Discovering Unknown Migrations with the Migratory Connectivity Project

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The Migratory Connectivity Project

Migration is one of the most engaging phenomena of the animal world and is epitomized by birds. Over 75% of the birds in North America migrate. Migratory birds are also the quintessential canaries in the coal mine and more than 35% of migratory birds in North America are declining — some as much as 95% in the last 40 years. And like a canary in a coal mine, many migratory birds are indicators of an ecosystem's health — ecosystems that we as humans also depend on. Understanding and tracking bird migration is crucial for understanding causes and locations of population declines, and for conserving habitats that are essential to species and ecosystem survival. And yet, knowledge about why, how, when, and where bird species migrate during their lives is still missing for many species.

Male Black-bellied Plover
Photo by Ryan Askren, USGS

Migratory connectivity is the geographic and temporal linking of individuals and populations between one life cycle stage and another, for example, between breeding and wintering locations for a migratory songbird. Without an understanding of migratory connectivity, conservation investments can be ineffective because they are implemented at the wrong place or time, or for the wrong purpose.

Through the Migratory Connectivity Project (MCP), an initiative of the Smithsonian Migratory Bird Center, partners across North America are working to solve migration mysteries. Current initiatives of the Migratory Connectivity Project include discovering unknown migrations and testing new tracking technologies, catalyzing scientific collaborations around the migratory connectivity of birds, and building an atlas of migratory connectivity incorporating the 100-year North American bird banding dataset.

Discovering Unknown Migrations and Conducting Research on Species of Concern

In 2014 we initiated bird tracking projects throughout North America, focusing on Alaska, Alberta, Colorado, and Texas. We have since expanded our research to field sites in South Carolina, Georgia, Washington D.C., Maryland, Montana, Wyoming, Saskatchewan, and Argentina. Populations and species were selected for study based on either a lack of available migratory connectivity information, or a conservation need. We are working with species from many different biomes and taxonomic groups, including seabirds, shorebirds, songbirds, nightjars, raptors, and waterbirds, and we use and test many different types of electronic tracking technologies, including archival and satellite-linked tags.

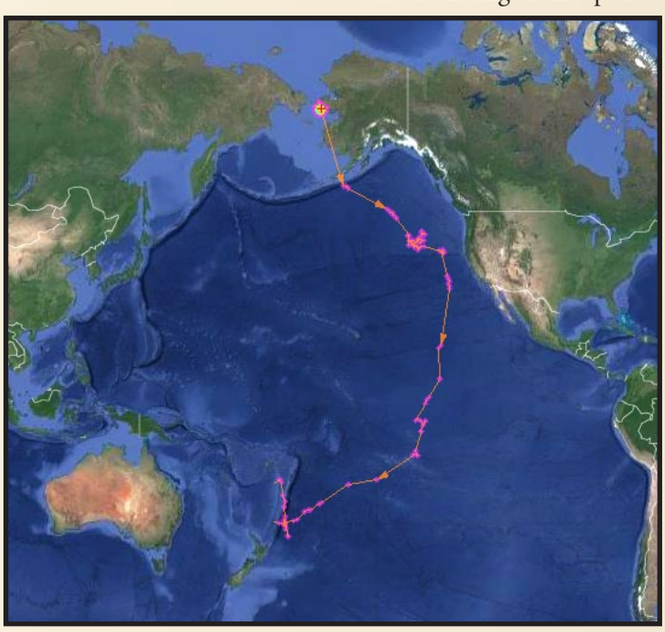
Microwave Telemetry is a main supplier of satellite tags for our research. Below we provide examples of exciting results from MCP studies using Microwave Telemetry tags.

Tracking shorebirds and small seabirds using a tag the weight of a nickel

Small tracking devices are revolutionizing the study of bird migration. They allow us to understand the migrations and habitats of birds like shorebirds and small seabirds that previously were too small to carry a tag, but that face great conservation risks.

In North America, shorebirds have declined by 50% though many Arctic breeders like Black-bellied Plovers, are little studied. In the 100-year history of bird banding in North America, only two band recoveries from breeding grounds to wintering areas have been reported for this species. Using Microwave Telemetry's 5g PTT (at the time, the smallest solar-powered satellite tag available), we tracked 15 Black-bellied Plovers from two breeding populations in Alaska (Nome and Colville River Delta). The Canadian Wildlife Service had the same idea, and has tracked over 30 individuals from the Canadian High Arctic. We are now combining our data to reveal the range-wide migratory connectivity of this species in the Americas, stop-over habitats, migratory behavior, and over-wintering locations.

The 5g PTT has also allowed us to reveal, for the first time, the migration of the Long-tailed Jaeger in the Pacific Ocean. In the Atlantic Ocean hundreds of individuals of this species have been tracked with geolocators, but there is very little understanding of this species' behavior in the Pacific. Long-tailed Jaegers spend most of their lives far away from land. In a pilot-study last summer, we tagged three individuals on their breeding grounds in Nome, Alaska. Before departing on their migration, one bird was confirmed shot, and its mate's tag also stopped transmitting the same day. Our third bird, however, gave us a show with an amazing migration path to the South Pacific, spending time over the Kermadec Trench north of New Zealand (see map).



Track of a Long-tailed Jaeger from Nome, Alaska to the South Pacific.

From the grasslands to the beaches, and the boreal forest to the tropics

The prairies and the boreal forest are two of North America's most iconic and threatened habitats. Using Microwave Telemetry 9.5g PTTs, we are studying the migratory connectivity of birds that breed in these special places. Three Broad-winged Hawks were tracked from Alberta's boreal forest, skirted the Gulf of Mexico, and over-wintered in South America.

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