
Increasing the Value of Migration Data through Collaboration: twenty years of monitoring by the Canadian Migration Monitoring Network

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Bird observatories the world over have been collecting data for decades on migratory birds and their patterns of movement. In our digital age these data are increasingly available to researchers, but remain a largely underutilized resource (Dunn 2016). The recent 20-year report of Canada's Migration Monitoring Network (Dunn et al. 2021) illustrates what can be achieved when observatories work together, not only to increase access to data, but also to improve its value by providing metadata, analytical products, and interpretation.

The CMMN-RCSM has two prime objectives:

- (1) To generate high quality research and monitoring information on population trends, delineate locations of source populations, bird migration corridors/routes, windows of when migration/dispersal occur, stopover sites and other aspects of the ecology of migrant birds; and
- (2) To influence bird conservation by making results readily accessible to member observatories, the scientific community, wildlife managers and regulators, and the general public.

Member observatories annually undertake standardized daily migration monitoring, usually with a combination of visual counts and banding, and also conduct and support independent and collaborative research on migratory birds and other wildlife. To date, data collected through the network have contributed to over 150 scientific publications (listed in the 20-year report).
Oct. - Dec.

Observatories also provide training opportunities for students, biologists, and researchers, and engage in a variety of outreach and education activities that increase understanding, appreciation and conservation of Canadian birds and their habitats.

Most member observatories participate in the CMMN-RCSM's core cooperative project, the Trend Monitoring Program (TMP). Data are submitted via network software to Birds Canada, which calculates trends every two years, archives data, and hosts a variety of resources and puts results online at [NatureCounts.ca](https://naturecounts.ca) (e.g., Figure 2). Species are classified with a system that allows users to identify the quality and appropriate interpretation of each trend (see caption to Figure 3).

Recent efforts of the CMMN-RCSM have focused primarily on increasing the value of the TMP products. Progress over the past decade, detailed in the 20-year report, includes improving analyses, identifying the portion of breeding range sampled by each observatory, and investigating means for combining site trends into regional and national trends. Migration count data from the CMMN-RCSM and several U.S. observatories are currently being combined to estimate range-wide population trends for the Blackpoll Warbler *Setophaga striata*, and plans are underway to do the same for additional species of the far north. Trends for boreal forest breeders are among the Network's most valuable contributions to conservation assessment, because individuals counted during migration come from all parts of the breeding range, including regions beyond the road-accessible, mainly southern, portions of the boreal that are sampled by the North American
The full 20-year report, along with network resources, publications, and contact information

for CMMN-RCSM and individual member observatories can be found at <https://www.birdscanada.org/bird-science/canadian-migration-monitoring-network-cmmn/>. Data from the CMMN-RCSM is available at NatureCounts.ca, including through the NatureCounts R Package [<https://www.birdscanada.org/naturecounts/cmmn/main.jsp>].

LITERATURE CITED

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<https://www.birdscanada.org/bird-science/canadian-migration-monitoring-network-cmmn/>

Figure 1. Canadian Migration Monitoring Network - Réseau canadien de surveillance des migrations member observatories.



Figure 2. Fall trends (2008-2018) for Cedar Waxwing (*Bombycilla cedrorum*). Trend graphs are shown only for “Regular Migrants” (as opposed to irruptive species, local breeders, staging waterfowl or casual visitors to the site). Sites marked with circles indicate that trends were calculated showing no significant change. Small and large arrows indicate significant declines of < 5% or ≥ 5% per year, respectively.



Figure 3. Distribution of species groups monitored by the CMMN for which at least one site trend can be calculated, grouped by taxonomy and migration patterns. Trends for “Regular Migrants” represent change across broad regions, whereas trends for birds in other categories require individual interpretation because they can reflect change in site use that do not parallel broad-scale population change.

