

Full-annual-cycle models track migratory bird populations throughout the year

March 4 2015

Ignoring the wintering ranges of migratory birds when studying their populations is like doing a puzzle with half of the pieces missing. In a new Review published this week in *The Auk: Ornithological Advances*, Jeffrey Hostetler and his colleagues show how statistical analysis can fill in those missing pieces.

Many birds spend only a few months of the year in their breeding range before leaving to spend the winter in another region or even on another continent, and models that only make use of data from one season may not paint a complete picture; climate change, in particular, is likely to affect breeding, migratory, and winter ranges in different ways. For this reason, Jeffrey Hostetler, T. Scott Sillett, and Peter P. Marra of the Smithsonian Migratory Bird Center have written the first comprehensive review of the different types of full-annual-cycle modeling approaches available to ecologists, including suggestions for potential improvements and the best model types for different situations. This Review highlights the importance of incorporating data from all parts of migratory birds' annual movements when developing demographic models to study changes in their populations.

"In discussions over the past several years, biologists repeatedly have expressed the need for full-annual-cycle models that would enable decisions about how best to target strategic conservation action," explains Hostetler. "Writing this paper provided an opportunity for me to explore both models that I was very familiar with and those that I was less familiar with, as well as share my own thoughts on what full-annual-

cycle modeling techniques are most useful for conservation and ecological research." He adds that much of the work in this area so far has been theoretical due to the lack of real-world data tracking [bird populations](#) as they move between different parts of their range. "As scientists' ability to track [migratory animals](#) throughout the year continues to improve, we expect that these models will increasingly be applied."

"As our knowledge of interactions between different components of avian annual cycles rapidly grows, it is critical that we integrate this knowledge into how we model population dynamics," according to Ohio State University professor Chris Tonra, an expert on migratory birds' seasonal interactions who was not involved with the paper. "This Review marks a giant step forward applying the basic science of full annual cycle studies to understanding the nature of population limitation and regulation necessary for managing and conserving [migratory birds](#)."

More information: "Full-annual-cycle population models for migratory birds" is an open-access article:

www.aoucospubs.org/doi/full/10.1642/AUK-14-211.1

Provided by Central Ornithology Publication Office

Citation: Full-annual-cycle models track migratory bird populations throughout the year (2015, March 4) retrieved 6 May 2024 from <https://phys.org/news/2015-03-full-annual-cycle-track-migratory-bird-populations.html>

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