CONTRIBUTED PAPERS

THURSDAY, OCTOBER 9 ♦ 3:25PM - 5:00PM

Tracking and Migration

MEETING ROOM: JAMES

3:25 PM

Motus Wildlife Tracking System: A Broad-scale, Coordinated Approach to Automated Radio Telemetry

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One of the largest barriers to effective bird conservation is our ability determine the relative importance of various landscapes and how they are utilized throughout the annual cycle. For migratory flying animals (birds, bats, and large insects) that tend to be very mobile, the problem is exacerbated because they move across vast landscapes spanning continents and even hemispheres. The ability to track and monitor migratory animals through time and space is therefore paramount to their conservation.

The Motus Wildlife Tracking System (Motus) comprises a coordinated network of automated radio telemetry receivers that track the movements of small organisms fitted with digitally encoded radio transmitters, and reports all detections to a central repository hosted at Bird Studies Canada's National Data Center. The purpose of Motus is to facilitate landscape-scale research and education on the ecology and conservation of migratory animals. In 2014, close to 200 receiving stations, each with a detection radius of approximately 25km (~cost $1,500 each) spanned much of southeast Canada and the northeast United States with additional receivers at the north end of Hudson's Bay, along the James Bay Coast, and surrounding the Bay of Fundy. When combined, information from the receivers allows for tracking the movements and behaviors of individuals in great detail at fine scales, or across a diversity of landscapes covering thousands of kilometers.

Since 2012, more than 20 researchers have relied on the network to track over 2,000 animals of more than 30 species. Associated studies have revealed novel information about stopover and migratory behaviors of passerines and shorebirds, nesting, incubating, and travel patterns of colonial waterbirds, post-breeding dispersal of colonial aerial insectivores, and even stopover ecology and physiology of migratory bats. Examples of recent tracking data and potential research and conservation applications will be discussed as well as plans to expand and coordinate the array throughout the Americas. Broad-scale, coordinated research across landscapes, continents, and hemispheres such as this will help to maximize the valuable information needed to direct conservation decisions across multiple stages of a species life cycle.

3:45 PM

Connecting the Dots: Determining Connectivity Between Major Wintering, Migrating and Breeding Populations of Semipalmated Sandpiper

David S. Mizrahi, Cape May Bird Observatory, New Jersey Audubon Society; Arie L. Spaans Friends of Suriname Conservation; Nyls de Pracontal, Groupe d'Etude et de Protection des Oiseaux en Guyane; Roberta C. Rodriques, Universidade Federal Rural de Pernambucco; Bruno J. Almeida, Universidade Federal de Sergipe; S.R. McWilliams, University of Rhode Island

Understanding connectivity between wintering, migrating and breeding populations is critical to developing effective conservation strategies for migratory shorebirds. This is especially true for Semipalmated Sandpiper (SESA), a widespread species that has declined by nearly 80% at western Atlantic migration staging sites and major wintering areas in northern South America, specifically Suriname, French Guiana and Brazil. This region historically supported ~90% of all SESA wintering in South America. To assess connectivity between SESA populations throughout the annual cycle, we first conducted stable isotope assays on primary coverts collected from birds captured in Suriname and French Guiana during the wintering period. Adults molt these feathers after arriving on the wintering grounds and retain them throughout the following year, thus they can be used to link populations throughout the annual cycle. We used discriminant function analysis (DFA) to classify individuals from Suriname and French Guiana based on δ13C and δ15N values, which resulted in ~80% correct assignment. The DFA indicated that δ15N, which is linked to trophic levels of prey items consumed, was the factor determining sample discrimination between countries. We used DFA to assign feathers collected in Delaware Bay, a major migration staging and at breeding sites in Alaska, western Canada and the western Hudson Bay to either South American country based on isotope values. Overall, our results suggest strong

	connectivity between a major wintering and migration stopover site for SESA. Our analyses also suggest that 67% of birds sampled on the breeding grounds originated from French Guiana and the remaining from Suriname. Since 2004, we marked over 15,000 in the Delaware Bay with coded legs flags and ~10,000 SESA in Suriname, French Guiana and Brazil since 2009. To-date, we have received ~2600 resighting reports for 1760 different individuals. These data provide additional insight into connectivity between SESA populations wintering in northern South America, their migration routes and Nearctic breeding sites.
4:05 PM	**Tracking Migratory Movements of Songbirds in the Gulf of Maine using Nano Tag Transmitters** *Jennifer Smetzer, University of Massachusetts, Amherst; David I. King, USDA Forest Service, Northern Research Station; Curt Griffin, University of Massachusetts, Amherst* The imminent development of offshore wind resources in the Gulf of Maine could pose a risk to migrant songbirds. To investigate migratory movements in this region, we outfitted 60 red-eyed vireos (Vireo olivaceus) and 23 blackpoll Warblers (Setophega striata) with VHF NanoTag radio transmitters at the Petit Manan National Wildlife Refuge in Milbridge Maine in fall 2013. We tracked birds with 9 automated telemetry receivers we deployed on islands and coastal areas in the Gulf of Maine, and at 23 receivers deployed by collaborators between Nova Scotia and Nantucket Sound. We encountered 92% of the birds at >1 site (mean=4 2 sites range:1-13). Migration rates were highly variable for both red-eyed vireos (36.8 41-km/day range:5-200) and blackpolls (20.8 14-km/day range:4-54 km/day), and generally slower than those typically reported for long-distance migrants. Eighty-two percent (n=19) of blackpolls, and 30% (n=20) of red-eyed vireos made at least one (>24-hr) stop after the banding site within a relatively short (~400-km) stretch of coastline. Blackpolls made more stops than red-eyed vireos ($p<0.001$), lean red-eyed vireos exhibited lower migration rates than fat individuals ($p=0.002$), and birds exhibited a greater proportion of detections at offshore sites later in the season ($p=0.006$). Our results suggest that individuals of both species spend extensive time on stopover in the region, making numerous short-distance flights. This behavior could increase risk of collision with offshore turbines, particularly later in the season, when more over-water movements occur. We are conducting further analyses to identify how demographic factors and weather patterns relate to observed movement patterns.
4:25 – 4:45 PM	**Tracking Offshore Movements of Common Terns and American Oystercatchers Across the Southern New England Shelf Using Nanotags and Automated Radio Telemetry Stations** *Pamela Loring, U.S. Fish and Wildlife Service Division of Migratory Birds & University of Massachusetts NSF-IGERT Offshore Wind Energy Program; Paul Sievert, Curt Griffin — University of Massachusetts NSF-IGERT Offshore Wind Energy Program; Caleb Spiegel, Scott Johnston — U.S. Fish & Wildlife Service Division of Migratory Birds* Knowledge of offshore distributions and flight paths of bird species is required to inform effective conservation decisions in marine spatial planning, such as how to minimize impacts of offshore wind energy facilities on bird populations. To help fill this information gap, we are evaluating emerging Nanotag technology for tracking offshore movements of conservation focal species off the U.S. Atlantic coast. Nanotags are light-weight (0.25-2.6 g), digitally coded VHF transmitters that emit signals to specialized receiving stations programmed to monitor the locations of tagged birds around-the-clock. During 2013, we captured and attached Nanotags to 14 American Oystercatchers (*Haematopus palliatus*) and 72 Common Terns (*Sterna hirundo*) at nesting areas in southeast Cape Cod and Nantucket, Massachusetts. We constructed an array of six, 40 ft. radio telemetry tracking stations at strategic coastal locations in the area, which tracked movements of Nano-tagged birds up to 40 km away. We also deployed receiving equipment on a passenger ferry that traveled across Nantucket Sound multiple times per day. The array of receiving stations recorded over two million detections of Nano-tagged birds as they moved through the Cape Cod and Islands area during the breeding, post-breeding, and pre-migratory staging periods. In addition, the array detected over 30 different songbirds and seabirds that were Nano-tagged by collaborators in the Gulf of Maine and Canadian Maritimes and passed through the area during fall migration. In 2014, we Nano-tagged a total of 126 terns from nesting colonies on southeastern Cape Cod and eastern Long Island Sound, and expanded the radio telemetry array to eight additional coastal and offshore sites from Cape Cod to Long Island, NY. This pilot study of Nanotag technology will contribute new information about offshore movements of conservation focal species off the coast of southern New England and maximize the utility and performance of Nanotag tracking for future expanded studies of movement of flying animals in the offshore environment.