies (*H. r. transitiva*). Though selection on male morphology is strikingly divergent between these populations, song has as yet only been characterized for *H. r. rustica*. This is notable because studies from a wide range of taxa have highlighted the importance of acoustic signals in population divergence. Preliminary analyses suggest that overall song structure is highly conserved across barn swallow subspecies, though some song components do show significant differences among populations. In particular, the rate of pulses in the terminal "rattle" was the most divergent character measured, consistent with recent work in birds and insects suggesting that temporal aspects of acoustic productions are the first to diverge between populations. The aim of this study is to characterize the songs of *H. r. erythrogaster*, *H. r. rustica*, and *H. r. transitiva* from four populations (in Colorado, Romania, Turkey, and Israel) in order to improve

our understanding of the role of song in the rapid divergence of the barn swallow complex. CO14: Fri, 11 Mar 10:45

Karen Willard, Paul Rodewald, and Robert Gates, Ohio State Univ., Columbus, OH 43212.

[S]Occupancy modeling of marsh bird habitat associations in Ohio. Validation and refinement of marshbird habitat models is needed to enhance conservation efforts for these declining species.

We surveyed 571 emergent wetland points throughout glaciated Ohio in 2009 and 2010. We used occupancy modeling and an information theoretic approach to 1) identify micro and macro (within a 500 m buffer) habitat characteristics associated with marsh bird occupancy, and 2) determine relationships between occupancy and cover of invasive macrophytes (*Phragmites australis* and *Typha angustifolia*). Based on 2010 data, the best-fitting model indicated that a 20% increase in emergent vegetation and two additional vegetation cover types resulted in Virginia Rails being 2.1 (95% CI: 1.4-3.1) and 5.1 (95%CI: 0.49-26.7) times more likely to occupy a wetland, respectively. Virginia Rail occupancy was negatively associated with the till plains physiographic region (?_ = -6.885 ± 2.804). A 35% increase in emergent vegetation was associated with a two-fold increase in Sora occupancy (95% CI: 1.1-3.8). Least Bitterns were 2.2 (95% CI: 1.5-3.3) and 3.0 (95% CI: 1.2-7.1) times more likely to occupy a site for every 10% increase in persistent emergent vegetation and 10% reduction in *Phragmites* cover. Occupancy was associated with two regions (till plains: ?_ = -5.694 ± 2.616; lake plains: ?_ = 2.873 ± 2.349). Although we focused on fine-scale associations, results indicate that consideration of regional context can improve monitoring and conservation of marshbirds. The association between Virginia Rails with vegetation cover types suggests that managers should promote structurally diverse wetlands. Our results further indicate that Least Bittern would benefit from removal of *Phragmites*, if replaced by persistent emergents (e.g., *Typha* spp.). CO10: Thu, 10 Mar 16:30

Virginia L. Winder and Steven D. Emslie, Dept. Biology and Marine Biology, Univ. North Carolina at Wilmington, Wilmington, NC 28403.

[S]Ecology of Nelson's, Seaside and Saltmarsh sparrows (*Ammodramus nelsoni, A. maritimus* and *A. caudacutus*, respectively) and mercury availability at breeding versus non-breeding sites.

We investigated the ecology of three species of coastal sparrows (*Ammodramus nelsoni, A. caudacutus* and *A. maritimus*; NSTS, SSTS and SESP, respectively) using mark-recapture data from four seasons (2006-2010). We found that all three species exhibit high levels of site fidelity during their non-breeding period in North Carolina. Recapture data indicate that North Carolina NSTS and SSTS populations are composed largely of transient individuals during the early part of fall migration until transients filter out of the area and residents become established in November. SESP recapture data support the hypothesis that this species is a year-round resident in North Carolina marshes. NSTS and SESP apparent survival were estimated at 0.912 ± 0.260 SE and 0.658 ± 0.144 SE, respectively. Estimated SSTS survival was significantly lower than the other two species at 0.159 ± 0.057 SE. We also used these three species as indicators of regional mercury availability at breeding and non-breeding sites. Blood, breast feathers and the first primary feather were sampled for mercury analysis from banded individuals of each species during winters in North Carolina and from NSTS breeding in wetland systems in North Dakota, Ontario and New Brunswick. Results of our mercury analysis indicate that sampled populations of NSTS and SSTS are exposed to significantly higher mercury availability on their breeding sites compared to non-breeding sites in North Carolina. Our results demonstrate the importance of studying both non-breeding and breeding populations of migratory passerines and provide initial information that can be used in conservation and management of these species. CO28: Sat, 12 Mar 10:30

Jared D. Wolfe, School of Renewable Natural Resources, Louisiana State Univ., Baton Rouge, LA 70803, and C. John Ralph, USDA Forest Service, Pacific Southwest Research Station, Redwood Sciences Laboratory, Arcata, CA 95521 and Klamath Bird Observatory, Ashland, OR 97520.

[S]Gimme' Shelter: a tropical bird's dissimilar response to global climatic phenomenon in an uneven aged forest.

Tropical forest degradation coupled with global climate change may act synergistically to influence resident tropical bird demographics. Using eleven years of bird banding data we examined the influence of the El Niño Southern Oscillation Cycle (ENSO) on the physiology, survivorship and population growth change of White-collared Manakin (*Manacus candei*) populations residing in young and mature forest in Northeastern Costa Rica. White-collared Manakins in mature forest exhibited more stable survivorship, population growth change and were significantly heavier relative to counterparts in young forest. Although no trend between demographics, physiological condition and ENSO was detected in White-collared Manakins residing in young forest, the lowest survivorship estimate in young forest was during an El Niño year and the second highest survivorship estimate in young forest was during a La Niña year. Conversely, there was a slight positive correlation between White-

collared Manakin mature forest survivorship and El Niño. We conclude that food resource stability in mature forest provides refugia for species incapable of coping with inherently variable and unpredictable food resources associated with young forest. Conserving older forest is critical given that stochastic climatic events probably influence food availability via trophic cascades more strongly in less-stable young forest relative to more stable-mature forest. CO17: Fri, 11 Mar 14:30

Jared D. Wolfe, School of Renewable Natural Resources, Louisiana State Univ., Baton Rouge, LA 70803, T. Brandt Ryder, Smithsonian Migratory Bird Center, National Zoological Park, Washington, DC 20013, and Peter Pyle, Institute for Bird Populations, Point Reyes Station, CA 94956.

Categorizing bird age in the Tropics: an improved approach.

Accurately differentiating age classes is essential for the long-term monitoring of resident New World tropical bird species. Molt and plumage criteria have long been used to accurately age temperate birds, but application of temperate age-classification models to the Neotropics has been hindered because annual life-cycle events of tropical birds do not always correspond with temperate age-classification nomenclature. However, recent studies have shown that similar molt and plumage criteria can be used to categorize tropical birds into age classes. We propose a categorical age-classification system for tropical birds based on identification of molt cycles and their inserted plumages. This approach allows determination of the age ranges (in months) of birds throughout plumage succession. Although our proposed cycle-based system is an improvement over temperate calendar-based models, we believe that combining both systems provides the most accurate means of categorizing age and preserving age-related data. Our proposed cycle-based age-classification system can be used for all birds, including temperate species, and provides a framework for investigating molt and population dynamics that could ultimately influence management decisions. (Winner of Best Student Publication Award, *Journal of Field Ornithology*, 2010) P12: 72

Eric M. Wood and Anna M. Pidgeon, Dept. Forest and Wildlife Ecology, Univ. Wisconsin-Madison, Madison, WI 53706.

[S]The importance of oak trees as foraging habitat for Neotropical migrant songbirds during spring migration.

Over the past century, oak dominated forests of eastern North America have undergone compositional changes due to fire suppression and lack of regeneration. It is not clear how these changes may affect songbirds during spring migration. We investigated whether certain tree species in a Wisconsin hardwood forest were selected as foraging substrates with greater frequency than they occurred. During spring migration in 2009 and 2010, we collected data on tree species use by migratory songbirds and on tree and sapling diversity in the Kickapoo Valley Reserve, in southwestern Wisconsin. We recorded 28 songbird species, 17 of which were Neotropical migrant wood-warblers (Parulidae), using trees as stop-over foraging habitat over the two sampling periods. Of 35 tree species recorded, the proportional use by birds of several, including red (*Quercus rubra*) and white oak (*Q. alba*) was greater than their proportional availability. On the other hand, the proportional use of sugar (*Acer saccharum*) and red maple (*A. rubrum*) was much lower than their proportional availability. We compared current tree diversity data with historic Public Land Surveyor data to investigate forest composition change. The tree species composition within our study region has changed from an oak-elm dominated forest to a maple-oak dominated forest. Sugar and red maple saplings now form a nearly continuous cover in the understory, with very low recruitment of oak, suggesting a further shift of the forest composition towards dominance by shade-tolerant species. Our results highlight the importance of oak trees as spring stop-over foraging habitat for migratory songbirds. CO23: Fri, 11 Mar 16:30

Anna Joy Lehmicke, D. B. Warnell School of Forestry and Natural Resources, Univ. Georgia, Athens, GA 30602, **Mark Woodrey**, Coastal Research and Extension Center, Mississippi State Univ., Biloxi MS 39532, and Bob Cooper, D. B. Warnell School of Forestry and Natural Resources, Univ. Georgia, Athens, GA 30602.

Differences in breeding ecology of Seaside Sparrows in Gulf and Atlantic coastal marsh habitats.

Seaside Sparrows (SESP; *Ammodramus maritimus*) are passerines restricted to coastal salt marsh. They are considered a species of concern by the National Audubon Society, Partners in Flight, and the U.S. Fish and Wildlife Service due to current and projected habitat loss. The Gulf Coast Joint Venture (GCJV) Landbird Monitoring, Evaluation, and Research Team selected this species as an indicator of salt and brackish marsh health because its life history is tightly linked to this declining habitat. Unlike the Atlantic subspecies (*A. m. maritimus*, *A. m. macgillivraii*), little is known about the ecology of SESP along the northern Gulf Coast (*A. m. fisheri*). The current GCJV habitat model is based on assumptions based on the Atlantic Coast populations; however, marshes along the Atlantic are fundamentally different from those along the northern Gulf Coast. In this study we compared nesting data from coastal Mississippi to published data from Atlantic populations to test for differences

in breeding habitat parameters. Preliminary analysis illustrates differences in multiple measures including nest location, nest survival rates, and causes of failure. This supports our initial hypothesis that significant differences exist between Gulf coast and Atlantic SESP populations and suggests that the GCJV model should be revised to consider data from the Gulf Coast subspecies. PO4: 36

Steve Zack and Joe Liebezeit, Wildlife Conservation Society, Portland, OR 97205.

Conservation science for conservation outcomes in Arctic Alaska. The coastal plain of Arctic Alaska contains immense breeding grounds for migratory birds from all over the world.

The largest wetlands complex in the circumpolar Arctic is in Western Arctic Alaska, and that region is encompassed by the National Petroleum Reserve - Alaska (NPR-A, > 95,000 km^2). For the past decade, we have been engaged in on-the-ground studies of nest density, nest productivity, and nest predator determination as they affect shorebirds and songbirds both in the NPR-A and in the Prudhoe Bay oilfields. Our studies are directed at understanding where wildlife protection would be most important in the NPR-A, understanding the effects of energy development on these birds, and how climate change is beginning to affect these species. In a large collaborative study across several sites, we investigated how increasing numbers of nest predators associated with oil field infrastructure have affected nest productivity. We have also conducted studies in remote areas of the Teshekpuk Lake Special Area of the NPR-A, gaining novel information on the nesting density and nest productivity of shorebirds and songbirds. Finally, our studies of nest initiation dates in Prudhoe Bay allow comparison to studies dating back to the 1980s, and reveal increasingly earlier nest initiation. We draw from these studies to shape our conservation priorities, and engage with federal officials and other stakeholders in attempting to conserve wildlife in the changing Arctic. CO13: Fri, 11 Mar 10:00

Theodore J. Zenzal, Jr., Robert Diehl, and Frank R. Moore, Dept. Biological Sciences, Univ. Southern Mississippi, Hattiesburg, MS, 39406.

[S]The effect of radio telemetry devices on the flight behavior of Ruby-throated Hummingbirds (*Archilochus colubris*): a pilot study.

Radio telemetry is a valuable tool in the study of animal behavior, particularly with respect to movement and habitat use. This tool however, has limitations especially when it comes to smaller animals and their associated load bearing capacity. In order to obtain reliable data from radio telemetry, every effort should be made to minimize the impact of the transmitter on the animal's behavior. The Ruby-throated Hummingbird (*Archilochus colubris*) is a challenge in this respect with an average mass of 3 g which can easily double during migration. The aim of this study is to evaluate possible negative effects on the flight performance or behavior of individuals fitted with small radio transmitters. We tested three different transmitter designs on 15 males and 15 females using a paired study design. Treatment one used a 240 mg transmitter with a 12.7 cm antenna, Treatment two used a 218 mg transmitter with a 12.7 cm antenna, and Treatment three used a 218 mg transmitter with a 6.35 cm antenna. Birds' behaviors were recorded using video with a high speed shutter of 1/4,000 s. Videos were analyzed for wing beat frequency and time budgets with and without transmitters attached. Preliminary results indicate that Treatment one may have the greatest effect on flight performance, whereas Treatments two and three show little difference from the control. The use of radio telemetry as a tool in studying hummingbird biology, will allow us to broaden our understanding of their migration and stopover biology. PO8: 61

Yufeng Zhang and David Swanson, Dept. Biology, Univ. South Dakota, Vermillion, SD 57069.

[S]Metabolic rates in swallows: do energetically expensive lifestyles affect thermogenic capacities in birds?

Because both summit (Msum = maximum thermoregulatory metabolic rate) and maximum (MMR = maximum exercise metabolic rate) metabolic rates are functions of skeletal muscle metabolism, correlations between these measures of maximal metabolic output could occur, but this has been little studied in birds. Moreover, because energetically expensive lifestyles are often correlated with high metabolic rates, cross-training effects of a high-energy lifestyle (i.e., high exercise) on thermogenesis, and vice versa, may exist. We tested this cross-training hypothesis with swallows, a family with an energetically expensive aerial insectivore lifestyle. We measured basal and summit metabolic rates in three species of temperate-zone breeding swallows and combined these data with literature data to address the hypothesis that swallows have higher BMR and Msum than non-aerial insectivore birds. BMR for temperate-zone swallows was higher than for tropical swallows, similar to results for other bird taxa. In addition, our preliminary data suggest that BMR in swallows shows a tendency to be higher than BMR for other birds. In contrast, Msum values in the three species of swallows that we measured were consistent with Msum values for other swallow species, including tropical species, and the Msum-body mass regression for swallows was almost coincident with the Msum-body mass regression for other birds. These data tentatively suggest that swallow Msum is similar to that for other birds, so cross-training effects of an

energetically expensive lifestyle on thermogenesis are not apparent, but more data are necessary confirm this finding. PO7: 56

Hongfeng Zhao, Jinwei Dong, Youmin Chen, Delong Zhao, Xiangming Xiao, Center for Spatial Analysis, Univ. Oklahoma, Norman, OK 73019.

Effect of climate change and urbanization on geographical range shifts of Light-vented Bulbul *Pycnonotus sinensis* in China.

Geographic ranges of wild bird species over the world are responding to climate change and urbanization. Using published literature and geographic information systems, we examined how climate change and urbanization are related to recent range shifts of the Light-vented Bulbul *Pycnonotus sinensis* in China. Up to around 1990, this sedentary species occurred mostly in subtropical areas and was associated with cultivated land. However, recent data have shown that its range has expanded northwards substantially, and the species has become more common in urban areas. To evaluate whether climate change corresponds with this shift, we mapped the 0°C isotherm of mean air temperature in January using data from weather stations and satellites. To examine the potential effect of urbanization we analyzed (1) the built-up areas and (2) green vegetation (which relates to food resources for birds) of individual cities over time. We found that the 0°C isotherm corresponded well with the northern boundary of the species range in 1990 and earlier, which suggests a thermal physiological barrier to expansion. Moreover, by the mid 2000s both the isotherm and the northern boundary of the species range had shifted northward. Our analysis of urban areas indicated an increase in both built-up area and public green space. We suggest that the combined effects of a warming climate and incorporation of public green spaces into cities are the primary causes of the bulbul's northward expansion and their recent use of urban landscapes. PO1: 10

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[S]Avian community dynamics in managed and unmanaged boreal forests.

We compared the breeding bird communities of managed and unmanaged boreal forests in northeastern Minnesota. Birds were sampled in the spring and summer of 2010 in the Superior National Forest (SNF, managed landscape) and Boundary Waters Canoe Area Wilderness (BWCAW, unmanaged landscape). Point counts occurred along 10 paired transects, with 12 point-count locations per transect. The total number of individuals detected per point was significantly higher within the BWCAW ($F = 35.8$, $p < 0.01$). Avian species richness per point was also significantly higher within the BWCAW ($F = 16.8$, $p < 0.01$). These results are negatively correlated with increased amounts of regenerating forests (mainly from logging) and positively correlated with tree species richness, canopy height, and the number of dead or damaged trees. Nine species were more common in the BWCAW compared with the SNF (Black and White Warbler (*Mniotila varia*), Blackburnian Warbler (*Dendroica fusca*), Brown Creeper (*Certhia americana*), Golden Crowned Kinglet (*Regulus satrapa*), Least Flycatcher (*Empidonax minimus*), Northern Parula (*Parula americana*), Red Breasted Nuthatch (*Sitta canadensis*), Winter Wren (*Troglodytes hiemalis*), and Yellow Bellied Sapsucker (*Sphyrapicus varius*)). Only the Mourning Warbler (*Oporornis philadelphia*) was more common in the SNF. Species associated with mature or mixed forests tended to be found in the BWCAW at higher densities. In general, most species associated with early successional habitats did not differ between the BWCA and SNF landscapes. Our results suggest that northern Minnesota forests with natural successional and disturbance regimes provide habitat for a higher density and richness of bird species. CO25: Sat, 12 Mar 9:30