

Feature Article: The Canadian Migration Monitoring Network - taking the pulse of Canada's migratory birds

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Effective conservation and management of birds requires an understanding of changes in populations. Indeed, the importance of monitoring bird population trends has been recognized by both the tri-national North American Bird Conservation Initiative (NABCI) and Partners in Flight (PIF). In North America, the primary landbird monitoring program is the Breeding Bird Survey (BBS), which uses roadside point counts to document breeding bird abundance. However, in Canada, the breeding range of many landbird species is largely north of the road network. Among the species with especially poor BBS coverage are Yellow-bellied and Olive-sided Flycatchers, Gray-cheeked Thrush, Blackpoll, Cape May, and Connecticut Warblers, and Harris's and American Tree Sparrows. Alternative monitoring methods are therefore required if we are to understand how these populations might be changing. Because most of these birds migrate through southern Canada, where people (including birders) are concentrated, conducting standardized migration surveys is an effective way to collect data on landbirds.



CMMN-RCSM stations in eastern Canada have documented a recent increase in Cape May Warblers, correlated with a spruce budworm outbreak in Quebec. (Photo taken by Simon Duval at McGill Bird Observatory)

Partnerships from coast to coast

The Canadian Migration Monitoring Network - Réseau canadien de surveillance des migrations (CMMN-RCSM) was formed in 1998 as a cooperative venture among a dozen independent bird observatories with migration monitoring programs, Bird Studies Canada (BSC) and Environment Canada's Canadian Wildlife Service (CWS). The network has since expanded to more than 20 independent bird observatories across Canada, monitoring over 375 species annually. As a large collaborative network, CMMN-RCSM is uniquely positioned to contribute to the understanding of various aspects of bird migration at a national scale.

A volunteer Steering Committee comprising BSC and CWS staff and elected member station representatives coordinates network activities and organizes a biennial meeting typically attended by almost all member stations. The core effort at most stations is a banding program, but the majority also undertake a daily count of migrants, and at one station the observational approach is the primary data collection method; standardized protocols are followed for both. Some stations operate in both spring and fall, while others operate in one season only. At the end of the year, all banding data are sent to the CWS Bird Banding Office for incorporation into the North American banding scheme, while daily count data are sent to BSC for archiving and population trend analysis.

In addition to their core migration monitoring activities, many stations run special research projects during summer and/or winter. University researchers frequently undertake special research projects at migration monitoring stations; a publication repository is currently being compiled for the CMMN-RCSM website. Publications include studies on the effects of weather and climate change on bird migration, stop-over ecology, timing of migration (e.g. chronology/phenology), as well as energetics, physiology, disease, productivity and survival of birds. As the databases of individual member stations and CMMN-RCSM continue to grow, there will be ever greater opportunities for large-scale collaborations to advance our understanding of bird movements and population trends. Already, CMMN-RCSM data are increasingly being used to support assessment of species at risk, including status deliberations by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and evaluation of population status for species that are difficult to monitor on their breeding grounds (e.g., in support of the *Status of the Birds in Canada* website; www.ec.gc.ca/soc-sbc/).

As a network, CMMN-RCSM has recently participated in four collaborative national research projects: 1) contributing to the DNA barcoding of North American species, 2) contributing to modelling the spread of infectious disease into Canada through tick-borne vectors, 3) delineating catchment basins and place of origin of Canadian birds based on their isotopic signature, and 4) calculating trends in migratory bird populations across Canada (presented in a comprehensive technical report available at www.bsc-eoc.org/download/CMMNReport2008.pdf). Trends were calculated for 14 stations with at least 10 years of data; Prairie and Eastern regions showed predominantly declining populations for all species guilds examined, whereas Ontario and Western regions showed

predominantly increasing populations. Summarizing across Canada, about half of the species in most landbird guilds showed population increases, while the other half showed population declines.

All monitoring programs require a long time-series of data before meaningful trends can be produced and interpreted. This is especially true for bird populations, which typically fluctuate over time in relation to a variety of factors. Currently, population trends for migrating birds are updated periodically and are available on BSC's portal of the Avian Knowledge Network, NatureCounts (www.naturecounts.ca) along with detailed summary statistics such as migration windows and seasonal checklists from every station across the country. However, a major effort is being made to obtain the resources necessary to produce trend results annually for all member stations in order to get a timely "big picture" of how bird populations are faring across the country. Indeed, a better understanding of how regional population trends relate to specific geographical regions and overall national trends is a priority for the CMMN-RCSM. An upcoming synthesis of feather isotope analysis paired with band recovery data will strengthen our ability to do so.

The members

Most CMMN-RCSM stations are located at coastal sites, or strategically positioned near inland lakes or river systems; many are in protected areas, including Important Bird Areas. Most stations are accessible by car, but some can be reached only by boat (or a long hike). On-site facilities range from downright rustic to thoroughly modern. While there are many similarities, no two CMMN-RCSM stations are exactly alike. As independent entities, each station is responsible for its own management, funding, and programming. Across the network, there are strong affiliations and partnerships with universities, other research institutions, an array of federal, provincial and local government agencies, local and regional naturalist clubs, foundations, industry, and private memberships. There is also exchange among stations in terms of volunteers, personnel, knowledge, and even funding.

Most CMMN-RCSM stations rely heavily upon a cadre of highly trained volunteers who are usually overseen by a paid seasonal biologist. As such, training students and other volunteer field biologists is often an integral component of the field program. In fact, hundreds of top-notch field biologists from around the world owe their professional development to the valuable training they received at such stations over the years. Some CMMN-RCSM members have even extended their research and training programs to Latin America.

CMMN-RCSM members make significant contributions to conservation by engaging communities and building new partnerships, providing unique data to local and regional management issues, training citizens and students, restoring habitat, and of course, monitoring bird migration. Several stations have sophisticated on-site programs aimed at educating the general public. Nearly all provide information to the birding community, often through their own websites. A growing number also offer special birding "festivals" during peak migration, bringing attention to conservation issues concerning migratory birds and the importance of stopover areas.

Looking to the future

CMMN-RCSM has the capacity to help answer a great variety of questions. For example, how are bird migration patterns affected by weather variables and what can this tell us about the impacts of climate change on migratory birds? To what degree can we use fall age ratios of migrants to monitor annual breeding productivity? What are the geographical connections between specific breeding and wintering populations? What habitat characteristics make stopover sites important to migrating landbirds? Migration monitoring is taking flight with the advent of exciting new technologies like isotope analyses that link migrating birds to their breeding areas, DNA "barcoding," radar ornithology, and the miniaturization of tracking devices. CMMN-RCSM can play a critical role in applying these techniques to advancing our understanding of Canadian migrants by assisting researchers across Canada through providing sophisticated field training or accommodation and support to students, volunteers, and staff before they go in the field. CMMN-RCSM can also provide technical and analytical support for local to national research programs. Most of the CMMN-RCSM member stations take an open-source approach to their data and comprise some of the largest data sets on migratory populations anywhere in North America available to researchers. Inquiries about potential research collaborations are always welcome!

More information about CMMN-RCSM can be found on the web at www.bsc-eoc.org/national/cmmn.html. Please address any comments, questions, or suggestions to the current Steering Committee co-chairs, Marcel Gahbauer (marcel@migrationresearch.org) and Marie-Anne Hudson (marie-anne.hudson@ec.gc.ca).



Yellow-bellied Flycatcher, one of several species with limited summer or winter monitoring data, but regularly documented at CMMN-RCSM stations. (Photo by Marcel Gahbauer)