

## What We Are Learning Through Migration Monitoring At Last Mountain Bird Observatory

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Over the last 21 years, an incredible amount of data on summer resident and migrant songbirds has been gathered at Last Mountain Bird Observatory. Over 70,000 birds of 119 species have been captured and processed. In addition, hundreds of thousands of birds of 250 species have been observed during our census and other activities. We do not merely band the birds; for each capture we record its species, age and sex, capture method, wing chord, fat score, weight, breeding condition, mist net number, time of banding, and a primary moult score. In some cases, a tail feather is taken for stable isotope analyses. Analyzing this amount of data is a huge undertaking.

But it has yielded some very interesting results, some of which can be summarized as follows:

1. The Avifauna of the northern Last Mountain Lake. Since 1989, monitoring and related activities at LMBO have added 24 species to the list of 299 species recorded at the northern end of Last Mountain Lake. For some of the more cryptic or hard to identify species, LMBO has totally revised our knowledge. For example, the Alder Flycatcher was known as a very rare migrant before LMBO began operation; migration monitoring has shown it to be the second most common forest-dwelling migrant in the region!

2. Monitoring of Songbird Population Trends. This is the primary reason for the establishment of LMBO. Since it takes many years of bird population monitoring to establish trends, statistically significant trends have only recently emerged. Species such as the Canada Warbler and Rose-breasted Grosbeak, which favour deciduous woodlands, have shown significant increase, while others such as the Alder Flycatcher, Palm Warbler and Common Yellowthroat, which favour wetland areas, have shown significant decrease. These results suggest that the very nature of the forest may be changing, perhaps due to forestry practices or climate change.

3. Migration Phenology. Climate change is often cited for changes in the timing of migration of birds (phenology). As with population trends, however, many years of monitoring may be required before trends come to light. So far LMBO results are mixed, with some species returning earlier and others later. Furthermore only a few of the changes are significant, which suggests that more years of monitoring are required.

4. Stopover Ecology of Migrants. Studies at LMBO have done much to elucidate the migration strategies of songbirds that nest in our northern forests and migrate to the warm Temperate and Tropical areas for the winter. A direct migration route between the breeding and wintering areas involves the crossing of the relatively treeless Northern Great Plains, a barrier almost as formidable to some species as the open ocean. Over the millennia, this group of birds has evolved three strategies to deal with this barrier.

*Strategy 1* involves species which fly around the Plains by moving east in the fall or west in the spring along the southern edge of the Boreal Forest, which swings south through southern Manitoba. Species that employ this method include several spruce-loving birds such as the Black-throated Green and Blackburnian warblers.

*Strategy 2* is to overfly the Plains, a journey requiring many hours of non-stop flight extended over two or more nights and one or more intervening days. This requires a large payload of fuel as fat, which is accumulated on or near their breeding grounds. Species that appear to do

this include the Swainson's Thrush, Ovenbird and Red-eyed Vireo. These species seem to land only during periods of adverse weather such as strong head winds or stormy weather.

*Strategy 3*, which is employed by the more adaptable species, is to use whatever habitat is available on the Plains for refueling. Species which have evolved this migratory strategy include the Alder Flycatcher, and Yellow-rumped and Blackpoll warblers.

Although it is beyond the scope of this article to explain in detail how these strategies have been elucidated, it has basically been accomplished by: Comparisons between the relative numbers of each species that nest in the Boreal Forest to those that occur as stopovers at LMBO – this separates birds using Strategy 1 from those using Strategies 2 or 3; and Determination of which species that arrive with fat and lose weight, and those that arrive lean and gain weight – this separates species using Strategy 2 from those using Strategy 3.

5. Breeding Ground Origin of Migrants. One of the drawbacks of banding birds is that the recovery rates are very low (for most species of songbirds, fewer than 1 in 1,000 is recovered elsewhere). Other space age methods have promise - one of these is the use of Stable Isotopes (e.g., Palm Warbler). Over 600 feather samples from 14 species have been collected for this analysis.

6. Population Dynamics of Local Breeding Birds. Over the last 21 years, 700 birds of 22 species have returned to LMBO. These data will allow us to create "actuarial tables" for the calculation of survivorship for some species.