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Data Sources and Methods for the Population Status of Canada's Migratory Birds indicator

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1. Introduction

The Population Status of Canada's Migratory Birds indicator (www.ec.gc.ca/indicateurs-indicators/default.asp?lang=En&n=2FCEF3BF-1) is part of the Canadian Environmental Sustainability Indicators (CESI) program (www.ec.gc.ca/indicateurs-indicators/default.asp?lang=En&n=47F48106-1), which provides data and information to track Canada's performance on key environmental sustainability issues. This indicator is also used to measure progress towards the goals and targets of the Federal Sustainable Development Strategy (www.ec.gc.ca/dd-sd/default.asp?lang=En&n=CD30F295-1).

2. Description and rationale of the Population Status of Canada's Migratory Birds indicator

2.1 Description

The proportion of bird species that are neither over-populated nor under-populated provides a snapshot assessment of the state of birds in Canada.

Species, especially waterfowl, may be managed towards specific population levels. However, natural fluctuations do occur and population estimates are rarely exact. The indicator assesses whether species are within acceptable bounds of the specific numbers; it should not be interpreted as the proportion of species that have met management goals. Rather, it is the proportion of species that do not trigger immediate concern because they are reasonably close to management goals.

2.2 Rationale

Birds are important to Canadians for many reasons, including bird watching and hunting, and as beautiful and functional elements in our landscapes and seascapes. Changes in bird populations reflect the overall effect of many ecological factors, including habitat loss, pollution, agricultural impacts, climate change, and hunting.

Because birds are sensitive to environmental changes, they can also be used as an indicator of ecosystem health and the state of biodiversity. Tracking the status of Canada's birds can help to identify the impact of these changes. When population sizes are not within acceptable ranges, conservation action can, over time, improve trends.

3. Data

3.1 Data sources

Data on Canada's migratory bird species populations are drawn from different monitoring programs that use a range of methods designed to survey different bird species or types of habitat. Many monitoring programs are designed by professionals, but engage highly skilled volunteers to help collect data. Some volunteer programs, like the North American Breeding Bird Survey (www.ec.gc.ca/reom-mbs/default.asp?lang=En&n=416B57CA-1) and the Bird Studies Canada's (BSC's) breeding bird atlases, nocturnal owl surveys and marsh monitoring surveys (www.bsc-eoc.org/volunteer/index.jsp?lang=EN&targetpg=progchoose), take place in the breeding season. Others monitor birds during migration (e.g., the BSC's Canadian Migration Monitoring Network (www.bsc-eoc.org/volunteer/cmmn/index.jsp?lang=EN&targetpg=index) and shorebird migration surveys) or in winter (e.g., the BSC's Christmas Bird Count (www.bsc-eoc.org/volunteer/cbc/index.jsp?targetpg=cbcparticpate&lang=EN) and Project FeederWatch (feederwatch.org)). Checklist programs like eBird (ebird.org/content/canada/) and Étude des populations d'oiseaux du Québec (ÉPOQ) (www.oiseauxqc.org/epoq.jsp) encourage birders to record their observations every time they go birding.

Other programs, such as surveys of breeding waterfowl, arctic shorebirds and colonial seabirds, are conducted entirely by professional biologists.

Environment Canada's Canadian Wildlife Service (CWS) collates the data from many of these programs, in collaboration with others. Results are reported in a number of publications, including the State of Canada's Birds 2012 report (www.stateofcanadasbirds.org). For more detailed information on the population status of each species of bird in Canada, see Environment Canada's Status of Birds in Canada (www.ec.gc.ca/soc-sbc/index-eng.aspx?sY=2011&sL=e).

Species are classified into ecological groups with similar habitat requirements; the groups used here are drawn from State of Canada's Birds 2012 (www.stateofcanadasbirds.org). Species are included in the "all birds" category whether or not they fit into one of the ecological groups considered here.

3.2 Spatial coverage

National.

3.3 Temporal coverage

Estimates are for 2013.

3.4 Data completeness

Data are for all bird species that are addressed in the *Migratory Birds Convention Act* (MBCA) and that are regularly resident in Canada. While the MBCA covers most migratory birds, groups of species such as raptors and corvids are not included. The term "species" used here may also refer to subspecies or other management units.

4. Methods

Determining whether species have acceptable population levels requires first establishing population goals and then determining whether population levels are far enough from those goals to cause concern. Population goals for wildlife are generally guided by an underlying idea of what constitutes a "healthy" or otherwise desirable population level. This "desirable level" may reflect a science-based assessment of the minimum number of individuals required to sustain a population (including the need to accommodate natural fluctuations), but thresholds are usually higher, recognizing that species provide ecological services. For example, game species or those of special cultural importance should have population levels high enough to support use. Many species are important as elements of our everyday landscape; the arrival of robins in the spring is an example of how a bird can be part of something we consider to be a Canadian experience. It is possible, although rare, for birds to be considered overpopulated when they begin to conflict with human uses of the landscape (e.g., through damage to crops) or have negative impacts on other species. Population goals therefore may have minimum and maximum levels; a maximum level may not be defined where is it unlikely to be relevant.

For species that have existing goals as part of current management regimes, the same goals were used here when possible. For example, Species at Risk may have long-term recovery goals. Harvested species with continental or regional goals have had the goals adapted to the national level based on the distribution of the species. In cases where distinct populations within a species have different management goals, these are treated as separate species in the indicator.

Most species do not have existing population goals. For these, goals were established considering current and historical abundance, habitat capacity, the amount of information available, the ecological function of the species, and societal needs. Natural variations in numbers do occur, and goals take this into account. Goals may be revised over time. Further information on setting population goals is available from Environment Canada.

The indicator is the proportion of species regularly occurring in Canada and addressed by the MBCA that meet their population goals. As noted above, "species" in some cases are subspecies or management units. As a result, the indicator reports the proportion of 420 taxa considered. These taxa represent 380 full species.

Population estimates contain some uncertainty and results should be interpreted with this in mind.

5. Caveats and limitations

Species that are within the acceptable range may still be of conservation concern. Examples might include cases where trends are negative or where a species remains at the lower end of the range for a number of years. Similarly, if a group of related species are near the boundaries of the acceptable range, it may signal the need for management intervention.

The indicator is restricted to species considered under the MBCA. While the MBCA covers most groups of migratory birds, groups of species such as birds of prey and corvids (crows and jays) are not included.

Species with limited data are assessed in the same way as adequately monitored species, avoiding reliance solely on expert opinion. Species with no data are excluded from the index. Four species of geese have goals yet to be determined and are also excluded; these are Brants (Pacific population), Cackling Geese (Midcontinent population) and Canada Geese (North Atlantic population and Central/Northern BC Breeders).

6. References and further reading

6.1 References

North American Bird Conservation Initiative-Canada (2012) State of Canada's Birds 2012. Retrieved on 15 September, 2014. Available from: www.stateofcanadasbirds.org.

6.2 Further reading

Environment Canada (2011) Status of Birds in Canada. Retrieved on 15 September, 2014. Available from: www.ec.gc.ca/soc-sbc/index-eng.aspx?sL=e&sY=2011.

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