The Calling Lake Fragmentation Experiment: What are we learning?

Lessons from this one-of-a-kind study are helping support forest birds on harvested landscapes in the short- and long-term.

Not familiar with the Calling Lake Fragmentation Experiment? Check out our recent blog post[SN1] that describes the experiment's history on Al-Pac's forest management tenure.

The bedside alarm goes off. A sleepy researcher rolls over and checks the time—4:00 AM. Just enough time to scarf down some breakfast, brew up some desperately-needed coffee, and hit the road. It is time to follow their GPS until they reach a point where researchers have stood every spring for the last quarter century.

The sun is barely over the horizon, but for the birds in the forest - and for the researcher standing at the ready - the day is just beginning. For the birds, it is time to sing. For the researcher, it is time to listen.

A unique collaboration

The Calling Lake Fragmentation Experiment is a 25-year research partnership between the University of Alberta and Alberta-Pacific Forest Industries (Al-Pac). In a designated area of the Al-Pac tenure, researchers have been visiting the same points year after year to monitor how forest birds have responded to specific forest harvest patterns over time.

Unlike most forest research projects, the design of the harvested areas was determined through collaboration between researchers and Al-Pac. The collaborative project design allowed researchers to study a type of harvest pattern that leaves behind live overstory aspen trees, known as **retention**. These trees may be left as single trees, in rows in the harvested area, or they may be clumped together to form patches. At Calling Lake, a range of patch sizes from 1 to 100 hectares (ha) was left so researchers could observe which species were found in them, and whether the size of patches left behind had any effect on bird communities.

What we're learning

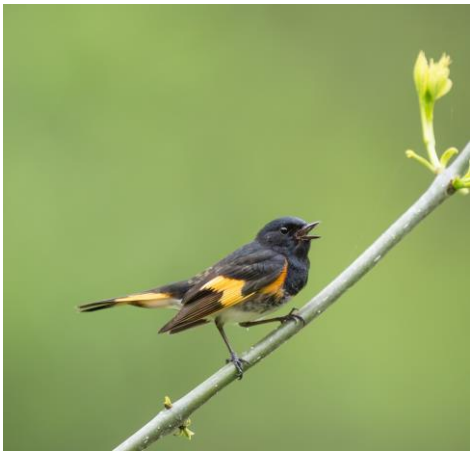
If there is one overarching takeaway from Calling Lake so far, it's that as the forest changes, so too do the bird communities.

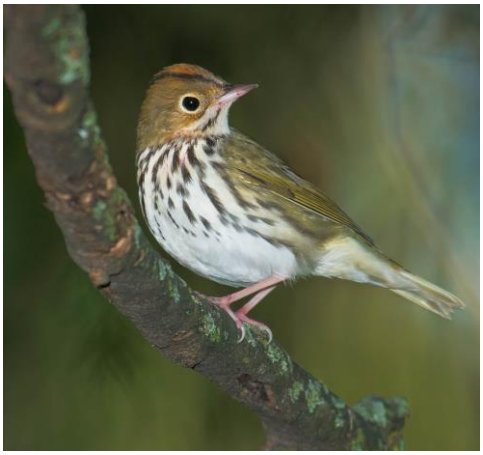
For example, researchers have found that short-term responses can differ a lot from what happens in the long-term. In the first few years following harvest at Calling Lake, researchers noted that forest-associated birds were "crowding" the patches of trees that had been left behind: birds that used to live in the harvested areas were densely packing into the patches. One year after harvesting, there were **25% more birds** in the patches compared to nearby unharvested areas. After five years and later, this crowding effect disappeared. If the study had stopped after those first few years, the researchers might have concluded the remnant patches were higher quality habitat than they actually were. Many birds used these patches initially, but there was a lag while they adjusted to the changes on the landscape and eventually dispersed elsewhere.

Larger patches for more sensitive species

At Calling Lake, some species—usually those that are closely associated with older forests—**were more likely to be found in the larger retention patches** (100 hectares) than the smaller ones (<100 hectares). Retention patches usually have slightly different vegetation around their outer edges, where there are more shrubs and plants that grow best in the sunny harvested area. A smaller patch can be dominated by these edge conditions, while in a larger patch there may be a larger "interior" area with habitat characteristics that old forest species require.

This result clearly indicates that within harvested areas, **larger patches will provide greater value to sensitive species associated with old forest** than smaller patches.

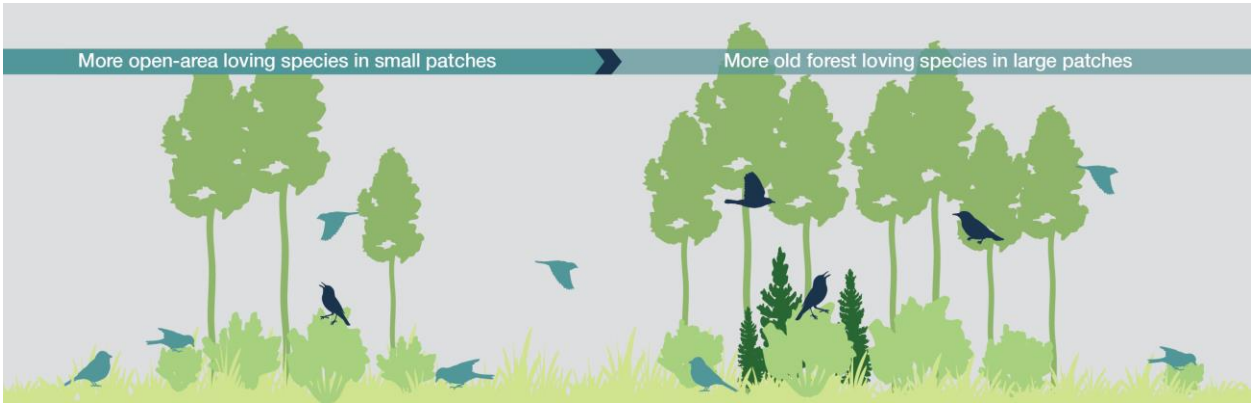




Species like American redstarts (left) and ovenbirds (right) depend on old, mature forests. For these species, larger retention patches help to preserve important habitats.

Clear-cuts for disturbance-loving species

Meanwhile, the clear-cut areas between remnant patches were **colonized by species associated with recent disturbances,** including fire-associated species like the Western wood-pewee. Species that prefer mature forest declined or disappeared from these harvested areas, but the air was not silent: instead, the sounds of many sparrows and other open-area loving species could be heard.

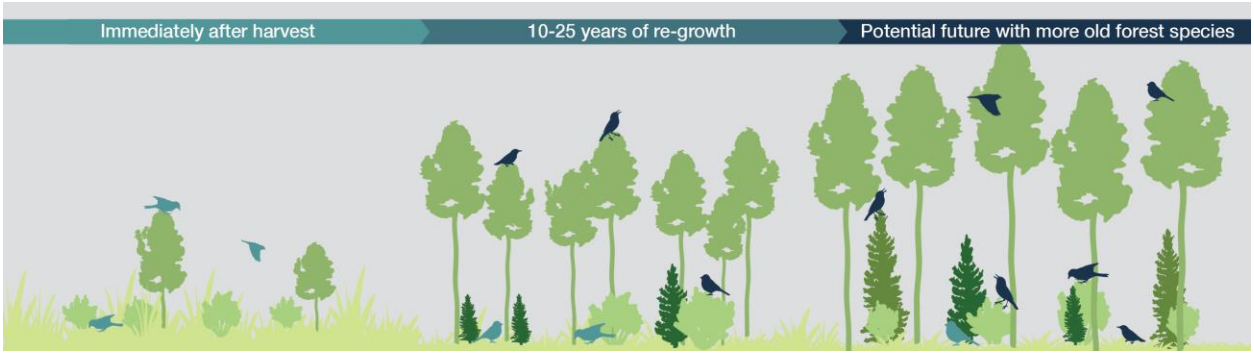


Patience rewarded

The long-term research at Calling Lake has revealed patterns in bird population responses to harvest patterns that simply could not be captured by a shorter-term study. The long-term outcomes are important because forest harvest is not a temporary change to habitat: a harvested area in Alberta typically takes 80–100 years to grow back.

Now, 25 years after the project was started, the patience of researchers at Calling Lake has been rewarded as they have seen the **re-colonization of harvested areas by many species associated with mature deciduous forest**. This includes some sensitive species like ovenbirds and Canada warblers. The Calling Lake experiment is, therefore, helping managers understand the timeline for when regenerating harvests start to provide habitat for species of concern.

Importantly, **some species were still rare except in unharvested forest**. For example, species that nest in tree cavities were less likely to re-occupy harvested areas. Features of the forest like tree cavities take time to develop, so with continued patience there is a chance that researchers will start to see more species returning in the next decades at Calling Lake.



Alberta-Pacific Forest Industries Inc. (Al-Pac) is located near Boyle, Alberta, where they manage one of the largest Forest Management Agreement (FMA) areas in the province. Al-Pac has a long history of collaborating with researchers and using their results to improve environmental outcomes on their FMA. This series looks at recent research conducted by Dr. Erin Bayne and his students, based at the University of Alberta.