Ontario Forest Birds Workshop (Sault Ste. Marie, Ontario, April 8-10, 2008) – Summary

Ian Thompson, Jim Baker, Margaret Donnelly, Susan Hannon, Rob Rempel, and Kandyd Szuba

Introduction

Over the past decade, a body of research on forest birds has accumulated in Ontario, based on funding from several key sources. Much of the work is published or publication is imminent, including the new Ontario Breeding Birds Atlas. The workshop organizers perceived a need to assimilate the new knowledge into a kind of 'state of the forest birds in Ontario report' that would be of value to forest managers and researchers. Hence, a key objective for the event was to transfer knowledge in a summary.

Workshop Objectives

The objectives for the workshop were to summarize the considerable research that has occurred in Ontario during the past 10 years, to provide direction for future forest bird research and to provide recommendations to managers. To this end, the workshop had four major themes with science/background papers, followed by breakout group discussions. Participants were asked to keep track of the data gaps and research needs that they perceived. Most of the presentations are available at: http://www.forestco-op.ca/forest_birds_workshop.htm.

The workshop themes follow.

Theme 1 - Status of Forest Birds
What do we know about the status and distribution of birds that might be affected by forest management?

Four people addressed this theme by presenting information from a variety of sources of trend information, commenting on the strengths and weaknesses, the significant population trends suggested by those surveys, and which of the species showing significant trends are likely to be affected by forest management. A panel discussion followed to answer question about data and knowledge gaps. Taking into account the strengths and weaknesses of individual survey methods, the panel assessed the weight of evidence for increase, decrease, or stability of the forest bird species likely to be affected by forest management.

Status of Ontario's forest birds. Peter Blancher, Environment Canada, Canadian Wildlife Service view presentation

Bird monitoring programs in Ontario: what have we got and what do we need? Charles Francis, Environment Canada, Canadian Wildlife Service view presentation

Modelling bird habitat using satellite-derived data for area-based habitat conservation plans. Jason Duffe, Environment Canada, Canadian Wildlife Service view presentation

Boreal Avian Modelling Project. Samantha Song, Environment Canada, Population Conservation view presentation

Theme 2 - State of Science With Respect to Forest Birds:
Twelve presentations addressed two key questions: What do we know about effects of forest management on forest and forest-wetland birds? At what scales are bird responses measurable or detectable?

Riparian Management: Forest bird responses to partial cutting in riparian reserves in Ontario's boreal mixedwood forest . Steve Holmes, Canadian Forest Service view presentation

Effects of post-harvest silviculture on boreal breeding birds. Ian Thompson, Canadian Forest Service view presentation

Birds & forest management: An overview of relationships & management approaches. Margaret Donnelly, Sustainable Forest Management Network, and Chris Wedeles view presentation

The importance of standing deadwood in the foraging and nesting ecology of birds in the boreal forest. Pierre Drapeau, Université du Québec a Montréal view presentation

The effects of single-tree and group selection on the birds in hardwood forests in a forested landscape. Erica Nol, Trent University view presentation

Impacts of partial harvesting on forest breeding birds in fragmented forests. Dawn Burke, Ontario Ministry of Natural Resources view presentation

Do post-harvest forests emulate natural disturbances from the perspective of boreal landbirds? Ryan Zimmerling, Golder Associates view presentation

Effects of forest management activities on stick-nesting birds: new direction for mitigation in Ontario. Brian Naylor, Ontario Ministry of Natural Resources view presentation

Boreal mixedwood bird community response to spruce budworm outbreak and succession. Lisa Venier, Canadian Forest Service view presentation

Linking the range-wide decline of a songbird to long term prey cycles: The case of the Canada Warbler. Kandyd Szuba, Domtar Inc., and Darren Sleep, NCASI view presentation

Pattern, process and bird community assembly on boreal landscapes originating from fire and timber harvest: can we have our ecosystem and preserve it too? Tom Nudds, University of Guelph view presentation

Birds as ecological indicators of sustainable forest management. Lisa Venier, Canadian Forest Service view presentation

Theme 3 – Recommendations for Management and Monitoring of Forest Birds:
Four presenters addressed our state of knowledge with respect to monitoring: do we need to direct forest management actions towards any individual species? Can specific mitigating measures and implementation options be recommended, or is further study required? What species (if any) or groups of species are useful as indicators of forest change? Are there reliable models to assess the effects of management options on long-term change in habitat supply and/or population response and how do we address threshholds? What do we need to know to increase reliability and precision of these models?

A test of Ontario's habitat suitability matrix for forest birds. Steve Holmes, Canadian Forest Service view presentation

Forest cover thresholds in boreal birds: Implications for management. Susan Hannon, University of Alberta view presentation

Development and application of biological integrity indices for reporting on the status of boreal forest bird communities. Erin Bayne, University of Alberta view presentation

Developing a focal species bioassay for assessment of songbird conservation design strategies. Rob Rempel, Ontario Ministry of Natural Resources view presentation

Theme 4 – Uncertainties, Knowledge Gaps, and Research Needs:

Five presenters looked at current policy questions, including the issues surrounding the 'incidental take' problem in forest management. Key question included: what are the policy issues faced by forest managers and how can science improve policy?
Can we identify future research needs (gaps, uncertainties), information needs, tools, emerging issues, etc. to improve habitat management for forest birds?

Development and evaluation of coarse-filter policy options for the conservation of forest songbird communities. Rob Rempel, Ontario Ministry of Natural Resources view presentation

Forest Industry perspectives on MBCA - Challenges and Solutions. Andrew Devries, Forest Products Association of Canada view presentation

Providing for bird habitat in forest management plans in Ontario - Opportunities and Difficulties. Kandyd Szuba, Domtar Inc., Greg Lucking, Ontario Ministry of Natural Resources, and Jim Baker, Ontario Ministry of Natural Resources view presentation

Forest Birds Workshop Summary view presentation

Workshops:
Participants were asked to consider the following issues in the two workshops:

- what species need fine-filter management?
- what do we need to do in riparian areas?
- what mitigative actions do we need and are there data gaps?

And :

- what are the data and monitoring limitations and how can we increase precision?
- is there any benefit to using birds as forest management indicators?
- what analytical tools (models, remote sensing, etc.) can predict long-term change?

Workshop summary

The following is a summary of the key results from the Ontario Forest Birds Workshop. It includes many ideas that flowed from the papers presented, workshops, panel discussions, and questions asked by the audience. Our intent is for the results to stimulate improved management and focus future research questions.

What does a forest manager need to know?

Are forest birds declining?

Most bird species are not declining but there are some species that seem to be in long-term decline. Populations of some species fluctuate over short time periods and population dynamics of the same species vary regionally across the province. Further, some species seem to prefer some areas of the boreal zone over others within a region such as Ontario, so there may be ecoregional responses in population density possibly related to broad habitat conditions, for example.

The 'Ontario Breeding Birds Atlas' data compares two counts separated by 20 years. The aerial foraging guild has had a large decline throughout the province. Several common boreal species have also declined, including: northern goshawk, Tennessee warbler, purple finch, and ruby-crowned kinglet. Great-Lakes St. Lawrence forest species in decline include: brown thrasher, scarlet tanager, whip-poor-will, rose-breasted grosbeak, and gray catbird, among others. The reasons for declines are not fully understood and the panel agreed that there is limited knowledge of changes in migratory habitat, wintering habitat, over-wintering success, migration mortality, and the effects of climate change. The long-term downward trend in spruce budworm may have had an effect on some species, such as Canada warbler.

Is there evidence that forest management is contributing to particular species declines?

There was no evidence presented at this workshop that forest management alone is causing a long-term or large-scale decline in any forest bird species. However, some studies clearly suggested that while convergence is occurring in bird communities between some of the oldest second-growth stands and old uncut forests in Ontario, that population declines have been observed for some species. However, in cases where multiple causation is possible, it is difficult to tease apart the contribution of forestry to declines in species. Several studies highlighted forest management effects on some 'old forest' species including boreal chickadee, brown creeper, and some woodpeckers that were common in older forests and but absent or at low numbers in regenerating forests. For example, low numbers of these resident species occurred in the oldest second-growth forests in Ontario (ca. 50-60 years). However, none of these latter species was detected as declining from the Ontario Breeding Birds Atlas data. This difference needs to be reconciled. It may be due to relatively poor data in the atlas from northern boreal areas, or that although there are instances of forest management effects, these are insufficient to be detected at large spatial and temporal scales. However, habitat thresholds may exist for many forest breeding birds that, once crossed (i.e., sufficient habitat is removed), result in declines.

Most estimates of bird abundance are of relative abundance from unrepeated point counts, rather than providing estimates of absolute abundance (density). However, we do not know if bird presence indicates that the bird is necessarily breeding. Further, relative abundance data cannot be used in population viability models to assess population trends. One conclusion from the workshop was the need to develop better data on breeding success, demography, and density data for key individual species. Another suggested area for further research included: examining other members of a guild to which a known declining species belongs to determine if the cause is general, or specific to the species.

Do we need to alter forest management to better conserve forest birds?

This is a difficult question to answer owing to a lack of complete understanding of effects, and the fact that a full forest rotation has not yet been completed (i.e., regenerating forest becoming old forests and logged again). Therefore we need to continue a precautionary and adaptive approach to forest management. For example, we need to falsify the idea that the 'coarse filter approach' to forest management is not maintaining all bird species in time and space. The workshop also highlighted the need for better landscape-level species models for the key species of interest, such as those used as indicators in forest management or identified as declining. For example, a test WORD MISSING the Ontario habitat matrix resulted in poor predictive capacity (false positive or negative) for several important species including boreal chickadee, suggesting that our understanding is poor or that better modelling techniques are needed.

What management options might improve forest management for birds?

There was a general agreement that having policy objectives explicitly for forest birds would be a positive step in landbird conservation in Ontario above the scale of a forest management unit. There are specific habitat targets for some forest birds in forest

management plans in Ontario. However, there are issues concerning the number of species with targets and the accuracy of habitat models. Such policies might be helpful in planning for forest birds at scales larger than the FMU.

Specific management actions suggested were: mixedwood management to maintain the original tree species composition and age structure in time, an increased use of prescribed burning, retention of dying trees (rather than snags), selective application of herbicides to leave some shrub cover within spray blocks, multi-cohort management, management for snags based on post-fire variation in snag abundance and type, and development of field guides for machine operators for residual tree retention (characteristics, spacing, etc.).

Some of the research needs specific to forest management actions that were suggested included:

- determine key stand structures other than dead wood
- determine how many and what quality of snags are needed to maintain more than a minimum number of cavity-users
- model the effects of post-harvest silviculture (trajectories) on species
- improve understanding of gap dynamics, especially in the boreal forest
- identify management actions that differ from natural processes
- conduct further research on thresholds
- incorporate climate change into forest management models

Within riparian areas it is important to:

- maintain heterogeneity in forest composition, age classes, and structure, because this is what would naturally occur along waterways
- maintain a range of sizes and shapes for buffers
- state riparian and adjacent terrestrial management objectives explicitly in forest management plans
- link riparian management strategies to the overall landscape design

Research needs identified for riparian areas included: comparisons between natural and management practices and understanding effects at large scales.

How should individual bird species be selected as indicators and what might some good indicator species be?

Workshop participants developed the following criteria for the selection of indicator species: species at risk, regional 'species of concern', those with high Ontario stewardship responsibility, game species, cavity-nesters, old forest species, keystone species, post-fire species and species known to be ecologically rare (e.g., owing to limited habitat availability). Species need to be selected to represent a suite of life histories and habitat uses. The use of functional guilds as indicators is also a useful approach (cavity, old forest, early post-fire, and residents).

Some individual suggested species included northern goshawk, brown creeper, boreal chickadee, ruffed grouse, black-backed woodpecker.

How good is our knowledge?

We often develop models for various management purposes (e.g., Ontario habitat matrix that cross-references animal species to forest types and age classes, and is used in forest management planning in Ontario) or in association with individual research studies, but these are rarely tested to determine either accuracy or generality. Some suggested areas for research included testing models by evaluating the outcomes of past forest management with respect to model predictions, and transporting models to different areas or ecosystems to assess their generality. Finally, we could evaluate models by substituting space for time.

Data accuracy for forest variables might be improved by using remote sensing-derived data (e.g. Lidar) for habitat variables such as stand age, woody material, and soils type. Participants indicated a need for better growth and yield models and improved understanding of successional pathways, especially as compared between burns and managed forests.

How can we improve habitat models?

Not all forest birds are detected equally well in all habitats and so data may be biased towards more visible or loud species, or be non-comparable among habitats; corrections for detectability would improve models. Similarly, basing models on adequate sample sizes, over longer-term datasets, and from a reasonable geographic distribution would improve accuracy. In the latter regard, work is needed on how to scale local models to regional scales. Improved understanding of the relationship between model parameters and real ecological thresholds is needed. Model components that are lacking include climate effects, natural variability (in fire and insect outbreaks), and effects of blowdown in otherwise continuous stands.

Models should be externally validated in similar but distant areas to determine their generality. Model sensitivity needs to be assessed: if a variable in a model has a threshold, then the output of the model is strongly influenced by that variable as threshold values are approached. A response surface is a useful way to report on model sensitivity. Use of standardized model coefficients enables evaluation of the effect size associated with each model parameter and model sensitivity with respect to each independent variable.

Models need to be evaluated in terms of their success in modelling datasets and thresholds. There are numerous statistical methods for modelling occupancy and threshold responses, for example, Bayesian linear regression, generalized additive models, generalized linear models. Given a common dataset, we need to evaluate which of the methods most reliably estimates presence or absence of a bird at a site (based on habitat variables), and which method most reliably estimates the presence, location, and form of a threshold.

Models should be able to address multiple species, and multiple forest management scenarios (and climate change) in a spatial context. In Ontario, we need a standardised suite of predictive models that can be used throughout the province. Further, there is a need for platforms that can convey results more readily to managers, the public, and policy makers in a more intuitive fashion.

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