



Executive Summary

Charting a Healthy Future for North America's Birds

**100 Years After the Migratory Bird Treaty, Innovative Conservation
and Technology Essential to Overcome New Challenges**





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80% of the waterfowl species commonly found in the U.S. and Canada regularly breed in the Boreal Forest, including the Green-winged Teal.



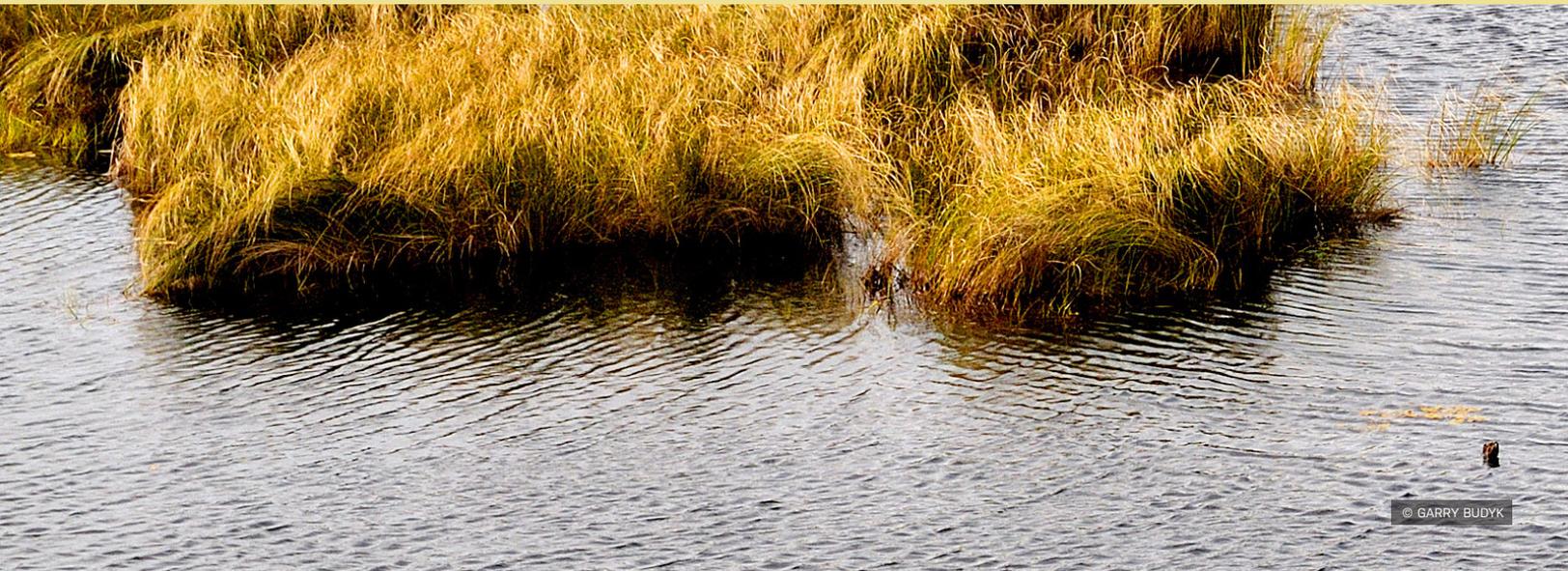
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The decline of the fittingly named Canada Warbler has spurred researchers to monitor the species more closely in recent years.



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The Lesser Yellowlegs is a candidate for future inclusion on Canada's list of threatened or special concern species.



Executive Summary

As Canada and the United States mark the 100-year anniversary of the Migratory Bird Convention this year, our nations have much to celebrate. The convention has emerged as one of the most successful environmental treaties in history. It helped countless bird species rebound from near extinction and brought the people of Canada and the United States together to protect shared migratory birds.

The treaty was a breakthrough for its time, curbing the unchecked hunting that threatened many bird species. Today, migratory birds face new threats. Complex forces ranging from habitat loss to climate change have caused some bird populations to decline 70 percent to 90 percent in the past five decades.

It's time for another breakthrough in bird conservation. Cutting-edge technological advances are shedding new insights on bird migration and reshaping conventional understanding of bird flyways—the notion that most birds migrate within four predictable corridors. Findings from this new research reinforce that billions of birds start their migration in one important region: North America's Boreal Forest. And they strengthen the scientific consensus around a bold approach for protecting the Boreal.

Together these technologies are helping unleash the next century of migratory bird conservation.

KEY FINDINGS: NEW INSIGHTS ON SCOPE OF MIGRATIONS AND ROLE OF THE BOREAL FOREST

Recent technological developments are helping uncover the mysteries of bird migration, yielding detailed data about the hemispheric-scale movements of migratory birds. Most importantly, these technologies provide information about what we can do to better protect birds:

- Satellite tracking and geolocator technologies are providing detailed accounts of when and where birds move and the places they stop in between, revealing critical areas of habitat for potential protection;
- Radar and audio sorting technologies paint new pictures of nocturnal migration, including the discoveries of previously unknown rest stops that songbirds rely on during migration;
- The analysis of isotopes and genetic markers connect regional subpopulations within species' breeding and wintering ranges, which helps provide better insight into the causes behind regional and overall population fluxes;
- Internet-based platforms allow millions of observations gathered by everyday citizens to be uploaded and analyzed instantly, making it possible to identify larger patterns, such as the shifting of distribution or timing of migration;
- Taken together, these technologies reinforce that billions of birds begin their migration in North America's Boreal Forest, and that it is a vital breeding ground for North America's birds.

The overarching, and most critical, finding from the application of these and other technologies is that migratory birds need intact habitats across vast scales that encompass all parts of their life cycles, from breeding to wintering ranges and the stopover habitats in between.

In many parts of the world, large-scale conservation of intact, pristine habitats is simply no longer possible. In North America's Boreal Forest, there is still such an opportunity—perhaps the last opportunity



in human history—to retain large portions of the landscape free of large scale industrial disturbance. The Boreal annually "exports" some 3 billion - 5 billion birds each fall to populate the winter ecosystems of the Americas from southern Canada and the U.S. south through Mexico, the Caribbean, and Central and South America. This critical nesting ground, however, is at risk due to increasing development pressures and climate change.

Maintaining vast areas of healthy intact landscapes in the Boreal Forest will allow birds to raise their young and launch their migrations across North America for generations to come.

RECOMMENDATIONS: BOLD AND CREATIVE SOLUTIONS FOR THE NEXT CENTURY

In the past several years, two ambitious conservation solutions have been proven to restore and strengthen migratory bird populations: setting vastly higher benchmarks for land protection, and empowering Indigenous communities and governments in land-use planning and management. Conservation success in the Boreal Forest will require embracing these solutions.

Canada is starting to put these solutions in place. The governments of Ontario and Quebec have articulated commitments to protect at least half of their northern landscapes, through the Far North Act and Plan Nord, respectively. Indigenous governments and communities are showing some of the most ambitious leadership, developing new land use plans and management models in places like the Pimachiowin Aki site in Manitoba and Ontario; the Dehcho, Lutsel'ke and Deline First Nations of the Northwest Territories; the Eeyou Istchee (Cree Nation) of Quebec; the Kitchenuhmaykoosib Inninuwug and Moose Cree First Nations of Ontario; and the Innu Nation of Labrador.

To fully realize the potential of these solutions to conserve bird populations, we recommend the following:

- At least 50 percent of intact boreal ecosystems should be protected. Modern conservation science has shown that maintaining the full diversity of species and ecosystem functions requires setting aside at least half of intact ecosystems from large-scale industrial development. This vision is articulated in the Canadian Boreal Forest Conservation Framework, the principles of which have been endorsed by more than 1,500 scientists worldwide;
- Conservation of lands must accommodate Indigenous traditional uses of the land and should be managed or co-managed by Indigenous governments. All land-use decisions should follow Free Prior and Informed Consent (FPIC) principles which state that Indigenous peoples have the right to determine and develop priorities and strategies for the development or use of their lands and other resources;
- Federal and provincial governments should make large-scale investments in providing financial resources for communities to train and hire Indigenous land-use planners, managers, and on-the-land guardians or rangers; and
- Research into the migratory routes, connectivity, timing and other aspects of migration must continue to be encouraged and funded. In particular, cross-cultural and cross-border partnerships and collaborations that work toward full life-cycle conservation of species should continue to be supported and developed.

Bird migration research continues to spotlight the shared stewardship responsibilities of nations across the Americas. And bold solutions offer our best path forward for ensuring a hundred more years of bird conservation success.

Innovations in Bird Migration Research



The Boreal Forest—North America's Bird Nursery—irrupts with billions of migratory birds heading south each fall. Their precise migrations have long been mysteries, but recent technological advances are uncovering clues as to when, where, and how these species navigate their way through the Americas.



Citizen Science

Bird observations from everyday citizens can be compiled in internet databases and used to detect migratory patterns. Observations of Canada Warblers are shown here prior to their shift north in April and May.



Genetic Markers

Embedded in DNA from birth, genetic markers show which portion of the species' breeding range individuals came from. Wilson's Warblers sampled in the winter in western Mexico were found to have come from the northwestern portion of its breeding range.



Geolocators

Geolocators record changes in light levels to determine location. A Blackpoll Warbler made a non-stop flight from the Maritimes to the Caribbean before continuing to Venezuela. It took a more land-based route back the following spring to Vermont.



Isotope Analysis

The regions a bird spent portions of its life in can be deduced through analyzing isotopes in feathers or claws. A White-throated Sparrow sampled in Manitoba was found to summer in the central-western Boreal Forest and winter in the southeastern U.S.



Radar Imaging

Bird migration can be observed en masse using Doppler radar. A wave of migrants begins to cross Lakes Erie and Ontario in May as they head toward breeding grounds further north. Darkness of color reflects density of birds detected.



Radio Telemetry

Birds fitted with radio transmitters alert equipped radio antennas when they come into range. A Gray-cheeked Thrush in northern Colombia in April was detected a month later near the Hudson Bay coast of Manitoba.



Satellite Tracking

Satellite transmitting devices provide real-time movement updates. The migration of a Whimbrel was tracked from its breeding grounds in Canada's Mackenzie River Delta to its wintering grounds in Brazil and back again the following spring.

BOREAL SONGBIRD INITIATIVE
1904 Third Avenue, Suite 305
Seattle, Washington 98101
www.borealbirds.org

CORNELL LAB OF ORNITHOLOGY
159 Sapsucker Woods Road
Ithaca, New York 14850
www.birds.cornell.edu

DUCKS UNLIMITED INC.
One Waterfowl Way
Memphis, Tennessee 38120
www.ducks.org

DUCKS UNLIMITED CANADA
P.O. Box 1160
Stonewall, Manitoba R0C 2Z0
www.ducks.ca

ENVIRONMENT FOR THE AMERICAS
5171 Eldorado Springs Drive, Suite N
Boulder, Colorado 80303
www.birdday.org