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**2015 WBBA ANNUAL MEETING
SCIENTIFIC SECTION
ABSTRACTS**

SESSION 1: BIRD BANDING MONITORING AND EDUCATION

SONGBIRD MONITORING IN SOUTHERN BELIZE: A REVIEW OF YEAR ONE

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The Calgary Bird Banding Society (CBBS) has been looking for a suitable site to conduct spring migration monitoring in Central America since 2002. Banding was conducted on a site on the Osa Peninsula in Costa Rica from 2002-2008. Although diversity and numbers of Neotropical migrants were not sufficient to justify long-term monitoring, CBBS did generate scientific publications on Swainson's Thrush connectivity and stop-over ecology and the resident bird community from this effort. Subsequent investigations included two years (2011-2012) at La Selva Biological Station, Costa Rica and Minatitlan, Mexico (2013). A chance email introduction with the owners of Toucan Ridge Ecology and Education Centre (TREES), in Belize, presented yet another opportunity for a long-term project. In Apr 2015, CBBS conducted pilot migration monitoring of Neotropical migrants passing through the rugged, hilly, orchard habitat banding station on the TREES property. In total, 542 Neotropical migrants of 35 species were captured and banded over the 31-day period. Of the 35 species captured, 11 were captured in sufficient numbers and frequency to track population trends including: Red-eyed Vireo (134), Swainson's Thrush (98), Gray Catbird (83), Tennessee Warbler (40), and Rose-breasted Grosbeak (15). This year's results were encouraging and CBBS is currently planning to continue the banding in 2016 and add an additional week on each end (approx. 25 Mar – 7 May) to try and monitor migration more completely.

BIRTH OF THE PERUVIAN BIRD BANDING PROGRAM
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In 2010, with the support of The Wetland Trust, Porzana Ltd. and two NMBCA grants, the Centre for Ornithology and Biodiversity (CORBIDI) established the first national bird-banding program in Peru. The main components of the Peruvian Banding Program (PBP) in the past five years were the creation of constant-effort banding stations, the involvement of allies with banding research projects and the implementation of basic banding courses. A total of four banding stations currently work year-round and are in charge of building local capacity in different habitats in Peru. Seven Peruvian allies and some independent researchers have completed a total of 16 different research-banding projects. With the support of Peruvian and non-Peruvian sponsors, we have organized a total of seven banding workshops and >300 Peruvian students have received training in bird banding skills. At least 15,000 Peruvian bands have been distributed, an average of >1,000 resident birds have been banded per banding station, and close to 4,000 migratory shorebirds have been captured and marked in Paracas, southern Peru. A map with 75 international re-sightings has been created, providing the most updated map on migratory pathways for shorebird populations that spend the non-breeding season in Peru, linking continents and people involved in shorebird research/banding projects in The Americas.

MIST NETTING AND ACOUSTIC MONITORING OF NOCTURNAL FLIGHT CALLS IN MINATITLAN, VERACRUZ, MEXICO

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Two previous studies near Vancouver compared mist netting data with that from acoustic monitoring of avian night flight calls, the first in 1995 by Rhonda Millikin of

Canadian Wildlife Service and the other in 2004 by Jessica Murray and staff at the Rocky Point Bird Observatory (Victoria, BC). Both studies noted that the acoustic technique recorded an order of magnitude more Swainson's Thrush (*Catharus ustulatus*) nocturnal flight calls than individuals mist netted. Here we report similar results using mist netting with audio lure and night flight call monitoring from Minatitlan, Veracruz at the Observatorio de Aves del Pantano de Santa Alejandrina (OAPSA) between 22 Mar to 28 May 2015. In addition, we present comparative results for other species along with discussion on the inherent bias of each method and the utility in using both simultaneously.

PRELIMINARY RESULTS FROM NINE YEARS OF WINTER BANDING IN SONORA, MEXICO

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The Navopatia Field Station in southern Sonora, Mexico, is situated in a unique and little-studied ecosystem near the southern coastal border of the Mexican state of Sonora. A summary of preliminary results of nine seasons of MoSI (*Monitoreo de Sobrevivencia Invernal/Monitoring Overwintering Survival*) data will be presented with corresponding area search survey data. Results including; species diversity, capture rates, age class differences, survivorship, noteworthy recaptures, observations, and natural history observations of over 65 captured species will be given. Notes concerning the natural history, education, and conservation of this little-known ecosystem will also be presented.

VITAL RATES OF NORTH AMERICAN BIRDS: INTRODUCTION TO THE WEBSITE THAT PRESENTS THE ANALYSIS OF 15 YEARS OF COORDINATED BIRD BANDING DATA

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A new website unveiled by The Institute for Bird Populations (IBP) provides unprecedented estimates of the vital rates of 158 species of North American landbirds. Vital rates of North American landbirds provides estimates of the annual rates of survival, reproduction, recruitment, and population change for each of the 158 species. The data is based on analyses of 403,711 adult and 212,237 young (hatch-year) birds, and includes 66,171 between-year recaptures collected over a 15-yr (1992-2006) period across the US and southern Canada by the Monitoring Avian Productivity and Survivorship (MAPS) program.

The MAPS program that produced the 15-year dataset that formed the basis for the website utilizes a standardized protocol of mist netting and bird banding and state-of-the-art capture-mark-recapture analytical techniques. It consists of a network of over 1,200 bird banding stations across North America that operate during the May-to-Aug landbird breeding season; an average of more than 400 stations have been operated annually. About 20% of MAPS stations have been operated by IBP biologists and trained interns, while the remaining 80% have been operated by independent licensed bird banders, making MAPS one of the largest and most highly trained citizen science efforts anywhere in the world.

By examining the estimates of these critical vital rates and the annual and geographic relationships among them, the website identifies the extent to which population changes in these species are driven by factors affecting productivity, which occurs during the spring and summer breeding season, versus factors affecting mortality, which primarily occurs during the non-breeding season. The information presented on the website allows identification of where and when in the annual life cycle of these species the vital rates are exerting their effects and thus, where and when the populations are being limited.

Determining the vital rates that are the likely drivers of avian population change is critical for informing effective conservation because management can then be

directed at the annual-cycle stage that actually limits the population. This is especially important for migratory species that breed in temperate areas of North America but spend the winter in tropical areas, because it tells us where we should focus our limited conservation resources. Understanding the contribution of the various vital rates to the population declines exhibited by many landbird species not only has important conservation implications, it is also fundamental to our basic understanding of avian population dynamics.

THE BIRD'S EYE VIEW EDUCATION PROGRAM: USING BIRD RESEARCH TO EDUCATE THE PUBLIC ON THE IMPORTANCE OF HEALTHY RIPARIAN SYSTEMS

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The Upper Clark Fork River Basin (UCFRB) of western Montana has been degraded by over 100 years of mining and smelting activities. The UCFRB is the largest contiguous complex of federal Superfund sites in the nation. Restoration and remediation efforts were initiated in the late 1980s and will continue, at a minimum, through 2030. Any restoration activity should include public education and outreach so that land-use decisions in the future do not compromise the integrity of the ecosystems that support the region. The Bird's-eye View Education Program (BEVEP), which integrates public education and research on the ecological health of the UCFRB, was developed to inform the public on the importance of healthy riparian areas. Specifically, we focus on birds, inviting the public to observe research at songbird banding stations and Osprey (*Pandion haliaetus*) nests. BEVEP currently operates three songbird banding stations and monitors multiple Osprey nests around the UCFRB, interacting with around 650 individuals a year. Results from an assessment show that participants leave with a positive attitude toward the outdoor science experience and a general knowledge of Upper Clark Fork restoration, its history, and its riparian ecosystems. In addition, data collected during BEVEP contribute to management and land-use decisions. Songbird banding sites are operated as MAPS (Monitoring Avian Productivity

and Survivorship) stations. Data from these sites are reported to multiple agencies and NGOs, including the Institute for Bird Populations, U.S. Forest Service, National Park Service, the Natural Resource Defense Program, and the Clark Fork Watershed Education Project. This integration of public education and ecological research serves both the citizens of the UCFRB and the various actors working to remediate and restore their home.

SUMMER ORNITHOLOGY: PROVIDING BIRD BANDERS SINCE 1983

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This talk will focus on the current and historical impacts of Summer Ornithology; Birds in the Hand (hereafter, Summer Ornithology). Summer Ornithology is a three week course offered to students at The Evergreen State College, located in Olympia, Washington, to learn the fundamentals of ornithology, bird banding, and natural history of the local high desert flora and fauna. The course originated in 1983, designed by faculty member Dr. Steven Herman, who continues to teach. As of 2015, Summer Ornithology has been taught for 32 years and has helped students foster an interest in birds and altered the career paths of students. This intensive and intimately focused course provides a unique cooperative learning experience and a rare opportunity for emerging ornithologists and intrigued scholars alike.

SESSION 2: THE USE OF BIRD MONITORING DATA IN MAKING SOUND LAND USE DECISIONS

TONGASS RUFOUS HUMMINGBIRD PROJECT

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The Rufous Hummingbird's (RUHU) breeding range is tied to northwestern temperate forests. The species has been identified by Partners in Flight as a priority for monitoring, research and management in Bird Conservation Region 5. Recent data from the Breeding Bird Survey and Alaska Landbird Monitoring System

suggest possible population decline. Hummingbirds, as pollinators, may be ecologically important to their habitat. Information about habitat use and phenology could aid in designing forest restoration projects and could inform climate change tracking. Because hummingbirds are conspicuous and watched by the public, research is aided by citizen science efforts, and conservation education projects can easily be designed focusing on hummingbirds. Yet much remains to be learned about RUHU habits, particularly in Alaska. In 2013, the Tongass National Forest in collaboration with the Western Hummingbird Partnership (WHP) sought to gain insight into the habits, breeding chronology and demographics of RUHU. This was the first full season study of the species in southeast Alaska. Two banding stations were established near Juneau using general WHP guidelines and data collection protocol similar to those in use by Rocky Point Bird Observatory. Also, foraging observations and migratory movements were sought from local citizen scientists. I present results from the first three years including data summary of over 350 banded birds, discussion of recaptures, and a general breeding season chronology hypothesized from those results. I will also list important natural forage plants.

REFINING POPULATION TRENDS OF NEOTROPICAL LANDBIRDS USING STANDARDIZED MIST NETTING DATA

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The Canadian Migration Monitoring Network (CMMN) is a collaboration of monitoring stations across Canada, the Canadian Wildlife Service and Bird Studies Canada. A primary objective of the CMMN is to generate population trends for Neotropical migrant landbirds that are not monitored well by other methods. Such population trends are critical inputs to status assessment and conservation planning. Trends for most CMMN stations are generated using a combined data set of bandings and visual observations. Trend estimates for the Calgary Bird Banding Society's station at Inglewood Bird Sanctuary are based exclusively on

banding of new captures which has the advantage of reducing variance but the disadvantage of reduced sample sizes. However, by limiting the data to new captures, covariates such as daily net effort, capture net, and age or sex, can be included in trend analyses. We refined trend analysis methods to allow for comparison of trend estimates before and after accounting for non-operational days and standardizing captures with respect to net effort. The adjustments did not significantly affect trends for Wilson's Warbler, Solitary Sandpiper and Cedar Waxwing based on Inglewood capture data between 1995 and 2012. This was due to low variability between years in average daily net-hours and a fairly even distribution of non-operational days across years at Inglewood. Although long-term trends were robust, adjustments to annual abundance estimates for specific years were noticeable. Effects of capture standardization on annual abundance estimates are expected to be greater for less frequently captured species with implications for the accuracy of trends, which will be discussed in the context of additional Neotropical migrants.

BIRD BANDING ACTIVITIES AND THEIR USE IN MANAGEMENT OF METRO VANCOUVER REGIONAL PARKS

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As one of the Lower Mainland, BC's largest landowners, Metro Vancouver (MV) has a responsibility for preserving the natural resources of the region. MV's management approach considers the entire ecosystem, including humans, and is based on the principles of sustainability, adaptive management, and ecological connectivity. Its goals are to conserve ecosystem health to ensure long-term resiliency as well as conserve diverse biological communities and their associated habitats while at the same time accommodating public use of their parks and promoting environmental stewardship through public education

and involvement. Bird monitoring can be used in an adaptive management framework to ensure objectives are met. Of the 25 parks and reserves operated by MV, two include banding programs covering more than seven habitat types. The Vancouver Avian Research Centre (VARC) operates a bird banding program in Colony Farm Regional Park, located in Coquitlam. The program aids MV in attaining its goals by promoting conservation through its public education programs as well as providing scientific data for management purposes. To assist MV in meeting its management objectives, VARC collects banding data from five habitat types, including three variations of old-field habitats. More than 90 species are regularly caught during banding activity in Colony Farm and three of those are listed as species of conservation concern. This presentation will discuss the use of banding data in contributing information to habitat requirements for birds as well as to assess specific problems, trends that are starting to become evident and what is needed to put a plan into place. Specific emphasis will be on the extensive old-field and riparian habitats within the park which represent high value ecosystem features for resident and migrating birds. Also discussed will be species specific banding studies which can allow for more detailed monitoring. This includes a look at the decline of swallow species in Colony Farm and their use of old-field habitat, providing an opportunity to contribute to North American wide aerial insectivore monitoring studies.

USING BANDING TO HELP DETERMINE HOW CLIMATE INFLUENCES DEMOGRAPHY THROUGH REGULATING FOOD OF HAWAIIAN FOREST BIRDS

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Individual bird species numbers and community composition are regulated through several processes, including density dependent, top-down, and bottom-up interactions. While the literature has many indirect studies involving correlational analyses, direct measure-

ments from banding data, coupled with phenology of fruits and flowers to establish trophic linkages and role of competition in bird communities to demonstrate these processes are exceedingly rare. Hawaiian bird communities are excellent to study these processes because they are relatively species poor, and have easily measureable trophic linkages (including obligate nectarivores and frugivores, endangered specialists, and generalists), as well as introduced and native species. We collected intensive data on 15 bird species in the 1970s and 1980s at several study sites where the population and behavioral dynamics and associated food resources, were assessed at monthly intervals. With analytical power unavailable when these data were gathered, we have recently constructed Structural Equation Models that combine multivariate and regression techniques to measure the direct and indirect effects of exogenous and endogenous variables on these species. We have found that they structure their life-cycle events around climatically-induced food availability, as well as trophic interspecies interactions. We also found that the principal food resources for the nectivorous and frugivorous specialists have a profound effect and drive the timing of events such as breeding and molt, as well as influencing survival. Importantly, interactions between species also had a major regulatory effect. Over the ensuing 30 years, increasingly dry conditions in these forests has likely had important consequences for the species and their interactions, thereby presenting new opportunities to address emerging threats involving climate change.

BANDING AS A TOOL FOR INVESTIGATING THE IMPACT OF HABITAT MANAGEMENT ON BREEDING BIRD CONDITION, SURVIVAL, AND DISTRIBUTION

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Adaptive grazing increases habitat heterogeneity, which in turn has been shown to augment avian diversity. However, the link between diversity and population trends has not been demonstrated for grassland birds. The goal of my master's project was to estimate the

impact of heterogeneity-based management on avian condition, survival, and distribution. I looked at whether these variables are more strongly impacted by environmental features that can be manipulated or those that can not. I focused on McCown's Longspur (*Rhychophanes mccownii*), a species of conservation concern in Colorado and Nebraska. I will build on this research for another two field seasons as part of a longer-term PhD project. McCown's Longspur is a shortgrass specialist, and its abundance appears to be declining due to habitat loss and degradation. In 2014, rangeland scientists at the Central Plains Experimental Range in northern Colorado initiated a 10 year application of adaptive grazing as a tool for increasing habitat heterogeneity, cattle forage availability, and populations of target bird species such as McCown's Longspur. In 2014 and 2015, I estimated daily nest survival for McCown's Longspur and modeled response of this variable to environmental features including temperature, precipitation, and nest-site vegetation. In an effort to obtain information on individual response to environment, I used a hand-made walk-in nest trap to capture adult birds on the nest, a method that had not been used on this species before. I gathered biometric data and collected feather samples. I captured nine individuals in 2014 and 23 individuals in 2015, with an increasing trapping success rate as my experience and technique improved. Preliminary results suggest that condition and survival do not vary substantially across treatments, but increasing my sample size over the next two years will improve my estimate for response. In 2015, I recaptured a bird that I had banded in 2014, at a nest only 0.15 miles from the earlier nesting site. This is a positive indication that McCown's Longspur exhibits breeding site fidelity. Having a proven approach for capturing these birds provides a foundation for tracking individuals within and between seasons. Feather samples may provide insight into where individuals from this population overwinter, which in turn would aid conservation on the wintering ground as well as the breeding ground. In summary, trapping and banding is an important value-added aspect of this nest-monitoring project that improves our ability to investigate how breeding birds are impacted by management decisions.

SESSION 3: AVIAN ECOLOGY

FISHES IN THE FOREST: BANDING HELPS DETERMINE INFLUENCES OF SALMON ON BREEDING SONGBIRDS

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Pacific salmon provide a complex cross-ecosystem link between the ocean, freshwater, and terrestrial systems. When marine-derived nutrients from spawning salmon are transferred to riparian forests through various food web pathways, they increase invertebrate abundance and enhance plant structure and composition; thereby subsidizing resources that are important to birds. We found and monitored nests of the Pacific Wren (*Troglodytes pacificus*) during the breeding seasons of 2012-2014 across a wide range of salmon-spawning biomass on 14 discrete streams along the remote Central Coast of British Columbia. To test for salmon-derived nutrients in their diet and reproductive fitness, we captured fledglings and territorial male wrens to collect morphometric data as well as examine isotope signatures in their feathers, feces and potential prey within individual nesting territories. This talk will highlight discoveries about body condition, nesting success, and food abundance among territories and streams across our study sites.

NESTING ECOLOGY OF MYIARCHUS NUTTINGI AND MYIARCHUS TUBERCULIFER IN NAYARIT, MEXICO

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Myiarchus Flycatchers are a prominent presence at the edges of the dry deciduous thorn forest and agricultural interface in coastal Nayarit, Mexico. Four species of *Myiarchus* Flycatchers winter there but only two are found nesting: Nutting's Flycatcher (*Myiarchus nuttingi*) and Dusky-capped Flycatcher

(*M.tuberculifer*). In the 2015 field season, 27 nests of Nutting's Flycatcher and three nests of Dusky-capped Flycatcher were monitored from egg laying through incubation, nestling growth, to fledging. Internal and external thermal characteristics of nest sites were compared. Both behavior and cavity choice of adults from both species were conspicuously different. Sixty percent of the nest cavities in fence posts were reused from the previous nesting season. Nesting elevation preferences differed between the two species. Incubation time for Nutting's Flycatcher was variable from 12-15 days. Predation was high at 58.33%. At nest sites adults were trapped and banded. Nestlings from three different nests were removed from day one of hatching and weighed, measured, and photographed for a preliminary aging guide.

WESTERN YELLOW-BREASTED CHAT POPULATION IN BC: DEMOGRAPHY, BREEDING SUCCESS, DISPERSAL AND THE VALUE OF COLOR BANDING

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Using color-banding of individual birds, we have been able to collect data on a variety of demographic parameters and threats to an endangered bird population. We studied return rates, site fidelity, dispersal, longevity, survivorship and occurrence of road kill of the Western Yellow-breasted Chat (*Icteria virens auricollis*) in the southern Okanagan River valley, British Columbia. Apparent survival for male Western Yellow-breasted Chats banded as adults was 65%, and survival and recapture were constant across time. Forty-four percent of males were re-sighted and 10% of Chats banded as nestlings returned. Of these, 62% of males and 54% of females returned to their natal study site to breed. Natal dispersal ranged from 2.5 km to 15.6 km for males ($n = 7$) and 2.3 km to 2.6 km for females ($n = 2$); 16 males and 7 females banded as nestlings did not disperse. We documented 6+ year old Chats and double and triple broods in this population. These findings contrast with predictions that species at the northern limit of their range will have low site fidelity

and return rates and higher dispersal distances than passerine populations at the core of their range.

PREDATORS DRIVE HABITAT-SPECIFIC REPRODUCTIVE SUCCESS OF LEWIS'S WOODPECKERS IN BRITISH COLUMBIA

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The abundance of nesting cavities, nest-site competitors, predators and food supply can all impact the breeding performance of cavity-nesting birds that do not excavate for themselves. These factors may also interact if the numbers of cavities limit reproductive success in the presence of predators when secondary cavity-nesters must compete for high quality cavities to avoid predation, but are less important in areas where the risk of predation is low. We compared the reproductive success of Lewis's Woodpecker (LEWO), a weak excavator, in three habitat types in British Columbia and explore the influence of cavity limitation, native and non-native competitors, predators and food availability on breeding performance. We found that LEWO in cottonwood habitat had low nest failure rates and a high number of fledglings (2.1 fledglings overall), LEWO in live ponderosa pine habitat had low nest failure rates but a lower number of fledglings (1.5 fledglings overall), and LEWO in burned habitat had high nest failure rates and a low number of fledglings (0.8 fledglings overall). Habitats differed in cavity availability, competitor abundance and predators. Habitat-based differences in nest failure and number of fledglings produced were best explained by differences in the predator community. The fact that predators influenced complete nest failure, altered foraging behaviour, and subsequent fledgling numbers suggest direct mortality and indirect effects of perceived predation could be important in driving the variation in breeding performance of Lewis's Woodpeckers in British Columbia.

WING AREA AND TAKEOFF SPEED TO MEASURE ESCAPE PERFORMANCE ON BIRDS

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For birds, flight is the main way to escape predators, and the initial phase during takeoff is key to decide the outcome of an attack. Take off escapes could be impaired by larger fuel loads or anatomical features (small wing area, large body size, short tarsus). Measuring escape performance and its variation can be used to test if vulnerability to predators is a plausible explanation for the segregation of birds across predation gradients. I will describe standardized field methods for the collection of wing pictures and flight videos to assess escape performance of birds and the use image software analysis to obtain wing-load and take-off speed from them. I will illustrate the use of this technique in combination with conventional morphological and survey datasets to evaluate intra- and inter-specific segregation of shorebirds in non-breeding locations of northern South America. With inexpensive technology, basic training and a short additional handling time, field stations can collect information on escape performance of birds. Escape performance datasets can be used to test the role of vulnerability to predators on structuring bird communities in local contexts and provide the building blocks to explore explanations for bird distribution at larger scales.

WINTER HABITAT EFFECTS ON INDIVIDUAL CONDITION AND TERRITORIALITY OF YELLOW WARBLERS (*SETOPHAGA PETECHIA*) IN NATURAL AND AGRICULTURAL HABITATS IN JALISCO, MEXICO

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The life history of long-distance migratory songbirds is defined by their occupancy of different landscapes at different times of the year. An understanding of their

population dynamics, therefore, requires consideration of events that occur during breeding, migratory, and overwintering periods. For eight months of the year, Mexico is host to millions of wintering migratory songbirds of 164 species. Currently 310,000 km², or 15.5% of Mexico's surface is used for agriculture, and increasing by 1,550 km² a year. The conversion of floristically diverse and structurally complex natural landscapes to simpler agricultural landscapes affects the quality and availability of winter habitat for migratory songbirds. This could play a major role in their demography. However, few studies have examined the impact of agricultural winter habitat on the behavior and condition of wintering migratory songbirds. We investigated wintering Yellow Warbler's (*Setophaga petechia*) use of natural (riparian/forest, and mangrove/dry scrub) and agricultural habitats in Jalisco, Mexico. Population composition at six sites was determined by capture rates from 2011-2014. Sixty individuals were fitted with radio tags to determine their habitat use. Individual condition was assessed using morphological measures and heterophil to lymphocytes (H:L) ratios. Wintering Yellow Warblers exhibited sex segregation by habitat: with a clear male bias in riparian forest. Territorial birds in agricultural habitats had smaller territories compared to natural habitats. In addition to territoriality we found birds that did not hold territories and instead foraged over large areas. In agricultural areas both territorial and nomadic birds foraged in several of the most commonly used crops: sorghum, corn, chili peppers and tomatoes. We found no difference in size in between individuals wintering at different habitats, but birds in agricultural habitats had lower daily mass gain than birds in natural habitats. Similarly, individuals occupying agricultural habitats had higher H:L ratios than individuals wintering in natural mangrove/scrub and riparian habitats. Our findings indicate agricultural habitat on the wintering grounds has the potential to affect the behavior and condition of migratory species.

FROM WATER TO WING: VARIATION IN TERRITORY SIZE, REPRODUCTIVE INVESTMENT AND DENSITY OF PACIFIC WRENS IN RELATION TO SALMON DENSITY ALONG STREAMS IN BRITISH COLUMBIA'S COASTAL FORESTS

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The annual migration of Pacific salmon represents an important cross-boundary delivery of marine-derived nutrients into not only freshwater systems, but also adjacent terrestrial ecosystems. There is increasing evidence of the profound influence of these allochthonous marine inputs for plant and animal communities along spawning streams. However, there are few studies on the indirect effects of marine-derived nutrients for animals that do not directly feed on spawning salmon, such as songbirds. The densities of some passerine species, including the Pacific Wren, have been positively correlated with salmon abundance along stream sites in Alaska and British Columbia, but the mechanism maintaining these densities and its role in shaping intraspecific interactions remains poorly understood. I propose to study how marine-derived nutrients shape songbird community structure by examining how salmon abundance along stream-sites in British Columbia's central coast affects male Pacific Wren (*Troglodytes pacificus*) territory size and spatial arrangement as well as total reproductive investment. I will examine the effect of salmon density on absolute wren density and male territory size within stream plots by spot-mapping over a four month period. I hypothesize that higher salmon density will correspond with higher absolute Wren densities and therefore smaller, more distinct territories. To explore the relationship between salmon density and wren reproductive effort, I will also determine if the frequency of double-brooding and overall breeding success varies between sites in relation to spawning salmon density. The results of this study will contribute to our expanding knowledge of the far-reaching impacts of salmon on coastal ecosystem function.

NETS AND NETWORK THEORY: USING BANDING DATA AND NETWORK MODELS TO MEASURE BIRD BEHAVIOR AND INTERACTIONS

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Mixed-species flocks and ant-following birds are a common feature of Neotropical bird communities and are sensitive to habitat change. In this study we used banding data in association with network models and behavioral observations from the central Amazon to examine changes in flock structure across a disturbance gradient. Additionally, we used banding data and network models to identify previously undescribed facultative ant-following behavior in the forest understory. We found that mixed species flocks exhibited diminished cohesiveness in fragmented and second growth forest where species richness was positively correlated with canopy height. Our network analysis of ant-following behavior suggested that several common arboreal insectivores regularly associated themselves with ant-following communities, indicating that cryptic foraging behaviors may be common amongst many tropical bird species. Our study demonstrates that network models represent a new and powerful tool to analyze banding data that can help identify cryptic changes in bird behavior.

POSTER SESSION:

"LEG GAUGE" FIELD MEASUREMENT IN TROPICAL SPECIES COMPARE TO BBL RECOMMENDED BAND SIZE

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The "band size" recommended by BBL has been used as a criteria to choose the correct band size according to each bird species in North America over the past years. During last April's Trilateral Meeting in San Diego, California, Canada, USA and Mexico signed an

agreement to undertake a cooperative effort to develop a Mexican Banding Program whose database would be compatible with that of USA and Canada. After ten years of banding over 120,000 birds in Mexico, we have found certain variations of leg and band size with regard to those recommended by BBL, particularly in some shared species in North America which happen to be residents. This poster summarizes some of the differences observed between the recommended sizes and the evaluation with the leg gauge, which leads to the conclusion that rather than strictly following the BBL recommendation for band size with all birds, particularly with shared species that are resident, it is important to use the leg gauge to select the best option in band size according to the specific leg morphology.

FLYWAY OF FEAR: IS THE DANGER POSED BY SEA EAGLES FUELLING CHANGES IN GOOSE MIGRATION TRADITIONS?

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Sea eagle populations in North America and Europe were decimated by persecution, habitat loss and increased use of pesticides, but eagles started to recover after they gained protection in the 1970s. While sea eagle numbers were rising, certain Arctic breeding goose populations started to show changes in their migration routes and timing. One example is the Russian Barnacle Goose (*Branta leucopsis*) population which winters in the Netherlands and breeds in Northern Russia. After departing from the Netherlands, geese used to stop for ca. three weeks in the Baltic; but since the 1990's, geese delay their migration departure from the Netherlands by a month and only stay in the Baltic for ca. seven days. White-tailed Sea Eagles (*Haliaeetus albicilla*), which prey on Barnacle Geese, used to be rare in the Baltic, but now there are over 200 breeding pairs. There are only six breeding pairs in the Netherlands. Does the increased predation danger posed by sea eagles play a role in the changes of goose migration, or is food competition causing geese to reduce usage of the Baltic stopover? In this study we are testing these hypotheses by comparing goose feeding behavior, giving up densities and time budgets in the Netherlands and Estonia (Baltic). Finding out why geese are changing their migration traditions will bring us closer to solutions for the increasing agricultural damage and political conflict surrounding this new behavior.

USING RADIO FREQUENCY IDENTIFICATION (RFID) TECHNOLOGY TO STUDY THE NESTING BEHAVIOR OF TREE SWALLOWS

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Radio frequency identification (RFID) technology allows the unique identification of individuals and automated recording of the presence of tagged birds at fixed locations such as nest boxes. Tree Swallows are familiar birds in coastal British Columbia, but their abundance has declined in the last 40 years due to unknown causes. Since they readily accept nest boxes, Tree Swallows represent an ideal candidate species for the use of RFID technology. The main objective of this project is to develop RFID capability to study the nesting behavior of Tree Swallows at Colony Farm Regional Park in Coquitlam, British Columbia. The technology will be used to better understand the connections between adult nesting behavior, and weather, food availability and nestling growth and survival. This research will use innovative technology to address important ecological and conservation questions. This work is being done collaboratively by Vancouver Avian Research Centre, the University of the Fraser Valley and Vancouver Island University.

NESTING HABITAT AND DIET STUDIES OF SANDHILL CRANES (*ANTIGONE CANADENSIS*) FROM THE CENTRAL AND NORTH COAST OF BRITISH COLUMBIA

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The purpose of this study was to document the occurrence, habitat, and diet of Sandhill Cranes (*Antigone canadensis*) that breed in coastal British Columbia, a population believed to belong to the subspecies *rowani*. Specific objectives were to 1) locate cranes and their nests in selected areas of the central and north coast; 2) describe Sandhill Crane nest habitat; and, 3) identify shifts in diet content of breeding cranes from fecal samples. Helicopter surveys were

conducted within 1.5 km of the coastline during May 2007, 2008, and 2013. Twenty nest sites were visited in 2008 to collect data on nest habitat characteristics. Satellite imagery was used to measure stand-level and landscape features for 29 nests. Fecal samples were collected at six nest and roost sites. During the 2008 survey, 104 cranes and 19 nests were counted over a 430 km² area. Nests were in nearly all in shallow bog pools under 0.5 ha in size in forest or woodland bog openings. Food items characteristic of fecal samples included intertidal molluscs, insects, sedge (*Carex* spp.) and crowberry (*Empetrum nigrum*). Forested habitat may serve as a corridor for cranes with pre-fledged young, connecting bog nest and roost sites with shoreline foraging areas.

SUCCESSFUL USE OF A GOPRO AS A HOMEMADE BURROW CAMERA TO SURVEY BURROWS FOR BONIN PETREL CHICKS (*PTERODROMA HYPOLEUCA*) IN THE MIDWAY ATOLL WILDLIFE REFUGE

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Limits of time, personnel, and budget often lead to innovation. When short-term emergency maintenance and work projects within Midway Atoll Wildlife Refuge were scheduled to impact a small section of the Bonin Petrel (*Pterodroma hypoleuca*) colony during the 2015 nesting season, the U. S. Fish and Wildlife Service biological volunteer team rallied to survey the areas to identify burrows occupied by hatchlings. Grubbing techniques were used initially to assess burrows but many burrows were too long to reach to the end by hand. A homemade rig comprised of a GoPro camera and flashlight, wirelessly transmitting to a data phone with the GoPro App was used to survey the long burrows and document the presence or absence of hatchlings in real-time. Photographic and video footage of burrow interiors and hatchlings was collected to demonstrate the effectiveness of this technique. The survey results were used to inform management decisions in the planning, implementation, and monitoring of work projects; minimize impact to Bonin Petrels; and make recommendations to further reduce impacts of such projects in the future.

VANCOUVER ISLAND UNIVERSITY BIRD BANDING PROJECT AT BUTTERTUBS MARSH IN NANAIMO, BC

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Urban parklands are gaining more recognition as important wildlife habitats in otherwise fragmented landscapes. In particular, these green spaces can provide important breeding, stopover and wintering habitats for songbirds. The Buttertubs Marsh wetland complex located within the City of Nanaimo, BC, is an example of a productive urban parkland habitat with significant ecological value. This 53 hectare urban park encompasses a mixture of ecosystem types, including marsh, riparian areas, upland forest and old-field habitats. Since 2013, Vancouver Island University (VIU), in col-laboration with the City of Nanaimo and Ducks Unlimited Canada, has operated a bird banding project at Buttertubs Marsh. The objectives are to monitor migrant and resident birds, gain an understanding of the ecological role of the Buttertubs Marsh habitats, and to provide practical educational and training opportunities for students and community volunteers. This project was mainly operated by over 50 VIU undergraduate students who dedicated over 4,500 volunteer hours to the project. Twenty mist-nets stratified among the old-field, riparian and upland forest habitats are operated one to four days weekly between April and October, representing over 2,000 net hours per season. Weekly censuses and incidental observations combined with banding totals provided a comprehensive monitoring record of seasonal habitat use by songbirds in the park. Over 100 species were recorded in the Buttertubs Marsh area during the study period, and over 50 species were captured in mist nets (average capture rate: 40 birds per 100 net-hours). Results highlight the importance of the urban parkland at Buttertubs Marsh as breeding and nursery habitat (e.g., American Robin, Common Yellowthroat, Song Sparrow, Tree Swallow), and as a migratory stopover (e.g., Orange-crowned Warbler, Fox Sparrow, Lincoln Sparrow). In addition, all student volunteers received hands-on training in bird monitoring and banding activities, representing a unique undergraduate educational opportunity.