

IMPACTS OF SELECTIVE LOGGING ON THE FOREST BIRD COMMUNITIES OF FRAGMENTED DECIDUOUS FORESTS IN SOUTHERN ONTARIO

INTRODUCTION

Forest cover levels in many parts of southern Ontario are critically low. In some parts of southwestern Ontario, up to 95% of the original forest cover has been removed. In addition, many of the remaining forest fragments are periodically disturbed by logging. The two most commonly applied approaches to active woodlot management in this region are diameter limit and selection system logging. Diameter limit logging involves the removal of all merchantable trees with a diameter larger than a pre-set limit, which is often set by a local tree cutting bylaw. This method is used most often where the focus of forestry operations is on revenue generation. Logging under the selection system involves the harvesting of individual trees, selected and marked with the intention of maintaining good growth through reduced tree densities, while improving forest health and quality. At the same time, sufficient residual tree numbers are left to allow for a continuous supply of wood products over short (10-25 years) cutting periods.

Recent research has shown that large-scale forest loss, fragmentation and urbanization may be responsible for observed declines in a number of forest dependent wildlife species. Much less is known about the incremental effects of forest harvesting on wildlife communities in highly fragmented landscapes.

This study focuses on the effects of recent logging on forest songbird community structure and reproductive success. The goal is to identify those habitat attributes and silvicultural methods that favour healthy and diverse songbird communities.

LOCATION

The study was conducted in 27 woodlots scattered across 6 counties (Middlesex, Elgin, Oxford, Haldimand-Norfolk, Brant



and Niagara) in southwestern Ontario. Eight of the woodlots contain blocks that were selection harvested between 1995-99, nine others contain blocks that were diameter limit harvested between 1996-98, and ten others contain blocks that have not been harvested for at least 20 years. Within each harvest category, woodlots were further classified as either large (>50 ha) or small (<50 ha). All woodlots were primarily of the upland tolerant hardwood forest type.

PRELIMINARY RESULTS

Non-metric Multi-dimensional Scaling (MDS) of data from distribution abundance surveys conducted in 1999 revealed no significant difference in forest bird community structure between diameter limit and selection harvested woodlots. Likewise, there was no significant difference in forest bird community structure between small and large woodlots. A similar analysis was conducted in 2000, with the addition of 10 control blocks (6 small and 4 large woodlots). Again, there was no significant difference in forest bird community structure between small and large woodlots, but there was a significant difference among harvest method groups. Pairwise tests revealed that control and diameter limit-harvested woodlots were the only two groups that differed significantly.

On average, harvested woodlots tended to have more species and more individuals than control woodlots. The difference was greatest between diameter limit-harvested and control woodlots.

Species that were significantly more abundant on sites harvested to diameter limits included Brown-headed Cowbird, Chestnut-sided Warbler, Gray Catbird, Indigo Bunting and Veery. Only two species were significantly less abundant on sites harvested to diameter limits (Brown Creeper and Downy Woodpecker).





Conducting a bird survey in one of the study woodlots

Brown Creepers were the best indicators of control woodlots, Red-bellied Woodpeckers of selection-harvested woodlots, and Brown-headed Cowbirds of diameter limit-harvested woodlots. Other significant indicators of diameter limit-harvested woodlots were American Redstarts, American Robins, Chestnut-sided Warblers, Chipping Sparrows and Gray Catbirds.

Due to low sample sizes, nests were grouped across species for analysis. Likewise, nests from small and large woodlots were combined, since there were no apparent differences in nest success among woodlot size categories. Average daily nest mortality rates were 0.019 for control woodlots, 0.027 for selection-harvested woodlots and 0.041 for diameter limit-harvested woodlots. Based on a nesting cycle of 26 days, which is typical of species like Wood Thrush and American Robin, this translates to overall nest success rates of 60.7% for control, 49.8% for selection and 33.7% for diameter limit woodlots.

MANAGEMENT IMPLICATIONS

Preliminary results suggest that:

(1) Forest harvesting can be conducted in a way (i.e., selection logging) that has relatively little impact on forest bird community structures. However, when harvesting is sufficiently intense (i.e., diameter limit logging), significant changes to the forest bird community can occur.

(2) Several bird species respond positively to forest harvesting (e.g., early successional species), but a few (e.g., Brown Creeper) respond negatively.

(3) Both selection and diameter limit logging appear to have a negative impact on avian reproductive success. Only on unharvested sites are reproductive rates high enough to balance mortality. These sites appear to provide strong source populations of woodland bird species, but more work is needed

to confirm this possibility. Diameter limit harvested sites, in contrast, may not be producing young in sufficient numbers to maintain populations.



Aerial view of the fragmented forest/agricultural landscape near Woodstock, Ontario.

SOURCES OF RELEVANT INFORMATION

Holmes, S.B.; Burke, D.; Elliot, K.A.; Cadman, M.D. 2001. Diversity and nest success of songbirds in harvested upland hardwood stands in the Carolinian zone of Ontario. Woods Talk – Community Action to Conserve Ontario's Woodlands, 14-17 June 2001, Toronto, Ontario.

CONTACT

Steve Holmes, Research Scientist
Canadian Forest Service, Great Lakes Forestry Centre
1219 Queen Street East
Sault Ste. Marie, ON P6A 2E5
Tel: (705) 541-5661
sholmes@NRCan.gc.ca

For more information on Frontline Express Contact:
Canadian Forest Service, Great Lakes Forestry Centre
1219 Queen Street East
Sault Ste. Marie, Ontario P6A 2E5
(705) 759-5740
<http://www.glfc.cfs.nrcan.gc.ca>