PRESENTED BY

Delaware Kestrel Partnership

BrandywineZoo.org/
DelawareKestrelPartnership

american kestrel partnership

a project of The Peregrine Fund

Kestrel.PeregrineFund.org

AMERICAN KESTREL

SYMPOSIUM

JANUARY 28 & 29, 2017

9 AM - 5 PM

ICEBREAKER At Brandywine Zoo Friday, January 27

6-8 pm **EVENING ICE BREAKER, Brandywine Zoo Education Building**

Join us for an evening at The Brandywine Zoo's Education Building to mingle with symposium attendees and speakers. Light refreshments, beer and wine will be served.

***Location*:** Brandywine Zoo Educaiton Building, 1001 North Park Drive, Wilmington, DE, 19802
Parking: *Parking for the Icebreaker will be in the lot along The Brandywine River, just down the hill from the entrance of the Zoo and the Education Building. Attendees should park in the lot near the large (under construction) water fountain and the Van Buren Street Bridge. There is a footpath that leads up the hill to the Education Building, which is across the street from the main entrance of the Zoo. The Ed Building Entrances faces the woods, not the road.*

SYMPOSIUM SCHEDULE

DAY ONE Trends in Kestrel Research Saturday, January 28

Check-in starts at 8:30am Presenters please check in by 8:15

9:00 Opening Remarks
9:15 **KEYNOTE ADDRESS Nest Box Programs For American Kestrels: An Invaluable Tool For Research And Conservation** with **Dr. John Smallwood,** Montclair State University

10:15 **BREAK**

Session I
10:30 **American Kestrel Biology And Natural History** with Jacque Williamson, Brandywine Zoo
10:50 **A Summary Of American Kestrel Banding And Band Encounter Data** with Bruce Peterjohn, USGS Bird Banding Lab
11:10 **Research Recommendations To Understand Kestrel Decline** with Dr. Sarah Schulwitz, American Kestrel Partnership
11:30 **The Power And Peril Of Nest Boxes** with Dr. Chris McClure, American Kestrel Partnership

12:10 **LUNCH (provided) & ZOO Visit***

Session II
2:00 **Evaluating The Conservation And Agricultural Applications Of American Kestrel Nest Boxes In A Fruit-Growing Region** with Megan Shave, Michigan State University
2:20 **The Effects Of Climate Change And Advancing Growing Seasons On The Nesting Phenology Of American Kestrels In Southwestern Idaho** with Shawn Smith, Boise State University
2:40 **State Of Tracking Technologies For Use With American Kestrels** with Ross Crandall, Craighead Beringia South
3:00 **American Kestrel Breeding Genoscape: Using High-Resolution Molecular Markers To Identify Populations In A Raptor With A Continuous Spatial Distribution** with Michaela Brinkmeyer, Boise State University

3:20 **BREAK**

Session III
3:30 **Developing A Partnership For The Conservation Of American Kestrels, A Perspective From The Bird Banding Laboratory** with Bruce Peterjohn, USGS Bird Banding Lab
3:50 **Hawkwatch International's American Kestrel Studies** with Dr. Dave Oleyar, Hawkwatch International
4:10 **American Kestrels At Hawk Mountain Sanctuary: A Long History** with Dr. JF Therrien, Hawk Mountain Sanctuary
4:30 **Engaging The Private Landowner In Conserving American Kestrels: Pennsylvania Farmland Raptor Project 2012-2016** with Dr. Laurie Goodrich, Hawk Mountain Sanctuary

4:50 Closing Remarks

DAY TWO Successes in Citizen Science Sunday, January 29

Check-in starts at 8:30am Presenters please check in by 8:15

9:00 Opening Remarks

9:05 **Why Are We Doing This? The Role Of Citizens In The Advancement Of Knowledge** with Robyn Bailey, Cornell Lab of Ornithology NestWatch

9:25 **Introduction To The American Kestrel Partnership** with Dr. Sarah Schulwitz, American Kestrel Partnership

CITIZEN SCIENCE SESSIONS

Session I

9:30 **Southwest Montana Kestrel Nest Box Project** with Paulette Epple

9:45 **Long-Term Population Monitoring Of American Kestrels In Saskatchewan, Using Nest Boxes** with Jared Clarke

10:00 **Integrating A Kestrel Nest Box Program In Undergraduate Biology Courses At Concordia University, Seward, Nebraska** with Dr. Joe Gubanyi, Concordia University

10:15 **BREAK**

Session II

10:30 **Blue Grass Valley American Kestrel Project** with Patricia Reum and John Spahr, Virginia Society of Ornithology

10:45 **Northeast Connecticut Kestrel Project** with Tom Sayers, Connecticut Kestrel Project

11:00 **Monitoring American Kestrels On New York National Wildlife Refuges** with Carl Zenger, Iroquois National Wildlife Refuge

11:15 **Alberta American Kestrel Project** with Mitchell Warne

11:30 **Western North Carolina Kestrel Monitoring** with Mark Hopey, Southern Appalachian Raptor Research

Submit Q & A Questions

12:00 **LUNCH (provided)**

SESSION III: Q & A PANEL DISCUSSION

1:00 Discussing trends in kestrel research, best practices, data collection and sharing, and general Q & A with some of our presenters.

2:30 **BREAK**

2:45 **SESSION IV: ROUNDTABLE: STANDARDIZING PROTOCOLS AND DATA ENTRY**
with Dr. Chris McClure, American Kestrel Partnership

4:00 Closing Remarks

SYMPOSIUM LOGISTICS

***Location*:** Blue Ball Barn, Alapocas Run State Park, 1914 W Park Dr, Wilmington, DE 19803
Parking: *Ample parking is available at the Barn.*

Blue Ball Barn
***WIFI Password*:** bbb1914aid

FULL ABSTRACTS
For full digital abstracts for all our presenters, please visit **BrandywineZoo.org/DelawareKestrelPartnership/Symposium**

HOTEL SHUTTLE
SATURDAY & SUNDAY A shuttle (a Delaware State Park minibus) will be offered, starting at 8:00 AM traveling from The Inn at Wilmington to Blue Ball Barn. This shuttle seats a maximum of 13 people, so it is highly recommended that conference participants drive themselves if they have their own transportation. The Shuttle will loop continuously until 9:00 AM. It will run again post-conference, from 4:45 - 6:00 PM on Saturday, or 4 - 5:00 PM Sunday.

***ZOO VISIT**
SATURDAY after lunch on Saturday, Symposium attendees are invited to visit the Brandywine Zoo during lunch break on Day One. A shuttle will be offered, starting at 12:30 PM from Blue Ball Barn to shuttle guests to the Zoo, however, *driving your own vehicle or carpooling is strongly recommended,* as space in the Delaware State Parks Minibus is limited to 13 seats. Return shuttles will leave the Zoo starting at 1:30PM

SATURDAY NIGHT SOCIAL
SATURDAY NIGHT conference guests are invited to visit Trolley Square, a restaurant and bar center approximately 5 minutes from the Zoo. Grab dinner, drinks, or enjoy live music. Final restaurant location and directions will be available at the conference. Carpooling or Uber/Lyft/Taxi service is recommended, as no shuttle service will be provided.

OTHER
We encourage all participants to bring a reuseable coffee mug and/or water bottle.

THANK YOU OUR DONORS
Support for this Symposium comes from the Fresno Chaffee Zoo's Wildlife Conservation Fund and from a generous donation from Jonathan Schoolar and family. Travel stipends were generously provided by The Peregrine Fund.

Keynote with Dr. John A. Smallwood

Department of Biology, Montclair State University, Montclair, NJ, U.S.A. (smallwoodj@mail.montclair.edu)

NEST BOX PROGRAMS FOR AMERICAN KESTRELS: AN INVALUABLE TOOL FOR RESEARCH AND CONSERVATION

American Kestrels (*Falco sparverius*) are secondary cavity nesters, depending upon woodpecker-excavated holes in trees and other natural cavities in which to breed. Kestrels readily nest in wooden nest boxes erected in suitable habitat, open patches covered with short ground vegetation. Nest boxes have been shown to increase local kestrel populations that were limited by the availability of natural cavities. In addition to their conservation value, nest boxes greatly facilitate the study of kestrels by making the birds accessible to researchers. Examples of these studies include body growth and vocal development of chicks, effect of parasites on chick body mass and reproductive success, the relationship of weather and reproductive performance, and natal philopatry and adult return rates. Formerly one of the most abundant raptors in North America, kestrels have been declining in recent decades. Although the reason for the decline is still under investigation, local nest site limitation alone cannot account for it. This presentation will focus primarily on several studies applicable to designing and conducting kestrel nest box programs. These include the importance of habitat variables, including patch size, to occupancy and reproductive success; the use and limitations of nest box data for inferring population trends; and the effect of researcher disturbance on reproductive success.

ABSTRACTS

Day One

Session I

AMERICAN KESTREL BIOLOGY, BEHAVIOR AND NATURAL HISTORY

Jacque Williamson (jacque.williamson@state.de.us), Brandywine Zoo, 1001 North Park Drive, Wilmington, Delaware, USA

The American Kestrel's (*Falco sparverius*) vast range spans from Argentina to Alaska. American Kestrels are diurnal birds of prey with specific habitat requirements, such as open fields, perching opportunities, and the need to nest in vacated cavites. Understanding this charismatic little falcon's natural history is key in studying its behaviors both in and out of nesting season.

A SUMMARY OF AMERICAN KESTREL BANDING AND BAND ENCOUNTER DATA, 1960-2016

Bruce Peterjohn (bpeterjohn@usgs.gov) and Elaine Nakash, USGS Bird Banding Laboratory, Patuxent Wildlife Research Center, Laurel, MD, USA

The American Kestrel (*Falco sparverius*) has been the focus of extensive bird banding activities across the US and Canada during the past half century. Approximately 326,000 kestrels have been banded since 1960 with the greatest number of records during summer and autumn. The most significant gaps in the banding record are for kestrel populations inhabiting the boreal regions, wintering populations south of the US border, and breeding populations in the Great Plains. Approximately 5,300 band encounters have been reported to the Bird Banding Laboratory, of which nearly 1,900 are of young kestrels banded in the nest and 3,000 are birds banded as adults. The band encounter records suggest that four fairly distinct migratory kestrel populations exist in North America: east of the Appalachian Mountains, the Great Lakes region, the Great Plains, and west of the Rocky Mountains. Resident populations also occur within each region. Additional insights into temporal and geographic patterns in banding and band encounter data will be discussed that are relevant to the developing American Kestrel Partnership.

RESEARCH RECOMMENDATIONS TO UNDERSTAND KESTREL DECLINE

Dr. Sarah Schulwitz[1] (schulwitz.sarah@peregrinefund.org), Christopher J.W. McClure[1], Richard Van Buskirk[2], Benjamin Pauli[3], Julie A. Heath[3]

[1]The Peregrine Fund, American Kestrel Partnership, [2]Pacific University, [3]Boise State University

We present recommendations for future research into the cause of decline for American Kestrels to inform priorities regarding monitoring, identifying drivers of survival and reproductive rates, and creating full-annual-cycle models. Breeding Bird Survey data suggest that kestrel declines have been occurring steadily since at least 1966; therefore, specific threats that have arisen in recent decades are unlikely to be the ultimate cause of the decline. Nest cavities also do not seem to be limiting many populations, as evidenced by the low occupancy of many nest box programs. The most parsimonious demographic mechanism of decline seems to be that vital rates have been at constant levels that are too low to maintain populations since at least the late 1960s. But, the large range and complicated biology of the American Kestrel make simple, continent-wide drivers of decline unlikely. Research regarding phenology, migratory connectivity, and use of natural nest cavities will improve monitoring of American Kestrels and thereby improve our understanding of population declines. Full-annual-cycle,

demographic studies of the American Kestrel are also sorely needed, as are studies of breeding success in natural cavities, effects of climate change, and identification of important wintering and migration sites outside of the US.

THE POWER AND PERIL OF NEST BOXES

Dr. Chris McClure[1] (mcclure.chris@peregrinefund.org), Benjamin P. Pauli[2], Julie Heath[2]

[1]The Peregrine Fund's American Kestrel Partnership, Boise, Idaho, USA. [2]Boise State University, Boise, Idaho, USA

Despite their common use, the efficacy of nest boxes as tools for managing and monitoring birds depends on the demography of the target population and the availability of natural cavities. Yet, no one has articulated the demographic conditions enabling nest boxes to be useful or harmful. We use a simulation model for a typical population of American Kestrels to show that provisioning of nest boxes will only benefit populations if breeding sites are limiting or if nest boxes increase vital rates. Our results therefore demonstrate that a loss of breeding sites is unlikely to be the underlying cause of declines in kestrel populations observed across mush of North America. Importantly, trends in the occupancy of monitored sites will be misleading if the number of unmonitored sites changes over time. And, breeding site fidelity can cause an initial lag in occupancy of newly installed sites that could be misinterpreted as an increasing population. There are therefore many situations where the installation of artificial breeding sites, and their use in monitoring, can have unintended consequences.

Session II

EVALUATING THE CONSERVATION AND AGRICULTURAL APPLICATIONS OF AMERICAN KESTREL NEST BOXES IN A FRUIT-GROWING REGION

Megan E. Shave (megan.shave@gmail.com) and Catherine A. Lindell, Department of Integrative Biology, Michigan State University, East Lansing, Michigan, USA

Nest boxes for predators in agricultural regions are an easily implemented landscape enhancement with potential benefits for both conservation and agriculture. Kestrels have responded quickly to the installation of new nest boxes in northwestern Michigan cherry orchards since 2012, with nesting attempts made in 100% of new boxes in 2015. In addition, kestrels occupying these nest boxes in 2013 – 2015 showed high reproductive rates: apparent nest success was 91%, and mean nest box productivity (fledglings per box with nesting attempts) was 3.80. We also used roadside surveys and multi-season occupancy modeling to determine that the installation of nest boxes has increased the presence of kestrels in the region. Nest box video recordings and prey remains collections show that kestrels consume known orchard pests, including grasshoppers, meadow voles, and frugivorous birds; furthermore, we found that active kestrel nests significantly reduce the abundances of frugivorous birds in orchards. Our results therefore indicate that orchard nest boxes can benefit the conservation of kestrels in fruit-growing regions by sustaining or increasing breeding populations, which can in turn benefit agriculture by promoting kestrel presence, and therefore predation of pest species, in and around orchards.

THE EFFECTS OF CLIMATE CHANGE AND ADVANCING GROWING SEASONS ON THE NESTING PHENOLOGY OF AMERICAN KESTRELS IN SOUTHWESTERN IDAHO

Shawn H. Smith[1] (shawnhsmith2015@gmail.com), Alexandra M. Anderson[2], Karen Steenhof[3], Chris J. W. McClure[4], and Julie A. Heath[1]

[1]Department of Biological Sciences and Raptor Research Center, Boise State University, Boise, Idaho, USA, [2]Department of Environment and Life Sciences, Trent University, Peterborough, Ontario, Canada,[3]Owyhee Desert Studies, Murphy, Idaho, USA,[4]The Peregrine Fund, Boise, Idaho, USA

Climate change impacts on phenology have been documented in flora and fauna through long-term studies on breeding and flowering; however, mechanisms allowing for shifts in phenology have not been clearly identified. In southwestern Idaho, a long-term dataset on American kestrel breeding has allowed for a test of hypotheses explaining earlier breeding phenology. A 1000-km2 study area was established in southwestern Idaho in 1986 to monitor trends in American kestrel reproduction. The project began with only 34 nest boxes and rapidly expanded to include 134 nest boxes. A trend in earlier nesting phenology was soon observed, and by 2015, American kestrels were nesting 15 days earlier. Our group has tested two main hypotheses to explain earlier nesting: 1) warmer winters have released former constraints (such as migration) on early nesting that, when combined with seasonal declines in fecundity, drive advancement in nest date, and 2) shifts in growing season have led to earlier peaks in prey abundance and kestrels are tracking the advancement of prey because of the benefits associated with synchronizing reproduction with peak resources. Results suggest support for both of these hypotheses to be influencing kestrel breeding phenology in Idaho.

CURRENT OPTIONS FOR AMERICAN KESTREL TELEMETRY

Ross Crandall (ross@beringiasouth.org) and Derek Craighead, Craighead Beringia South, Kelly, WY 83011

Telemetry has long been used to assess aspects of animals' lives including but not limited to survival, habitat selection, migration routes, home range size estimation and territory fidelity. For birds, tracking devices and the associated hardware should be kept under 3% of the body mass of the individual, which has limited the devices that can be used for tracking American Kestrels. But, as technology improves, the number of different devices available for tracking smaller-sized birds continues to increase. Current options for American Kestrels include the

traditional VHF telemetry, geolocators, Global Positioning System (GPS) data loggers, nanotags, and Argos PTTs. In 2015, we deployed 5, 2.0 gram GPS tags on American Kestrels nesting in Northwestern Wyoming that we believed to migrate during the non-breeding season with the goal of identifying wintering areas. We recaptured 1 of the 5 kestrels in 2016 and discovered the bird migrated approximately 3,200 km from its nesting area to a wintering area in southern Mexico. As these tracking devices continue to get smaller and are able to collect more information, the opportunity will exist for us to fill gaps in our current knowledge of American Kestrels such as postfledgling-dispersal and survival.

USING HIGH-RESOLUTION MOLECULAR MARKERS TO IDENTIFY POPULATIONS IN A RAPTOR WITH A CONTINUOUS SPATIAL DISTRIBUTION

Michaela S. Brinkmeyer[1] (brin5845@gmail.com), Julie A. Heath[1], Kristen C. Ruegg[2], Tom Smith[2], Rachael A. Bay[3], Christopher J.W. McClure[4], David Oleyar[5], Karl Miller[6], Jean-François Therrien[7], Ted Swem[8], Clint W. Boal[9], Russell D. Dawson[10], Rich Van Buskirk[11], Lance Marrow[12]

[1]Raptor Research Center, Boise State University, Boise, ID, USA, [2]Center for Tropical Research, Institute of the Environment and Sustainability, University of California, Los Angeles, Los Angeles, CA, USA, [3]Department of Zoology, University of British Columbia, Vancouver BC, Canada, [4]American Kestrel Partnership, The Peregrine Fund, Boise, ID, USA, [5]HawkWatch International, Salt Lake City, UT, USA, [6]Florida Fish and Wildlife Conservation Commission, Tallahassee, FL, USA, [7]Acopian Center for Conservation Learning, Hawk Mountain Sanctuary, Orwigsburg, PA, USA, [8]Anchorage Fish and Wildlife Field Office, U.S. Fish and Wildlife Service, Anchorage, AK, USA, [9]Department of Natural Resources Management, Texas Tech University, Lubbock, TX, USA, [10]Ecosystem Science and Management Program, University of Northern British Columbia, Prince George BC, Canada, [11]Department of Environmental Studies, Pacific University, Forest Grove, OR, USA, [12]Shenandoah Valley Raptor Study Area, Timberville, VA, USA

American Kestrels (*Falco sparverius*) are declining at differential rates across North America for unknown reasons, and empirical support for any hypothesized cause is lacking (Smallwood et al. 2009). To monitor demographic trends at the population-level, or address threats that may vary between populations, it is important to identify populations at spatial scales that are relevant to conservation management. We used restriction-site associated DNA sequencing (RAD-seq) to discover single-nucleotide polymorphisms (SNPs) across the genome of the American Kestrel. We will use Fst outlier tests to identify SNPs under putative selective pressure, so that we can elucidate patterns of neutral and adaptive variation across the breeding range of the American Kestrel. We expect populations to be more structured at adaptive loci as a result of differential local adaptation. If this is true, we will be able to delineate genetically distinct populations of American Kestrels with higher resolution at adaptive loci versus neutral loci. Identification of genetically distinct populations of kestrels at regional spatial scales will allow us to develop an assay for rapid population assignment, so that we can address population-specific threats across the annual cycle.

Session III

DEVELOPING A PARTNERSHIP FOR THE CONSERVATION OF AMERICAN KESTRELS, A PERSPECTIVE FROM THE BIRD BANDING LABORATORY.

Bruce Peterjohn (bpeterjohn@usgs.gov), USGS Bird Banding Laboratory, Patuxent Wildlife Research Center, Laurel, MD, USA

The American Kestrel Partnership (AKP) will require significant support from the Bird Banding Laboratory (BBL) to achieve its objectives of reversing the long-term declines in kestrel populations and developing effective conservation strategies. In an era when Federal resources are limited for supporting avian conservation programs, BBL resources must be used efficiently to provide the necessary support for AKP activities in addition to other bird conservation programs occurring in North America. The AKP should use existing data sets to identify important information gaps. Whenever possible, ongoing banding activities should be leveraged to support AKP projects. Achieving the appropriate balance between conducting short-term studies focused on specific research questions and long-term monitoring activities is critically important. The AKP must develop a prioritized set of conservation objectives and related research questions that will be the focus of its activities. A detailed action plan should be created to address each research question. When presented with projects that have a strong scientific focus, the BBL will try to provide the necessary support for AKP activities.

HAWKWATCH INTERNATIONAL'S AMERICAN KESTREL STUDIES

Dr. Dave Oleyar (doleyar@hawkwatch.org), Jesse Watson, Mike Shaw, and Neil Paprocki, HawkWatch International, Salt Lake City, UT, USA

HawkWatch International operates a growing network of nest boxes (300 in 2016) along the Wasatch Front in northern Utah. Our program utilizes 30-40 citizen scientists each year to monitor these boxes during the breeding season (locally March through July). We check boxes every 7-10 days to determine occupancy, clutch size, brood size, and number of fledglings. We also band and color band nestlings and adults in an effort monitor movement and estimate survival. Our research goals are: 1) to understand if kestrel productivity and survival vary between different landscapes (wildland, agricultural, and urban) that are part of the greater Salt Lake City metropolitan area, an area with a human population of 1.2 million plus; 2) explore climate change implications on Kestrel breeding and migration phenology; 3) collaborate

with other organizations and researchers at a larger scale to identify and understand drivers of Kestrel declines; 4) engage citizen scientists and the general public in research and discussion addressing the impacts that urbanization and climate change can have on American Kestrel populations and other wildlife.

AMERICAN KESTRELS AT HAWK MOUNTAIN SANCTUARY: A LONG HISTORY

Dr. J.F. Therrien (therrien@hawkmountain.org), Hawk Mountain Sanctuary Association, Orwigsburg, PA, USA

Research and monitoring of American Kestrels has a long history at Hawk Mountain Sanctuary. Indeed, the autumn migration counts conducted at the site since 1934 have provided invaluable information on population trends: from a relatively stable one 40 years ago to an alarming decline today. Hawk Mountain researchers have also been erecting and monitoring nest boxes in and around the Sanctuary since 1954. Today, our network includes 125 boxes that are monitored annually, some of them located at the very same places they were 60 years ago. Over the years, we have combined migration counts, nest box monitoring as well as individual trapping and tracking to assess several aspects of American Kestrel biology. Starting with basic assessments of diet, habitat selection, and reproductive success, we have refined our understanding of American Kestrel ecology in a conservation context by assessing survival rates, disease prevalence (West Nile virus, blood parasitism...) as well as site fidelity and nesting behavior. Those efforts have produced several key scientific publications. Now, this ongoing monitoring project allows us to assess current threats facing the species such as land-use and global climate changes in an evolutionary perspective. As always, Hawk Mountain Sanctuary remains highly committed to collaborating on local and global research projects.

ENGAGING THE PRIVATE LANDOWNER IN CONSERVING AMERICAN KESTRELS: PENNSYLVANIA FARMLAND RAPTOR PROJECT 2012-2016

Dr. Laurie J. Goodrich (goodrich@hawkmountain.org) and Katie Andrews, Hawk Mountain Sanctuary Association, Orwigsburg, PA, USA

Grassland birds are one of the most severely declining avian groups within Pennsylvania and across the Northeast. Loss of grassland habitats and alteration of farming practices has reduced suitable nesting areas across the state. Most grassland or farmland habitats are privately owned, presenting a challenge to conservation. During 2012, Hawk Mountain launched the Pennsylvania Farmland Raptor Project with support from the Wild Resource Conservation Fund with two primary goals, (1) to gather better data on the annual distribution of four declining grassland raptors, the American Kestrel, Barn Owl, Short-eared Owl and Northern Harrier, and (2) to engage private landowners in improving nesting habitat for the four species and reporting breeding season sightings. During the five-year project, hundreds of kestrel boxes have been built and distributed by Hawk Mountain and its partners. Public programs by educators across the state and at PA Farm Show have increased awareness of kestrels and their conservation needs. Data reports to Farmland Raptor Project improved distribution knowledge for three rarer species although kestrel numbers appear well tracked by eBird, Christmas Bird Counts and Winter Raptor Surveys.

Day Two

Opening Speaker

WHY ARE WE DOING THIS? THE ROLE OF CITIZENS IN THE ADVANCEMENT OF KNOWLEDGE

Robyn Bailey (rb644@cornell.edu), Cornell Lab of Ornithology, Ithaca, New York, USA

Each nesting season, a California man walks hundreds of miles of countryside checking nest boxes. A Colorado woman enters >500 nests into a database every year. Why do so many unpaid volunteers spend epic amounts of time doing this work? Robyn Bailey is the project leader of NestWatch, a national citizen-science nest monitoring program hosted by the Cornell Lab of Ornithology. Robyn will discuss the role of citizen science in studies of avian reproduction, and the long history of amateur contributions to the field. Robyn will also share some lessons learned from managing a long-term citizen-science project; for example, how do you retain and engage volunteers for the long haul, and what motivates non-professionals (i.e., people who aren't getting paid) to continue collecting data. Robyn will end with a look at some areas of active research in the NestWatch program utilizing citizen science data, and provide a look at the free resources available from NestWatch.org.

Session I

SOUTHWEST MONTANA KESTREL NEST BOX PROJECT

Paulette Epple (bigskyepples@msn.com), Sacajawea Audubon Society, Montana, USA

Sacajawea Audubon Society became involved in the kestrel nest box program in the fall of 2012 when the American Kestrel Partnership built and installed 40 kestrel nest boxes in the Gallatin Valley in SW Montana. Since then Paulette Epple has spearheaded the chapter's efforts to monitor these boxes and has expanded the program by installing another 30 nest boxes. The results of the early years were disappointing; very few boxes were used due primarily to a lack of understanding of what constitutes suitable habitat for nesting kestrels. With the targeted placement of nest boxes in better quality kestrel habitat the rate of use has risen dramatically. In 2016, at the request of the American Kestrel Partnership,

Sacajawea Audubon also began to band kestrel nestlings, band incubating adults when possible, and to collect body feathers from nestlings for the Kestrel Genoscape Project. The chapter remains committed to this project and to the collection of data to be shared with the scientific community through the American Kestrel Partnership.

LONG-TERM POPULATION MONITORING OF AMERICAN KESTRELS IN SASKATCHEWAN, USING NEST BOXES

Jared Clarke (clarkejared@hotmail.com), Randy McCulloch, Joseph Kotlar, Matthew Tokaruk, Adam Crosby, Saskatchewan, CA

In 2015, we initiated an American Kestrel nest box project across southern and central Saskatchewan to monitor population trends of this declining falcon. In 2015, we monitored 50 boxes in 5 different locations across the province, and 79 boxes in 2016 in the same areas. Boxes are checked twice in the spring (generally at the beginning and end of May) if no kestrels are detected, and more frequently if they are. We capture and band incubating females and all nestlings, and opportunistically capture males in the nest box or using a bal-chatri trap. Kestrel occupancy has been low, 8% (n=4) in 2015 and 12% (n=10) in 2016. Over the two years, 13 adult birds and 45 nestlings have been banded. One banded adult male from 2015 was recaptured in a box 5 km away in 2016. One nestling banded in a box in 2015, in Moose Jaw, Saskatchewan, was recaptured on her winter territory near Corpus Christi, Texas, by Carter Crouch on November 29, 2015. She was resighted again on October 2, 2016, 100m from her territory in 2015. European Starling occupancy of the nest boxes has been high in both years, 50% (n=25) in 2015 and 59% (n=47) in 2016.

INTEGRATING A KESTREL NEST BOX PROGRAM IN UNDERGRADUATE BIOLOGY COURSES AT CONCORDIA UNIVERSITY, SEWARD, NEBRASKA

Dr. Joseph Gubanyi (joseph.gubanyi@cune.edu), Concordia University, Seward, Nebraska, USA

Following American Kestrel Partnership guidelines, Concordia University students in an undergraduate biology research class built and placed 46 nest boxes throughout Seward County, Nebraska in spring 2013. In subsequent years, students in conservation biology, ornithology, and service learning classes have continued to help manage and monitor nest boxes. There were multiple goals for students involved in the program including nest and habitat data collection and analysis, participation in a citizen science project, and local community education and awareness. Nest box use by kestrels was limited in the first three seasons (2013-2015) with only one box used by kestrels. However, in 2016 kestrel activity was observed at eight nest sites with eggs at six sites and young fledged at three sites. Benefits of the program include students contributing directly to kestrel conservation, hands-on learning connected to conservation and raptor biology, and high ownership by students involved in the program. Limitations of the program include time management (coordinating students' busy academic and co-curricular schedules with field work) and a poor match between kestrel nesting season and Concordia's academic calendar (spring semester is over just when kestrels start laying eggs).

Session II

BLUE GRASS VALLEY AMERICAN KESTREL PROJECT, VIRGINIA

Patricia Reum (pareum@gmail.com) and **John Spahr** (jspahr@yahoo.com), Virginia, USA

In the fall of 2014, we formed the American Kestrel Nesting Box Project under the auspices of the Virginia Society of Ornithology. The goal of this project is to provide nesting boxes for kestrels in locations in Virginia where kestrels are found and where there is suitable habitat.
In early 2015, a video camera nesting box monitoring project was started in Highland County, Virginia, to monitor the occupancy of boxes in 41 boxes in Highland County.

The Blue Grass Valley American Kestrel Project, located in northwestern Highland County, Virginia, was initiated in August, 2016, to monitor and band American Kestrel adults and chicks that occupy nesting boxes in selected locations in the Blue Grass Valley in Highland County, Virginia.

While population data confirms that there are fewer kestrels throughout Virginia, these sources offer no clue as to the causes. Are adult birds failing to return and breed after wintering in other locales? What is the mortality rate during breeding, in migration, or over-wintering? Are productivity rates changing? Have breeding rates declined or breeding failures increased? What is the impact of land use trends, of environmental contaminates, of competing predatory species? By continued monitoring over the coming years in this defined study site, we expect to learn much about the dynamics and demographics of this kestrel population.

It is our goal to use this data to provide information that will help in the conservation of the American Kestrel in Virginia. We need to learn how to protect this valuable kestrel habitat and protect the birds.

NORTHEAST CONNECTICUT KESTREL PROJECT

Tom Sayers (sayers.tom@gmail.com), Connecticut, USA

I will very briefly explain how/why I got started with kestrels. My project is very data-driven so I plan to share my observation/record keeping protocols as well as what the long term data trends show regarding nestbox occupancy, nestbox success rates, nestbox density findings, nestling gender ratios, clutch initiation dates as correlated with degree days, mean brood size, starling management, and trends in

spring arrival analyzed by both gender and specific calendar dates.

Banding has been an important part of my work, so I will share what my banding and recap data has revealed in terms of nestling natal site fidelity, adult return rates to the study area, and the incidence of repeated nestbox use by the same breeding birds over time. If time, I will briefly share what my work with radio telemetry, geolocators, and in-box GoPro cameras has revealed as well.

MONITORING AMERICAN KESTRELS ON NEW YORK NATIONAL WILDLIFE REFUGES

Carl Zenger (cpzenger@gmail.com), New York, USA

The primary objective of my nest box program is to increase the local population of kestrels and to educate the public about the decline of the species. I monitor my kestrel boxes every two weeks to help control starlings and I clean them every year and install fresh wood chips. I am very aggressive on controlling starlings and trap any that nest in my boxes. I enjoy ageing the chicks and seeing them develop into fledglings. I got started in kestrel conservation in 2005 when I took over the boxes on the Iroquois National Wildlife Refuge. We currently have 6 boxes on the Refuge, 5 on New York State DEC Wildlife Management Areas and 1 on private lands. Plans are to add boxes in 2017. Important stake holders are the Iroquois National Wildlife Refuge, The NYSDEC and the Friends of Iroquois National Wildlife Refuge, Inc. Outreach is done through newsletters of the New York State Bluebird Society, the Friends of Iroquois NWR and by discussion and talks at their Board and Annual meetings. I am in the process of developing a system to raise and lower my boxes for easier monitoring using round pipe and a wench system.

ALBERTA AMERICAN KESTREL PROJECT

Mitchell Warne (mitchellwarne@hotmail.com), Alberta, CA

The American kestrel is in decline across the entire province of Alberta but they are not lost. On Judah Hill, just south of Peace River I have installed numerous kestrel nest boxes on a variety of properties. Prior to their installation starting in 2012 we would see one maybe two pairs of kestrels in the area. The local farmers & ranchers have since said the numbers have rebounded to their peak back in the 70s/80s in the area. The only positive change in the area, besides landowners trying to help wildlife in a farming setting, is the installation of the nest boxes. Now there are eight or more pairs breeding in the area. I am also expanding the number of boxes and properties that are going to have kestrel nest boxes installed on. I have also installed a nest box on a property north of Peace River near Dixonville and will continue to pursue increasing the extend of nest boxes in the Peace River area not just the Judah Hill area.

THE RETURN OF THE AMERICAN KESTREL TO SANDY MUSH GAME LANDS IN WESTERN NORTH CAROLINA

Mark Hopey[1] (bigbaldbanding@gmail.com), Joseph Tomcho[2] (joseph.tomcho@ncwildlife.org)

[1]Southern Appalachian Raptor Research, North Carolina, USA, [2]NC Wildlife Resources Commission, North Carolina, USA

American Kestrels were observed on a few occasions during the breeding season on Sandy Mush Game Land from 2006-2010. Few snags with cavities large enough to be used by kestrels for nesting prompted a kestrel nest box monitoring program in 2009. Nest box occupancy by kestrels was initially slow, but by 2013, 12-14 out of 20 available nest boxes have been used every year since. Productivity has fluctuated slightly, but with just a few years of data, nothing conclusive can be determined yet. In 2016, we saw the first documented kestrels banded as nestlings return to nest and successfully produce offspring with another banded male floating in search of a territory.

SESSION III: DISCUSSION PANELISTS

Dr. John A. Smallwood
Department of Biology, Montclair State University, Montclair, NJ, USA. smallwoodj@mail.montclair.edu

Dr. Chris McClure
American Kestrel Partnership, Boise, Idaho, USA.
cmcclure@peregrinefund.org

Bruce Peterjohn
USGS Bird Banding Laboratory, Patuxent Wildlife Research Center, Laurel, MD, USA. bpeterjohn@usgs.gov

Michaela S. Brinkmeyer
Raptor Research Center, Boise State University, ID, USA.
brin5845@gmail.com

Dr. J.F. Therrien
Hawk Mountain Sanctuary Association, PA, USA.
therrien@hawkmountain.org

Dr. Dave Oleyar,
HawkWatch International, 2240 S 900 E, Salt Lake City, UT, USA. 84106. doleyar@hawkwatch.org

Erica Miller, DVM
University of Pennsylvania School of Veterinary Mededicine, Philadelphia, PA, USA.
Delaware Kestrel Partnership Committee Member.
Erica@jfrink.com

Tom Sayers
NE Connecticut Kestrel Project, Connecticut, USA.
sayers.tom@gmail.com