

Media Relations

UNH Research: Species Lines Blur between Two Sparrows in New England's Tidal Marshes



Nelson's Sparrow. Credit: Katrina Papanastassiou/UNH

DURHAM, N.H. — Among birds, the line between species is often blurry. Some closely related species interbreed where their ranges overlap, producing hybrid offspring that can backcross with either parent species, until a whole population of mixed-species birds forms in the area and creates what's known as a "hybrid zone." In the coastal marshes of New England, this has been happening between two sparrows — the Saltmarsh Sparrow and Nelson's Sparrow.

Research conducted by scientists with the [New Hampshire Agricultural Experiment Station](#) at the University of New Hampshire finds that appearance alone is not enough to identify these hybrid zone birds: there is no single, intermediate "phenotype" or physical appearance common to all of the first-generation hybrids found. In addition, birds from further backcrossed generations were often indistinguishable from the parent

species. Fifty percent of birds identified as pure Nelson's or Saltmarsh Sparrows in the field turned out to be the descendants of hybrids when their DNA was analyzed.

The research was conducted by Jennifer Walsh and Adrienne Kovach of UNH, Gregory Shriver of the University of Delaware, Brian Olsen of the University of Maine, and Kathleen O'Brien of the U.S. Fish and Wildlife Service. The authors are members of the [Saltmarsh Habitat & Avian Research Program](#), a collaboration of academic, government, and nonprofit researchers focused on the conservation of tidal marsh birds.

"Our findings show that hybridization can lead to complex combinations of plumage traits making hybrid identification difficult by appearance alone. This also means that it is challenging to monitor

the abundance/distribution of hybrids within natural populations without collecting genetic data. Both of these birds are high conservation priorities in the Northeast, and hybrid identification and monitoring can aid in management and conservation initiatives for Saltmarsh and Nelson's sparrows," said Walsh, who conducted the study as part of her doctoral research under the mentorship of Kovach.

The scientists collaborated on this project to capture and examine the birds in the hybrid zone on the coast of Maine, New Hampshire, and Massachusetts. Each bird was classified based on its appearance as a Saltmarsh Sparrow, Nelson's Sparrow, or a hybrid, and then a blood sample was taken so that the accuracy of this identification could be confirmed with DNA. The genetic data were compared with data the researchers collected on plumage, bill size, and body size to determine if physical traits could be used to predict genetic species and hybrids.

The researchers recommend that future studies of hybrid zone birds need to include DNA sampling to confirm field identifications. Both species are considered high priorities for conservation in the region, and the Saltmarsh Sparrow in particular is considered globally vulnerable to extinction. In order to ensure that both species have a secure future, the first step is making sure scientists know for certain which is which.

"Sampling for this study was a big undertaking," Walsh said. "We sampled 34 sites, spanning about 750 km. Traveling to and accessing all the sites was logistically challenging and we had a lot of support from USFWS and other conservation partners. Every marsh is hugely different in terms of bird density and accessibility. You never really know what to expect until you get there. In general, salt marshes are challenging too—there are a lot of holes and mud and ditches, and you are always working around the tides. It is amazing how quickly the marsh changes—very accessible at low tide, but at high tide you can find yourself swimming back."

The research is presented in the journal *The Auk: Ornithological Advances* in the article "Relationship of phenotypic variation and genetic admixture in the Saltmarsh–Nelson's sparrow hybrid zone." This material is based upon work that is supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, under award number 225575.

Founded in 1887, the [NH Agricultural Experiment Station](#) at the [UNH College of Life Sciences and Agriculture](#) is UNH's original research center and an elemental component of New Hampshire's land-grant university heritage and mission. We steward federal and state funding, including support from the [USDA National Institute of Food and Agriculture](#), to provide unbiased and objective research concerning diverse aspects of sustainable agriculture and foods, aquaculture, forest management, and related wildlife, natural resources and rural community topics. We maintain the [Woodman](#) and [Kingman](#) agronomy and horticultural farms, the [Macfarlane Greenhouses](#), the [Fairchild Dairy Teaching and Research Center](#), and the [Organic Dairy Research Farm](#). Additional properties also provide forage, forests and woodlands in direct support to research, teaching, and outreach.

The [University of New Hampshire](#), founded in 1866, is a world-class public research university with the feel of a New England liberal arts college. A land, sea, and space-grant university, UNH is the state's flagship public institution, enrolling 13,000 undergraduate and 2,500 graduate students.

PHOTOS AVAILABLE FOR DOWNLOAD:

https://colsa.unh.edu/sites/colsa.unh.edu/files/JenWalsh_Lubec.jpeg

Jennifer Walsh and her collaborators sampled 34 sites, spanning about 750 km. Here she is in the northernmost sampling area in Lubec, Maine. Credit: UNH

https://colsa.unh.edu/sites/colsa.unh.edu/files/Nelsons_Sparrow_Papanastassiou.jpeg

Nelson's Sparrow. Credit: Katrina Papanastassiou/UNH.

https://colsa.unh.edu/sites/colsa.unh.edu/files/Saltmarsh_Sparrow_Papanasassiou.jpeg

Saltmarsh Sparrow. Credit: Katrina Papanastassiou/UNH.

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