

on wrens, including some wonderful anecdotes and insights into porch-building behavior and vocalizations. The meeting was concluded by a Sunday field trip to Pawnee Grasslands, led by Amber Carver. The trip started out at the Crow Valley Campground, a known migrant trap in the grasslands of Eastern Colorado. Here, participants

were not disappointed with the variety of both Eastern and Western migrants observed. The field trip then continued into the Pawnee National Grassland, where participants familiarized themselves with the differences between Clay-colored, Brewer's, and Chipping sparrows. Thanks to Bird Conservancy of the Rockies for hosting us!



**2019 WBBA ANNUAL MEETING SCIENTIFIC SESSIONS AND WORKSHOPS,
20-21 SEPTEMBER
Brighton, Colorado**

Steven Albert, Danielle Kaschube, Jim Saracco, Peter Pyle, and Rodney B. Siegel - The Institute for Bird Populations. **Long-term banding data are providing surprises and insights into avian biology and responses to climate change.**

Since 1989, the Monitoring Avian Productivity and Survivorship (MAPS) program has been a source of information on long-term trends in avian population dynamics. This public-private partnership, one of the largest citizen science programs in North America, encompassing nearly every state and Canadian province, produces data that are frequently used by land managers striving to make the best decisions for birds and their habitat. In the past two years, IBP scientists and our colleagues have published several papers generated by the MAPS program. This presentation will describe recent studies that examined long term trends in breeding phenology and productivity in a montane bird community in

response to climate change, and how the network of stations provided surprising insights into post-breeding movements by numerous species.

Andrew Bankert and Erin Youngberg - Bird Conservancy of the Rockies. Colonization of Baird's Sparrows in Northern Colorado.

Before 2015, ornithologists considered Baird's Sparrow (*Ammodramus bairdii*), a rare migrant through Colorado with the nearest known breeding grounds over 500 km to the north. In 2015, point count technicians discovered Baird's Sparrows singing and holding territories in areas of taller grass at Soapstone Prairie Natural Area and Meadow Springs Ranch in Larimer and Weld Counties, Colorado. Over the next five years, Bird Conservancy of the Rockies monitored these sparrows throughout the summer, documenting their colonization of these tall grass patches in northern Colorado. We color banded individual sparrows in 2018 and 2019 to track their movement throughout the summer, and we discovered that

most sparrows hold territories for the first half of the summer before leaving the study site, and a new group of sparrows arrives to hold territories for the remainder of the summer. Recently fledged young discovered in 2018 provided the first nesting evidence in Colorado, and we documented two more pairs that successfully nested in 2019. Our monitoring suggests that while this new population consists of mostly male sparrows, the habitat is sufficient to support successful breeding with the presence of female sparrows. Future monitoring of this site will continue to provide valuable insight into how a species can colonize a new region with suitable habitat far from the core breeding range.

Amber Carver - University of Colorado, Denver.
Crash Course in Data Entry and Management in R.

The R programming language is one of the best ways to streamline data management, manipulation, analysis, and visualization. This workshop was intended for beginners who have little or no knowledge of R and wanted to learn how to get started. This workshop covered: (1) basic R syntax and logic, (2) importing, entering, manipulating, visualizing, and exporting data; and (3) how to create, use, and modify scripts.

Nancy Drilling - Bird Conservancy of the Rockies.
Dipper Research Techniques: Trapping, color-banding and nest-box design.

Because of their fast-moving mountain stream habitats, American Dippers (*Cinclus mexicanus*) are a challenging species to study. This workshop presented lessons learned on research best practices from the Black Hills American Dipper research project. We will discuss capture and banding of adults and young, survey tips, methods to study nests and productivity, and nest box design considerations.

Lorraine Dargis and Lauryn Benedict - University of Northern Colorado. **Does population density affect the singing behavior of female Canyon Wrens (*Catherpes mexicanus*)?**

Female songbirds are considered infrequent singers, particularly in temperate climates. Recent research has shown that female

song is widespread and ancestral, and female passerines sing in over 70% of observed species worldwide. Interestingly, the Canyon Wren is a species with female song that is distributed in temperate areas. Previous research has shown that this behavior is independent from male song and signals a territorial confrontation, prompting song from nearby females and some behavioral responses from males. Population density has been known to increase territoriality to neighbors. We hypothesized that high population density might affect rates of female song by promoting territorial confrontations. We conducted playback experiments in two areas: North-central Colorado (Spring/Summer 2018) and Southeastern Arizona (Spring/Summer 2019). We hypothesized that: (1) Females in higher density Arizona will sing more without playback as a result of increased social pressure. (2) Females in higher density Arizona will sing more songs, have songs with wider frequency bandwidths, higher mean entropies, longer syllable durations, lower frequencies and shorter times between songs in response to playbacks. Preliminary results have shown that females do not sing more often in densely populated areas, neither spontaneously nor in response to playback. Birds living in high density locations do appear to sing more aggressively. These outcomes shed light on the roles that females play in territory defense, and how and why female wrens retained their song.

Nancy Drilling - Bird Conservancy of the Rockies. **American Dippers in the Black Hills, South Dakota.**

The American Dipper (*Cinclus mexicanus*) is an aquatic songbird that lives along fast-moving clear cold streams throughout western North America. South Dakota's Black Hills has a small (<100 adults), isolated (>200 km from nearest site) population with relatively low reproductive success. As a result, the dipper is listed as a South Dakota state Threatened Species. The aim of this study was to determine the current distribution and breeding success of American Dippers in the Black Hills. Specific objectives were to 1) conduct surveys of potential breeding habitat in seven watersheds in the Black Hills, 2) monitor nest site occupancy and reproductive success during the

2017 - 2018 breeding seasons, and 3) band dippers for insights into mate fidelity, movements and survival.

We found 44 active and 16 old nests, all but one on two adjacent creek systems. Most unoccupied areas had poor stream quality with low or no water flow and high levels of sediment. More than 40% of nest attempts were in nest boxes, highlighting the importance of nest boxes to this population. Overall, probability of fledging at least one young was 0.62, a relatively low rate. We captured and color-banded 37 individuals: 27 adults, 7 fledglings, and 3 juveniles. In 2018, we resighted 79% of individuals banded as adults in 2017, one banded fledgling, and two juveniles. Almost all banded adults nested on the same territory and with the same mate in both 2017 and 2018. All birds that switched sites stayed on the same creek with a maximum distance between nest sites of ~3 miles. We documented fewer nest attempts and active sites during this study compared to a 2005 - 2009 study and the species' distribution did not change. We conclude that the Black Hills American Dipper population has not yet met recovery goals to be removed from the state Threatened Species list.

Nancy Drilling and Charlie Miller - Bird Conservancy of the Rockies. Migratory Small Owl Banding in the Western Dakotas.

Within the western Dakotas, forests occur as tiny corridors and patches in the middle of a sea of grass. These forested patches are stopover sites for a variety of migrating forest bird species, yet the role of these forested islands and corridors for migrating forest owls is not known. Since 2011 we have operated a series of owl banding stations during the fall migration period along the Little Missouri River corridor, focusing on the Northern Saw-whet Owl (*Aegolius acadicus*) (NSWO). Owls have been banded at four South Dakota sites in Custer and Black Hills National Forests, and in the south unit of Theodore Roosevelt National Park in North Dakota.

Between 2011 and 2018, we banded 1,355 Saw-whets, 16 Eastern Screech-Owls (*Megascops asio*) and 29 Long-eared Owls (*Asio otus*). Our

banding stations experienced a peak in NSWO numbers every four years but each station's peak occurred in a different year, with South Dakota stations' peak occurring one year ahead of the North Dakota station. Because NSWO peaks are caused by exceptional breeding success the previous summer, our results suggest that owls moving through each of our banding stations are coming from different locations that had different years of peak breeding. During eight years of fall banding, we have recovered 12 owls banded by others outside of the western Dakotas, other banders have recovered seven of our banded owls, and we have recaptured nine of our own owls at a different western Dakotas station than where it was banded. Most of these 'exchanges' have occurred to the north or east of the Dakotas, but there are few banding stations to the west or south of the Dakotas.

Continued owl banding in North Dakota will not only help us understand owl migration patterns in the Great Plains, but will continue to fill a gap in the continent-wide NSWO monitoring project.

Nancy Drilling and Charlie Miller - Bird Conservancy of the Rockies. Breeding Biology of Northern Saw-whet Owls in South Dakota.

Northern Saw-whet Owls (*Aegolius acadicus*) have bred in nest boxes erected in Custer National Forest, Harding County, South Dakota since 2003. We monitored box occupancy and recorded reproductive success of 245 nesting attempts which produced 872 fledglings. Means of clutch size (5.1 eggs per full clutch), brood size (4.4 nestlings per nest), and number fledged (3.7 fledglings per nest) on this study area are similar to those reported in other parts of the continent. We discovered the existence of a four-year breeding cycle, in which there are significantly higher numbers of nest attempts and fledglings produced every four years (2007, 2011, 2015, 2019), followed by an 'average' year (2003 and 2004, 2008, 2012, 2016), then a very low year. This has never before been documented in this species. There were no among-year differences in breeding metrics, such as mean clutch size, brood size, or number

fledged. Other new findings include the first documentation in the wild of double-brooding in this species, and two instances of natal philopatry.

Starting in 2012, many of the breeding females and nestlings have been banded. Of 261 banded nestlings, 18 have been recaptured at a later date, including four caught in other states. Of 47 females banded at a nest, 10 attempted to nest at least two years on the study area.

The long-term data set from the South Dakota nest box project offers a unique opportunity to study many questions about saw-whet owl breeding, movements, and survival. Continued nest monitoring and banding will contribute to our understanding of these common, but little-known owls.

Matthew DeSaix, Christen Bossu, H. Lisle Gibbs, Peter Marra, Thomas Sherry, Thomas Smith, Michael Webster and Kristen Ruegg. Colorado State University. **Incorporating evolutionary and ecological genomics into full life cycle avian research.**

Most populations of migratory birds are in decline and genetic tools have been widely used to understand the underlying causes of decline as well as inform management decisions for at risk species. Recent advances in genomics can build upon the foundation of conservation genetics and provide a new array of methods and, more importantly, new research questions that can be addressed for these species. Using genomic tools, the Bird Genoscape Project (BGP) currently focuses on mapping population-specific migratory flyways and climate adaptation in avian species. The objective of the BGP is to map 100 migratory bird species by 2025. Here, we describe how DNA samples collected by banders can contribute to full annual cycle research conservation genomics and provide an example with the American Redstart (*Setophaga ruticilla*): a recent addition to the species studied by BGP, but a long-time model species for full annual cycle research of migratory songbirds. Our results reveal finer-resolution geographic genetic clustering than previously reported for American Redstarts and we explore the influence of environmental variables on local adaptation. We highlight the importance of building on these

results and incorporating genomic data into a full annual cycle framework. Specifically, integrating research of migratory connectivity and local adaptation will allow us to tease apart the influence of selection pressures, throughout the annual cycle, on different avian populations. Ultimately, these conservation genomic models will help us predict how migratory species will respond to climate change and provide an understanding of the underlying genomic mechanisms behind a species' response.

Pablo Elizondo - Costa Rica Bird Observatories. Bird observatories and opportunities for conservation.

The tropics are home to about two-thirds of the world's biodiversity. Many of the migratory and resident bird species that inhabit these regions suffer from deforestation and habitat loss. The preservation of these species and the sustainable management of their ecosystems will require reliable scientific information. Such information provides estimates on survivorship, condition, and demographics leading to conservation strategies at a regional scale. Bird observatories play a key role in providing such science, and thus informing the conservation of tropical birds.

Bird observatories function as specialized centers for generating scientific information relevant to understanding describing the full-life histories of bird species. The science provides needed insight into population dynamics that is used to pinpoint limiting factors and causes of population declines. Bird observatories also act as disseminators of this scientific information that is needed for developing, implementing, and ensuring the success of specific conservation strategies. Additionally, bird observatories serve as promoters of environmental education programs that foster a conservation ethic and the elevation of bird conservation as an important societal value. Lastly, through volunteerism, professional education, and career development, bird observatories offer regional capacity for training new generations of biologists, ecosystem managers, and conservationists.

I will provide examples about how the Costa Rica Bird Observatories has applied this

bird observatory model to generate rigorously collected and relevant scientific information, in combination with strong community involvement, communications, and market-based incentives, to achieve advances in bird conservation. The examples may offer ideas that are applicable to capacity building for bird observatories in other tropical latitudes.

Holly Garrod and Mike Ellis - Costa Rica Bird Observatories and Tulane University, New Orleans, LA. **Adventures in starting a bird observatory in Ecuador.**

Ecuador is a country rich in biodiversity, particularly for birds where over 1700 species have been recorded. As of currently, very few long-term bird banding operations exist, as most of the current bird banding is done sporadically for short-term research with little connectivity between projects. The Jama-Coaque reserve, located in coastal Ecuador close to Pedernales, has been identified as an avian hotspot with almost 300 species observed within the reserve. Of these, 21 have been identified as IUCN red-list species. In order to better understand the phenology and populations of these birds, we ran 2-year constant bird banding effort. To account for the diversity of habitats found in the reserve, we chose 12 sites spread over a gradient of 325 – 700 m elevation. We found 2 distinct breeding peaks and changes in the avian communities, both corresponding to the rainy and dry seasons. We hope our bird banding efforts here help to spark more long-term efforts throughout the country to better understand the incredible avian diversity.

Stephanie Gobert-Pitt - University of Northern Colorado. **Monitoring reproductive success and output of banded Rock Wrens (*Salpinctes obsoletus*) from Larimer County.**

A population of Rock Wrens from natural areas near Horsetooth Reservoir in Larimer County, Colorado, was monitored during the 2016 and 2017 breeding season. Males were banded, experimentally evaluated using a playback study, and then were followed to quantify their reproductive effort and success for the season. This talk will explore some of the reproductive

measures quantified for this population over two consecutive breeding seasons. This research contributes a first report of reproductive success for Rock Wrens in Colorado and is a valuable addition to our knowledge of this species' reproductive success in the northern parts of its distribution.

Quresh Latif, David Pavlacky, Rob Sparks and Rick Truex - Bird Conservancy of the Rockies. **Nested sampling of forest restoration treatments reveals different species occupancy and richness patterns depending on spatial scale.**

Ornithologists increasingly monitor occupancy as a cost-effective approach to estimate population patterns and trends, and multi-species monitoring can additionally inform species richness. Practitioners typically focus on incorporating temporal replicates into their surveys to account for detectability, but many fail to appreciate how sampling scale affects inference. We leveraged nested bird data from an extension of the Integrated Monitoring in Bird Conservation Regions (IMBCR) program to demonstrate how occupancy and richness patterns estimated at different scales reflect different processes. Sampling points were nested within 4x4 1 km² grids (max 16 points each), and the Collaborative Forest Landscape Restoration Program (U.S. Forest Service) funded surveys and analysis. As with many studies that examine bird relationships with forest disturbance or management treatments, we found statistical support for both positive and negative species occupancy relationships with restoration treatments among survey points. We only found support for positive occupancy relationships with percent landscape treated for grids. Consequently, although species richness differed by < 1 species between treated and untreated points, mean richness increased by ~5 species from grids in untreated landscapes to landscapes with ~60% area treated. These results provide evidence for the often touted but less commonly documented importance of landscape heterogeneity for supporting biodiversity in lower elevation conifer forests of western North America. We demonstrate how occupancy relationships measured at different scales can reflect different processes – coarse-scale relationships quantify species distribution

whereas fine-scale relationships reflect habitat use or local abundance. We suggest ornithologists strongly consider sampling scale when planning occupancy-based surveys. This study exemplifies how IMBCR can facilitate bird population and community monitoring at multiple scales.

Ron Melcer Jr. and Ann Nightingale - University of California, Davis and Rocky Point Bird Observatory. **Migration Ecology of Landbirds on Southern Vancouver Island, BC.**

Rocky Point Bird Observatory (RPBO) is located within Bird Conservation Region 5 on the southern tip of Vancouver Island, BC and is the only Pacific coastal member of the Canadian Migration Monitoring Network. Birds migrating south along the island face a 16-29 km overwater crossing, serving as a weak migration barrier. RPBO has conducted migration monitoring since 1994, and provides important long-term information on western bird species. The coastal location and cool wet climate supports rich vegetation potential with field sites consisting of Scouler's willow (*Salix scouleriana*), red alder (*Alnus rubra*) – dominated riparian corridors surrounded by Douglas-fir (*Pseudotsuga menziesii*), Garry oak (*Quercus garryana*) – dominated forests. We analyzed the demographics, autumn migration timing, body condition, and mass gain for 17 Neotropical and 30 Nearctic migrant species, and 4 resident species. We found migration timing varies by species, age, and sex, and some patterns were consistent with other investigations. Mass varied by age in some species, and not in others. All species had positive trends in regressions of mass by capture time, indicating that these habitats provide important resources during the most vulnerable and unpredictable period of the bird's annual cycle. As southern Vancouver Island is subject to human population growth and land use intensification, these findings provide evidence of the importance of the conserving stream-side vegetation communities for migrant and resident species.

Sherry Nickolaus - Bird Conservancy of the Rockies. **Integrating educational programs with banding stations.**

Banding stations offer a unique opportunity for both youths and adults to see science in action and make lasting connections with local birds and their habitats. Careful planning is needed to ensure that educational goals can be met while also maintaining the safe operation of a banding station. I will share strategies for accomplishing these goals, including how to manage visitor access, share tools that can be brought into the classroom to prepare students for the banding station experience, and also provide related hands-on learning activities to help ensure a memorable experience for visitors.

Ann Nightingale and Wallis Moore-Reid - Rocky Point Bird Observatory. **Fractured clavicles can present as wing strain in Purple Finches (*Haemorhous purpureus*).**

Although bird injuries during mist netting are rare (<1% Spotswood et al. 2012), one of the more common injuries is “wing strain”. The term is used to describe any non-specific injury that results in the bird dropping to the ground rather than flying away on release after banding. Wing strain is generally thought to occur during extraction of the bird from the net, or during the banding and measurement process. It is usually thought to be muscular or nerve-related, although there have been records of coracoid bone breakage (Smith et al.). Since 2016, banders at Rocky Point Bird Observatory in Victoria, BC, noted that the wing strain rate was much higher (>2.5%) in Purple Finches than any other species. Despite restricting extractions of Purple Finches to banders and very experienced volunteers, the injuries continued to occur. Evaluation by wildlife rehabilitators at nearby British Columbia SPCA Wild Animal Rehabilitation Centre (Wild ARC) found that each of the “wing-strained” Purple Finches had a broken clavicle (and some cases, two broken clavicles). Most of the birds taken to Wild ARC recovered from this injury due to safe containment and treatment and were subsequently released. It is unlikely many of them would have survived in the wild. The exact cause (or causes) of the broken

clavicles is unknown, but the injuries are thought to occur when the bird hits the net (or possibly the trammel). Diet and general health may also be factors. Banders and people who remove birds from mist nets should learn the signs of clavicle fracture to reduce the risk of attempting to release an injured bird. Birds should be released in a manner that would allow easy recapture if the bird cannot fly. Whenever possible, “wing strained” birds should be taken to a rehabilitator, as the injury may be more serious than it appears, and containment and treatment has proven effective in recovery.

Bruce Peterjohn - United States Geological Survey (USGS) Bird Banding Laboratory. **A Workshop on the USGS Bird Banding Laboratory: Preparing for the next century of bird banding.**

The USGS Bird Banding Laboratory (BBL) is an integrated scientific program established in 1920. It supports the collection, archiving, management and dissemination of information from banded and marked birds across North America. These data are critical for scientific research and to inform management and conservation practices. Currently, the BBL is redesigning its data management system, improving the submission processes for banding and encounter data, enhancing the curation, archiving and dissemination of data, creating an electronic permitting process, and other important changes. These updates are being made with the goal of improving the efficiency of BBL data management practices, supporting an increased volume of banding data produced by our banding community, and adapting to new technologies. The roundtable discussion will introduce the changes to the banding community. We are seeking input from banders to learn about their specific needs and ideas for the BBL of the future. Regardless of whether you handle only a few birds each year or many thousands, whether you are only using metal bands or the latest in bird tracking technologies, we value your suggestions to improve the BBL program during its second century of operations.

Bruce Peterjohn - United States Geological Survey (USGS) Bird Banding Laboratory. **What's new at the BBL: Bird Banding Lab update for 2019.**

The USGS Bird Banding Laboratory (BBL) has undergone several significant changes since the last update provided to the Western Bird Banding Association. The Banders Portal was released in 2018 and will eventually become the primary means by which banders will interact with the BBL. A new version of the REPORTBAND web application is under construction. We hope to release the new application later this year, and it will mark the BBL's first venture into cloud computing. The current ORACLE data management system needs to be replaced and moved into the cloud environment. New data submission processes to replace the BANDIT software are also under consideration. Learn about these changes and other banding-related activities as the BBL approaches its centennial anniversary on 1 Mar, 2020.

C. John Ralph - Klamath Bird Observatory and Redwood Sciences Laboratory. **Three generations of bird observatories in the Americas: what have they done, where are they going, and how to keep them going?**

I will present an overview of the evolution and processes involved in creating, growing, and sustaining bird observatories. I will ask, “what makes bird observatories more (or not so much) successful?” We are all aware of the many important accomplishments of observatories (e.g. publish important scientific findings and influence political change for improved conservation). We are also aware of the multitude of motivating values and paths that characterize bird observatories. But which values and paths are most critical for success? I have had the privilege to observe three generations bird observatories on several continents. My observations of how the questions they have asked, and the technologies and methodologies that they have developed and promoted, provide insights into what the observatories of today should consider in order to fit in and survive in constant change.

Most obvious to me has been the different kinds of program paths that bird observatories take on. I will compare about a dozen such programs and critically examine how they have shaped bird observatory models. These include the: (1) Science-based Models (involving capture to determine strategies of demography and molt); (2) Abundance-Based Models (involving habitat relationships, breeding biology, and migration strategies and routes); (3) Education Model; (4) Taxon-specific Model; as well as the last (and some would say least), (4) Observatory as a Consulting Firm Model. Within these models, how can you best go about marketing and promoting your bird observatory?

To answer this, it is important for us to agree upon specific metrics of success that can be used to compare the different models. I will show how we can use metrics relating to staffing levels, budget and finances, active partnerships, use of web-based and social media, and products such as publications, all can be used to compare bird observatory models while holding constant the age and maturity of each bird observatory. Important is the promotion of Keystone Projects ones that your audience uses to identify your bird observatory and ones that set you apart from your competitors (aka “partners”).

The key to all this is of course the finances: you must determine who your audiences are for data, education, and other products. Is it birders, government agencies, scientists, individuals, or environmental consulting firms? Finally, in regard to implementation, I will talk about the essential key role of staff, comparing the relative roles of scientists, biologists, and volunteers... and, oh yes, the administrators.

Brandt Ryder - Bird Conservancy of the Rockies. An Introduction to the Wolfe-Ryder-Pyle age-classification system.

Molt is a fundamental, yet energetically taxing event in the avian annual cycle. Molt criteria have long been used to accurately age temperate birds, but the calendar-based system does not always reflect true age or the actual timing of plumage transitions. The WRP system, originally developed as an ageing tool for tropical

systems where breeding overlaps 1 Jan, is gaining widespread use North America. WRP is a based system based on molt cycles and their inserted plumages. It enables the determination of age range in months through the plumage succession and can be broadly applied across systems for demographic studies. This talk will provide an introduction to WRP and describe how it relates to calendar-based ageing systems and Humphrey-Parkes/Howell plumage terminology.

Walter H. Sakai - Thousand Oaks, California. Recovery of the avifauna after a chaparral fire - year one-half.

The Woolsey Fire burned some 39,234 ha in southern California in late 2018. The fire burned through the Zuma Canyon Bird Banding Station in the Santa Monica Mountains National Recreation Area, which has been in operation as a year-round constant effort bird banding station for 25 years. In order to assess the post-fire recovery of the avifauna, banding was resumed as soon as it was feasible. Here I present the recovery of the avifauna in Zuma Canyon during the first half year (January-June, 2019) post-fire. These findings were compared to the averages for the 10 years prior to the fire (January-June, 2009-2018).

Most of the species present prior to the fire were represented after the fire. Common chaparral species like Wrentits (*Chamaea fasciata*), House Wren (*Troglodyte aedon*), Bewick's Wren (*Thryomanes bewickii*), Common Yellowthroats (*Geothlypis trichas*), California Towhees (*Melozone crissalis*), Spotted Towhee (*Pipilo maculatus*), Song Sparrows (*Melospiza meloidea*), and Black-headed Grosbeaks (*Pheucticus melanocephalus*) were present. Lazuli Buntings (*Passerina ameona*), a post-fire species, were abundant. Some taxa like Picidae, Vireonidae, and Mimidae were notably absent in our mist nets, although they were seen or heard. All species mentioned above showed evidence of breeding during this first spring based on the capture of Hatching Year birds, as well as cloacal protuberances and brood patches in adult birds.

The key differences were that although these residents were present and breeding, the numbers, measured as birds per 100 nh, were

typically higher or lower than compared to pre-fire years depending upon the taxa.

Erin Strasser - Bird Conservancy of the Rockies. **Home range and habitat use in Sprague's Pipits across the annual cycle**

Understanding home range size and habitat preferences across the annual cycle is an important component of monitoring species in steep decline. Sprague's Pipit (*Anthus spragueii*) is a declining grassland specialist that breeds in the Northern Great Plains (NGP) with a substantial portion of its population wintering in the highly threatened grasslands of the Chihuahuan Desert (CD). We radio-tagged and tracked and 42 breeding pipits between 2017-2019 at two sites in the NGP and 18 wintering pipits between 2014 and 2019 at three sites in the CD to generate baseline home range estimates and identify habitat preferences on their wintering grounds. We found that mean home range on the breeding and wintering grounds with 95% kernel density estimators were 19.9 ha and 15.3 ha respectively. Within their winter home ranges, pipits selected grasslands with more bare ground and less 'other cover' (litter, duff, animal excrement, and rocks) than what was available on the landscape. These findings may reflect different habitat use, diet, and predator avoidance strategies than other grassland passerines which select for denser grass cover during winter in the Chihuahuan Desert and highlight the importance of structurally heterogeneous grasslands. We also discuss methods used to capture and track this elusive species on the breeding and wintering grounds.

Jennifer Timmer - Bird Conservancy of the Rockies. **Accessing breeding landbird monitoring data - the Integrated Monitoring in Bird Conservation Regions.**

The Rocky Mountain Avian Data Center (RMADC) serves as the portal for avian information collected by Bird Conservancy of the Rockies and our collaborators in the Rocky Mountains, Great Plains, and Intermountain West. The RMADC also serves as a regional node of the Avian Knowledge Network. The RMADC primarily hosts population estimates

produced from a collaborative breeding landbird monitoring program, Integrated Monitoring in Bird Conservation Regions or IMBCR. Information available to the public on the RMADC includes occupancy, density, and abundance for 200+ species at a variety of scales (e.g., National Forest up to a state up to a Bird Conservation Region). Approximate survey locations, species counts, and survey effort are also available. IMBCR partners are the main users for the RMADC, and they extract population estimates and species counts for areas of interest to help complete environmental assessments, inform State Wildlife Action Plans, and compare bird populations at local and regional scales. Online tutorials are available to help new users explore the RMADC (<http://rmbo.org/v3/avian/ExploretheData/ShortVideosonUsingtheADC.aspx>). Presented was a brief overview of the IMBCR program and what data are available on the RMADC, as well as how to extract and interpret information from the site.

Judith Toms - Environment and Climate Change Canada, Edmonton, AB. **New online tools to improve your bird ID and ageing/sexing.**

I will introduce a few free online tools that Environment and Climate Change Canada has helped to develop to support bird identification by birders and banders. Being able to accurately age and sex birds is critical for banders, but experience is often needed to effectively use banding reference materials; Piranga is an online resource of photos for individuals of known age and sex, which can be used for in-field reference or training. Many banding stations also conduct an audio-visual bird census; Dendroica is a catalogue of bird vocalizations, which can be used as reference materials or for training through use of quizzes, which can be based on customized lists. Banders may also find the nesting phenology tool useful; it documents the likelihood of selected species breeding in a selected region at any point in time.

Tammy Vercauteren - Bird Conservancy of the Rockies. **Welcome to Bird Conservancy of the Rockies: Introduction to BCR and Barr Lake.**

Our mission at Bird Conservancy of the Rockies is the conservation of birds and their habitats through an integrated approach of science, education and land stewardship. We envision a future where birds are forever abundant, contributing to healthy landscapes and inspiring human curiosity and love of nature. Our work radiates from the Rockies to the Great Plains, Mexico and beyond. Our efforts are advanced by sound science, achieved through empowering people, realized through stewardship and sustained through partnerships. Together, we are improving native bird populations, the land and the lives of people.

Matt Webb and Maureen Correll - Bird Conservancy of the Rockies. **The collaborative development of a Great Plains Motus network.**

The Motus Wildlife Tracking System is a large-scale automated radio telemetry network developed and used to fill in important gaps in our knowledge of avian movement and migration. This "new use of an old technology" has allowed researchers to learn about where birds go without the need to recapture and retrieve data. Large gaps in network coverage currently exist throughout the western half of North America, particularly in the grasslands of the Great Plains and Chihuahuan Desert. Bird Conservancy of the Rockies and partners have developed a multi-year phased plan to collaboratively expand the coverage of the Motus network, ensuring that researchers are able to rapidly take advantage of this exciting technology to learn about and conserve the unique avian diversity found within the region

Walter Wehtje - Ricketts Conservation Foundation. **Effects of fire in Wyoming Aspen Woodlands: Preliminary MAPS banding results.**

In Wyoming, prescribed burns in aspen woodlands are considered an effective management tool to limit conifer encroachment and improve mule deer (*Odocoileus hemionus*) and elk (*Cervus*

elaphus) habitat. The effect of these actions on non-game bird species is less well-understood. In 2018 the Ricketts Conservation Foundation partnered with the Wyoming Game and Fish Department and the Bridger-Teton National Forest to assess a planned prescribed burn of 4046.8ha on Monument Ridge in Sublette County, WY. After two years of banding and an unplanned 24281.1ha acre wildfire, we have some interesting differences in bird abundance and diversity between a burned and unburned MAPS site. We expect to continue to document these differences and see how the breeding avifauna changes as one site recovers from the 2018 fire, while the second one becomes part of the fire treatment within the next few years.

Colin Woolley - Bird Conservancy of the Rockies. **Habitat use and home-range size in Mountain Plovers during nest incubation.**

Mountain Plovers (*Charadrius montanus*) are a species of conservation concern throughout their breeding range of the western Great Plains. Agricultural crop fields have replaced much of their native short-grass prairie habitat. Plovers have taken to nesting on these crop fields, particularly in areas that are fallow or with low-growing crop. The study areas in Kimball County, NE, and Weld County, CO, consist of mostly crop fields, with interspersed patches of grassland. Plovers spend most of their time at their nest, thermoregulating their eggs. When temperatures are moderate, they leave the nest to seek foraging opportunities. It has been unclear if crop fields provide sufficient food resources or if plovers commute to nearby grassland patches to forage. This study used GPS loggers on plovers to examine how they use this varied landscape during the breeding season.

We found that plovers used fallow crop fields nearly exclusively and avoided areas of grassland or growing crop. Mean home-range size was 155.4 ± 54.9 (SE) hectares. We also sampled invertebrate prey populations in grassland and fallow crop fields and found no significant difference in biomass or calorific density. These results will help inform future management decisions for Mountain Plovers, particularly in areas where agriculture is the primary land use.