



The Institute for Bird Populations

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Where do birds molt their feathers? New research indicates molting grounds are discrete from breeding and wintering sites.

A new study by The Institute for Bird Populations finds that many North American birds do not molt on their breeding territories, as previously thought, but disperse or migrate in late summer to discrete molting locations before continuing their migration to wintering areas. The locations and habitats at these molting sites -- and their conservation status -- remain largely unknown.

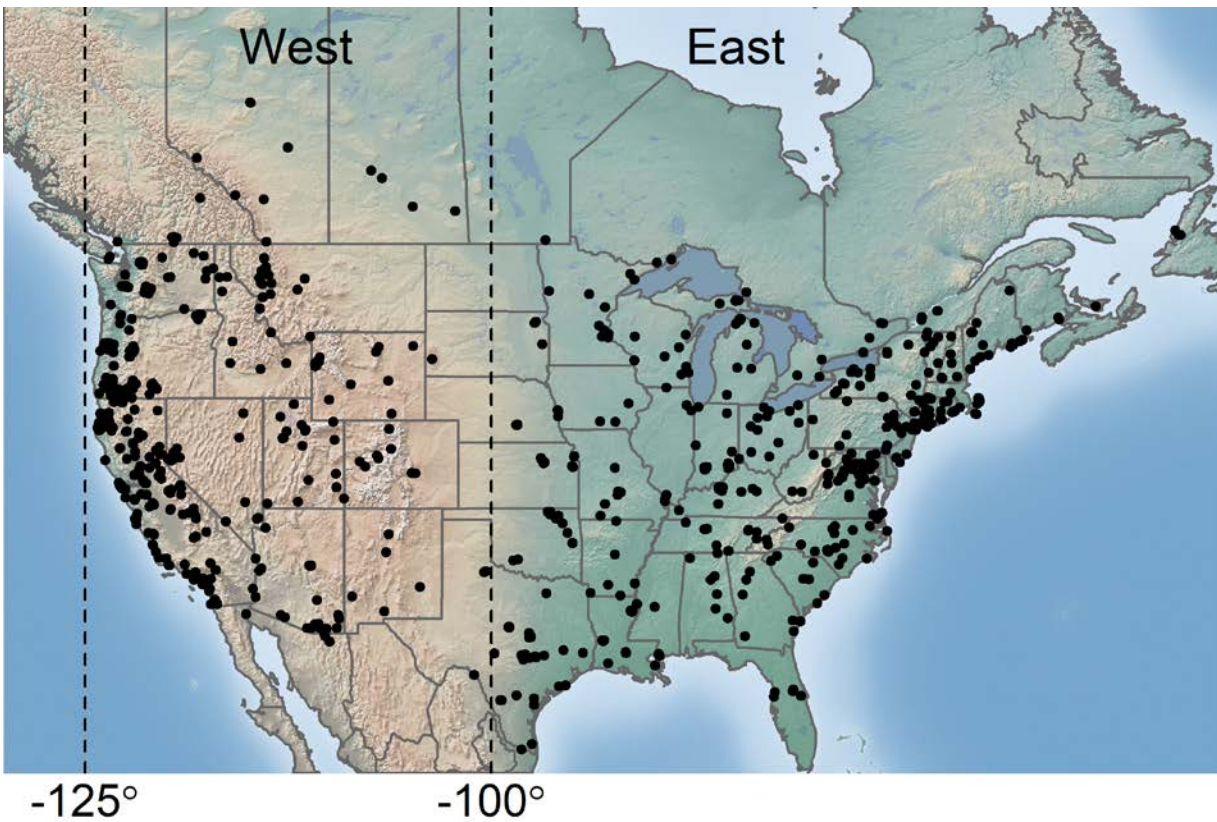
Effective conservation of migratory birds depends on the protection of habitats used during all phases of their life cycle. New research by The Institute for Bird Populations, a non-profit bird conservation organization, has shed light on a key phase of the annual cycle: where birds go to molt after they breed. [The study](#) was published May 2, 2018 in the journal *The Auk: Ornithological Advances*.



Nashville Warbler, one of 140 species whose post-breeding movements to molting areas were examined in a new study by The Institute for Bird Populations. Results indicate that Nashville Warblers in western North America disperse upslope from breeding areas to molt, whereas in the East, they move downslope and south. Many such east-west differences within species were found, reflecting differing climate and insect availability across North America. This photo was taken in August, when Nashvilles are on their molting grounds. (Photo by Frank D. Lospalluto via Flickr Creative Commons).

Molt is an energetically taxing process during which birds shed worn or broken feathers and grow new ones. During this time, a bird's flight ability is reduced, so they become harder to find than at other times of year. "Molt has been under-studied by ornithologists. Birds become very retiring at this time, as if on vacation, to recover from the breeding season," said Peter Pyle, lead author on the study. Despite its importance to a bird's survival, the subject has received a lot less attention than other factors such as breeding, migration, and wintering habitats. "We still have no clue where most North American landbirds undertake their post-breeding (prebasic) molt, and we need more information on the particular habitats or foods that are

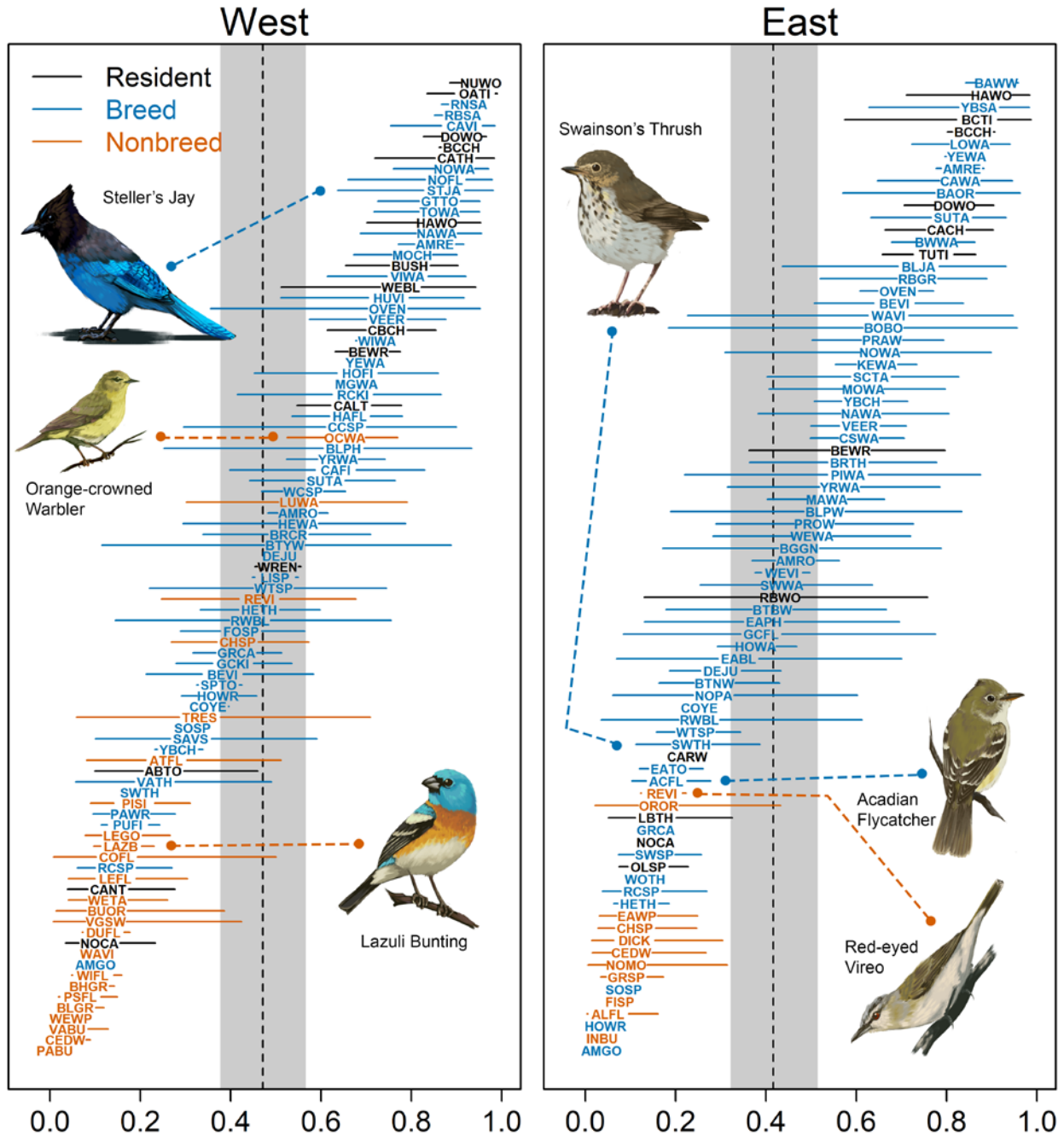
most important, and the conservation status of these areas."



The new study relied on 17 years of records from The Institute for Bird Populations' Monitoring Avian Productivity and Survivorship (MAPS) Program, a continent-wide bird banding effort assisted by thousands of citizen scientists and professional biologists. Data from more than 760,000 capture records of 140 species of landbirds collected at 936 MAPS bird-banding stations across North America were used to generate the results. The authors leveraged this extensive data set to estimate what proportion of birds known to breed at a station were also captured molting there, and vice versa. Dashed lines indicate delineation of western and eastern North America.

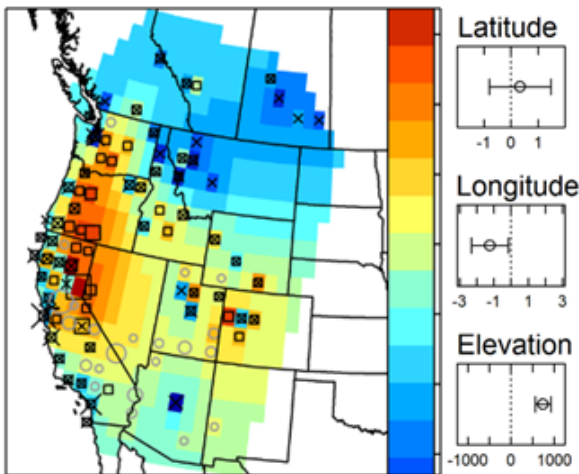
Although some bird species are known to undergo "molt-migrations" -- movement to a molting location that is neither where they nested nor where they will winter -- to take advantage of wetter conditions or more abundant food in areas such as the Sierra Nevada mountains in California or the late summer monsoonal rain area in the desert Southwest, most species have been assumed to molt on or near their breeding territories. This turns out not to be the case.

The study demonstrated some surprising findings, including widespread evidence of molt-migration for many species previously thought to molt only on their breeding grounds. The researchers analyzed spatial differences between breeding and molting locations, and found evidence that, across North America, birds shifted in nearly every compass direction, and with some going higher in elevation and some lower to find suitable molting areas. "In some cases this may be hundreds of kilometers away, in others it may be down the block," Pyle noted.

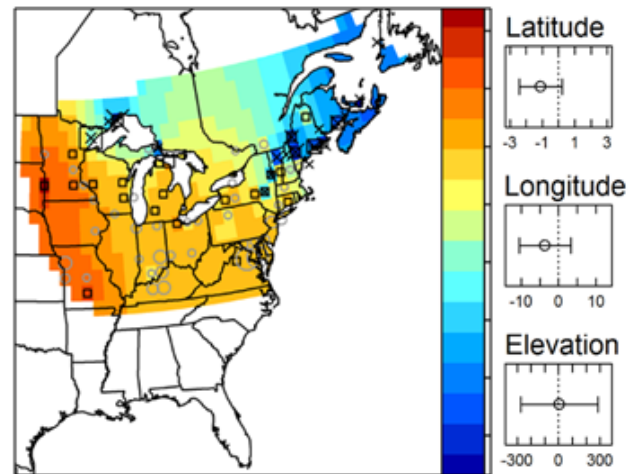


Most of the 140 species examined (indicated by 4 letter codes abbreviating their common names) showed movements from breeding to molting areas. Species lower/further left on each graph show a lower probability of being recaptured during molt at a site where it bred. In the graph, species names in orange were known to molt away from breeding grounds, those in blue were thought to molt on breeding territories, and those in black are residents, presumed to molt on or near breeding territories. The new study largely validates these results for species marked in orange and black, but many species previously presumed to molt on breeding grounds (those in blue) appear to undergo molt migrations.

Orange-crowned Warbler



Swainson's Thrush



Two examples of molt migration movements by North American birds. Bluer areas represent higher probability of a bird breeding relative to molting at that site and redder areas represent higher probability of molting relative to breeding. As with Nashville Warbler (see above), Orange-crowned Warblers in the West moved significantly further south and higher in elevation, largely into the Sierra Nevada mountains of California, likely to take advantage of cooler and moister habitats at these locations in late summer. Within the MAPS area, Swainson's Thrushes in the East appeared to shift west and south, largely into the Mississippi Valley, but did not appear to shift elevations.

Although western North American species and populations have previously been reported to undergo more molt-migration than eastern species, this study found similar evidence of molt-movement between the two regions, although many species in the west migrate longer distances.

These findings have significant implications for conserving birds. Although molting areas appear to be crucial for completing a species' annual life cycle, more study is needed to determine if such areas are receiving the conservation attention or protection they need. The new research also indicates that individuals within a species make various molt-movement choices, even on an annual basis, in response to breeding season success or environmental and food conditions each year. "Rather than characterizing molt as occurring on discrete breeding or wintering grounds, it can perhaps best be thought of as a process occurring along a continuum, with most some species, populations, or individuals showing some level of movement from breeding territories to molt," said Jim Saracco, another author on the study. "Our findings highlight the need for better understanding of molt-movement patterns and habitat needs during molt to better inform full life-cycle conservation strategies."

For more information about this study, contact [Peter Pyle](#).