Bicknell's Thrush in New Brunswick Forests

What we know, what we need to know, and how the forest industry can help

The Bicknell's Thrush is New Brunswick's "newest" bird, since it was considered only a subspecies of the Gray-cheeked Thrush prior to 1995. It is also one of North America's rarest and most poorly understood songbirds.

The Bicknell's Thrush traditionally breeds in dense, stunted coniferous forests typical of high elevation areas in eastern Canada (Québec, New Brunswick, and Nova Scotia) and in the northeastern United States (Maine, New Hampshire, Vermont and New York). In addition to its "traditional" habitat, the species is also found in regenerating clearcuts and conifer plantations that mimic the dense forest habitat of traditional breeding sites.

Sometimes called the "Phantom of the Forest" because of its secretive nature and affinity for nesting in remote, inaccessible areas, the Bicknell's Thrush cannot be accurately monitored by traditional bird surveys. Furthermore, its unusual mating system makes estimating breeding densities difficult. Current global population estimates are considered to be nothing more than educated guesses.

Appearance

The Bicknell's Thrush (*Catharus bicknelli*) is a medium-sized bird (16-17 cm), about the size of a large sparrow, with an olive-brown back, buffy throat, grey-to-white underparts, and black-spotted chin and flanks. Distinguishing it from other co-occurring *Catharus* species can be difficult; Hermit Thrush (*C. guttatus*), has a much brighter rufous-coloured tail, and also has a more

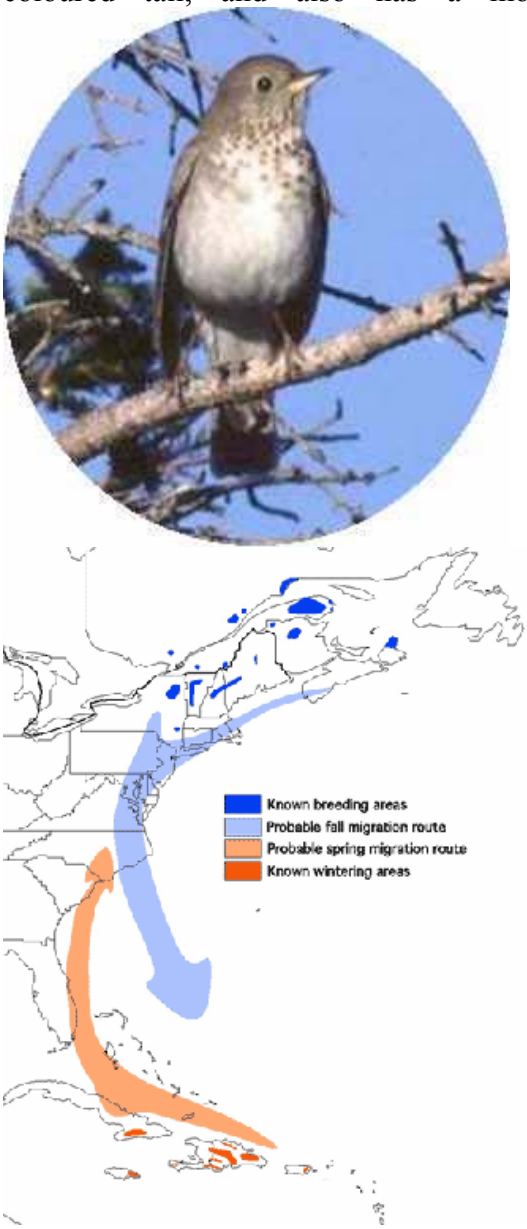


Figure 1: Distribution and probable migration routes of Bicknell's Thrush (source: Dan Busby, Canadian Wildlife Service)

extensively spotted breast. Swainson's Thrush (*C. ustulatus*) has a broad buffy eye-ring and much paler facial coloration than Bicknell's Thrush. Veery (*C. fuscescens*) is more richly and uniformly reddish brown above, and has a less heavily spotted breast.

Population Status

Estimates on population size range from 5,000 to 25,000 pairs worldwide, with 2,000 to 5,000 pairs occurring in Canada, spread over a naturally fragmented breeding range. In 1999, the Bicknell's Thrush was designated a "Species of Special Concern" by the Committee on the Status of Endangered Wildlife In Canada, the assessment body that determines the national status of wild Canadian species. It received this designation primarily because of its low population numbers, patchy distribution, low reproductive potential, and pressures stemming from large-scale forestry operations on its habitat in Canada.

It has also been designated as "May be at Risk" in New Brunswick, as "Sensitive" in Nova Scotia, and as "Globally Vulnerable" by the World Conservation Union. Furthermore, the Bicknell's Thrush has recently been designated as the landbird of highest conservation priority in Bird Conservation Region 14 (Atlantic Northern Forest) by Partners In Flight.

Bicknell's Thrush Habitat

Surveys done by the Canadian Wildlife Service, the University of New Brunswick and the Canadian Forest Service in the 1990s, and by Bird Studies Canada (BSC) since 2002 have shown that the Bicknell's Thrush inhabits two distinct habitat types at high elevations in Canada. Traditional "natural" breeding habitat is described as dense, naturally stunted conifer stands, while non-traditional "industrial" habitat is comprised of relatively young, regenerating stands or plantations. In New Brunswick, very little natural habitat remains and most Bicknell's Thrushes are found in industrial habitat. It is therefore imperative that we understand what kinds of forest stand characteristics attract the Bicknell's Thrush and how silvicultural practices impact the species.

Figure 2: Bicknell's Thrush natural forest habitat, Cape Breton NS

Figure 3: Bicknell's Thrush industrial forest habitat, Mount Edward, NB

Pre-commercial Thinning

The use of pre-commercial thinning (PCT), a silvicultural technique used to increase the number and quality of trees that can be harvested by greatly reducing

stem density, has increased dramatically over the last decade in the Maritimes.

PCT is usually carried out in regenerating stands or plantations that are between 10 and 15 years of age. According to recent surveys, Bicknell's Thrush density is also highest in these stands prior to thinning, raising concerns about the impact of PCT on Bicknell's Thrush.

Figure 4: Second-growth regeneration in NB, before pre-commercial thinning.

Figure 5: Second-growth regeneration in NB, after pre-commercial thinning.

Does PCT Impact the Bicknell's Thrush?

Yes, at least in the short term. Researchers at Dalhousie University recently evaluated the effects of PCT on Bicknell's Thrush by comparing abundance in three New Brunswick Crown forest stands immediately before and one year after thinning. Results show that Bicknell's Thrush abundance was higher before PCT was conducted in all three stands (Fig. 6).

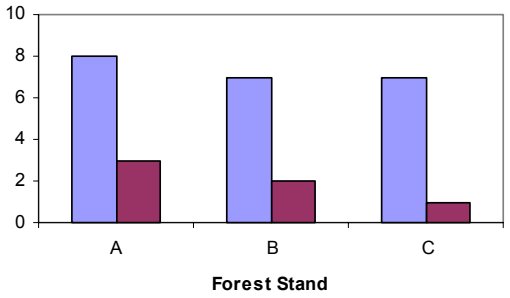


Figure 6: Average maximum number of Bicknell's Thrush (BITH) in three forest stands before (blue: 2003) and after (red: 2004) PCT. (Source: Sarah Chisholm, Dalhousie University)

Data from Bird Studies Canada's High Elevation Landbird Program (HELP) show similar results. Twenty-eighty stands with Bicknell's Thrush detections from across New Brunswick were grouped into the following categories: (1) natural stand (no cutting or treatment; all found in Mount Carleton Provincial Park); (2) before PCT; (3) 1-3 years post PCT; and (4) 4-8 years post PCT. Highest densities of Bicknell's Thrushes were observed in industrial forest stands immediately prior to PCT compared to stands surveyed 1-3 years after PCT (Fig. 7). Birds appear to return to thinned stands 4-8 years after PCT, but we do not have enough samples from stands of this age to determine whether or not this result is significant.

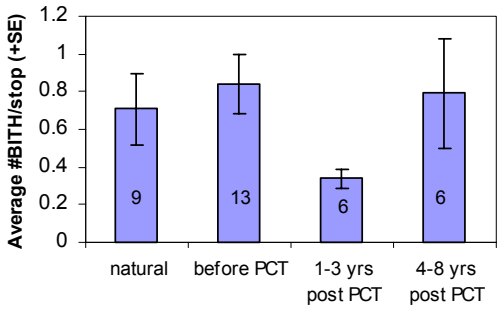
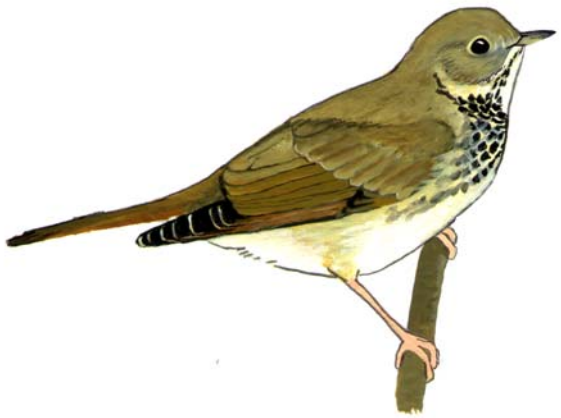


Figure 7: Average maximum number of Bicknell's Thrush in stands where the species was detected. Sample sizes are indicated on bars. (Source: Bird Studies Canada)

Researchers at Dalhousie University have also found a positive significant correlation between the area of unthinned forest patches remaining after PCT and the number of Bicknell's Thrush detected in that stand the following year, meaning that Bicknell's Thrush may be able to use small unthinned patches within thinned stands. Researchers at the Vermont Institute of Natural Sciences have shown that Bicknell's Thrushes use patches as small as 0.1ha in natural habitat in Vermont.

Characteristics of Industrial Forest Stands used by Bicknell's Thrush

Using locations of 39 Bicknell's Thrush detections from BSC's High Elevation Landbird Program (HELP) in 2002, along with the New Brunswick Department of Natural Resources' Forest Inventory Database and UPM-Kymmenes' database, we quantified the "optimal" Bicknell's Thrush stand in New Brunswick industrial forests. It should be noted that HELP routes were not chosen randomly, but were situated in stands that had an elevation of greater than 350 m and were dominated by >50% conifer cover, based on previous research by the Canadian Wildlife Service.



What makes a Bicknell's Thrush happy?

- Elevation: the average elevation of stands occupied by Bicknell's Thrush in NB is 594m (min. = 400m). The average elevation of 291 surveyed stands without Bicknell's Thrush is 535m (min. = 365m)
- Stand size: the average size of BITH stands is 32.4 ha. Average size of unoccupied stands is 15.8ha.
- Tree stem density: average stem density in BITH occupied stands is 49,635 stems/ha (UPM data).
- Species composition: Conifers (balsam fir or black spruce) dominate in 75% of stands with Bicknell's Thrush.
- Stand height: average stand height of BITH stands is 3.34 meters (UPM data).

Recommendations for Maintaining Bicknell's Thrush Populations in Industrial Forest

Pre-commercial thinning may be impacting Bicknell's Thrush abundance in the Maritimes. To protect this Species At Risk, forest managers are encouraged to consider the following modifications to pre-commercial thinning operations. These recommendations are based on the best available knowledge of Bicknell's Thrush biology and habitat preferences to date.

1. When possible, schedule thinning in optimal stands either before 1 June or after 31 July, to reduce

disruption to the Bicknell's Thrush breeding season. Bicknell's Thrushes have low reproductive rates, so every breeding season is very important in maintaining healthy population numbers.

2. When optimal stands need to be thinned, leave unthinned edges or patches of habitat >0.1ha in size; connect these "islands" to larger patches of unthinned habitat wherever possible.

3. Manage industrial forest with a "no net loss" policy, by ensuring that for every optimal stand which is thinned, an unthinned stand of equal size reaches optimal characteristics (i.e. 13 years of age) the following year.

4. Maintain close contact with organizations like Bird Studies Canada, Maritime universities, and the provincial Department of Natural Resources to remain aware of the most current research findings.

Further research

Much remains to be learned about this rare and secretive species. Determining optimal stand characteristics for Nova Scotia's industrial forest should be a top priority. Furthermore, Maritime research to date has only been able to examine Bicknell's Thrush abundance based on singing or calling individuals. Finding nests and measuring breeding success in stands of varying ages and treatments would be an extremely valuable undertaking. Studies in other regions have shown, however, that a great deal of effort needs to be expended in order to find nests, usually involving radio transmitters and many working hours. It would also be valuable to determine if and when birds return to thinned stands, and whether they breed as successfully in this habitat type as they do in stands that remain unthinned. Partnering with forestry companies to answer these questions would be of great interest to Bird Studies Canada and other Bicknell's Thrush researchers in the Maritimes.

Recommended Reading

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