North America's largest shorebird, the Long-billed Curlew, breeds in prairie habitat. It is a species of conservation concern throughout its range, but some populations are thought to be more stable than others. We found that birds breeding in Nebraska, the Dakotas, eastern Montana, Alberta, and Saskatchewan all overwinter along the beaches of Texas, many in protected areas, but also in school yards and baseball fields.

Tokyo or Tijuana? The migratory divide of Alaska's Pacific Loons

We tracked 20 Pacific Loons with Microwave Telemetry implanted PTTs from two breeding populations in Alaska. Because we simultaneously tagged individuals from the two separate breeding populations — one above the Arctic circle, and one in western Alaska — we were able to record an exciting phenomenon, a migratory divide. Loons from Alaska's north slope flew west to Russia and Japan, and loons from western Alaska flew south to California and Mexico. The Arctic is changing rapidly and the information we uncovered is critical for determining how changes might affect the two populations differently.

Building an Atlas of Migratory Connectivity for the Birds of North America

To fill an enormous knowledge gap about migratory connectivity of the birds of North America, we are also working on an important and exciting book entitled "Discovering Unknown Migrations: The Atlas of Migratory Connectivity for the Birds of North America." The Atlas will be published by Princeton University Press. This book will be the first of its kind for North American birds. It is a mapping project using existing banding recovery data integrated with new sources of tracking data (e.g., stable isotopes, geolocators, satellite transmitters). Existing data come from the USGS Bird Banding Laboratory where band recovery data has been archived for close to 100 years. One hundred years later, after the recovery of millions of bands, there has yet to be a comprehensive and thoughtful analysis of these data.

Discovering Unknown Migrations will begin with introductory chapters ranging from why understanding migratory connectivity is critical to the state-of-the-art tools available to quantify and track birds. Most of the book will consist of individual species accounts that contain a connectivity map and a short narrative written by knowledgeable experts that include descriptions of the species' basic biology, conservation status, and an interpretation of the migratory connectivity patterns.

Conclusion

No one group can solve the conservation crisis we face with migratory birds. Several complex issues underlie population declines that require partnerships across multiple disciplines. The Migratory Connectivity Project is supported by ConocoPhillips Global Signature Program. Many collaborators contributed to the work we described here including David Newstead of Coastal Bend Bays and Estuaries Coastal Bird Program; Dan Ruthrauff, Joel Schmutz, Lee Tibbitts, and Brian Uher-Koch of USGS Alaska Science Center; Erin Bayne's lab of University of Alberta Edmonton; Phil Bruner of Brigham Young University — Hawaii, and Jennie Rausch, Environment and Climate Change Canada. And at the heart of most modern studies of bird migration, indeed the cause of a revolution in migration science, is technology. We continue to need smaller, higher-resolution, reliable, and inexpensive tracking devices to deploy on individual birds of declining species. We are grateful for the rapid advances Microwave Telemetry has made in miniaturizing satellite tags. Creative interdisciplinary interactions with technology companies like Microwave Telemetry helps advance our goals of saving North American birds and their habitats.

Top: Long-tailed Jaeger, Photo by Neil Paprocki; Bottom: Pacific Loon taking off, Photo by Ryan Askren, USGS

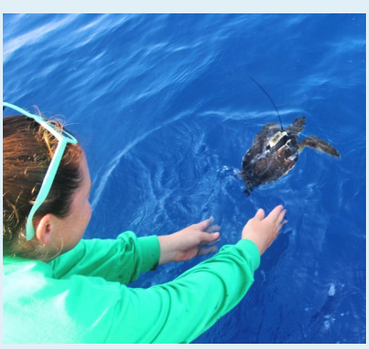
Rising Scholar Update

Sea Turtle Dispersal in Marine Habitats

Katrina Phillips is a PhD candidate in the Conservation Biology program at the University of Central Florida. Her research focuses on describing when, where, and why juvenile sea turtles shift habitats.

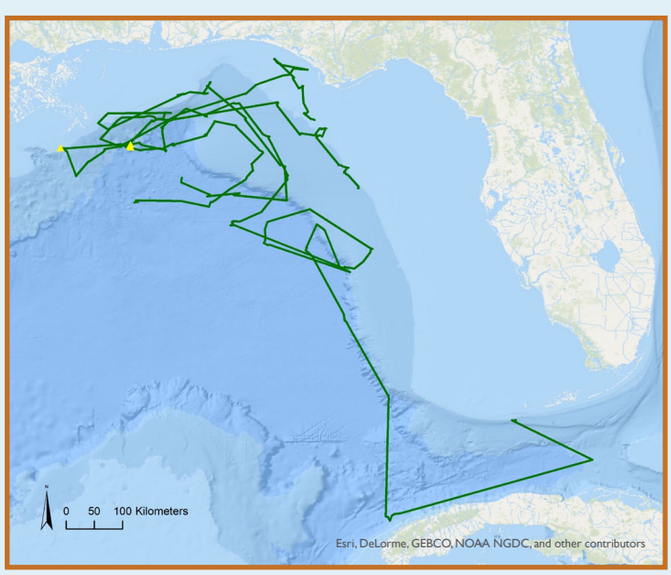
Juvenile dispersal is difficult to observe and monitor for many species, particularly in the ocean. Sea turtles hatch on sandy beaches and enter the marine environment, where they remain offshore for up to a decade or more before recruiting to coastal juvenile habitats. The oceanic life stage is so poorly understood that it is commonly referred to as the "lost years."

Extensive offshore surveys revealed that small turtles around 1–2 years of age could be found with mats of the floating seaweed *Sargassum* in the Gulf of Mexico. These observations included four species: Kemp's ridley (*Lepidochelys kempii*), green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), and loggerhead (*Caretta caretta*), all of which are protected by the U.S. Endangered Species Act and listed as vulnerable to critically endangered by the IUCN.



Releasing a green turtle with a Solar 9.5g Argos PTT. Photo by Kate Mansfield

Finding habitats that support sea turtles at this age class was a step toward solving the "lost years," but we're left with two questions: where did they come from, and where do they go? *continued on page 6*



Tracked movements of juvenile green turtles in the Gulf of Mexico from capture-release sites off the coast of Louisiana (in yellow).

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