

The Status of Gray-cheeked Thrush

(Catharus minimus)
in Newfoundland and Labrador



Adult Gray-cheeked Thrush, Cape Spear Road, Newfoundland, September 2008

**THE SPECIES STATUS ADVISORY COMMITTEE
REPORT NO. 24**

June 21, 2010

RECOMMENDED STATUS

Catharus minimus minimus

(breeding in Newfoundland and the Strait of Belle Isle region of Labrador)

Recommended status: Threatened	Current designation: Vulnerable, as <i>C. minimus</i>
Criteria met: Qualifies under criteria as C1 as THREATENED, because the population is less than 10 000, and there is a projected 10% decline in 10 years or 3 generations.	
Reasons for designation: Severe decline and there has been no evidence of population increase. Numbers have remained very low, with detectable numbers near 0. There grave concern for this subspecies.	

RECOMMENDED STATUS

Catharus minimus aliciae

(breeding in Labrador, north of the Strait of Belle Isle region)

Recommended status: Not at Risk	Current designation: Vulnerable, as <i>C. minimus</i>
Criteria met: None	
Reasons for designation: No evidence of decline. The population of this subspecies is considered secure.	

This report was originally prepared by Darroch Whitaker, and was subsequently edited by the Species Status Advisory Committee. It is an update of a 2005 report of the same title. The 2005 report was originally prepared by Kate Dalley, Kristin Powell and Darroch Whitaker.

STATUS REPORT

Catharus minimus (Lafresnaye 1848)
Gray-cheeked Thrush

Designatable units recognized in this report:

Catharus minimus minimus (Lafresnaye 1848) – Newfoundland Gray-cheeked Thrush

Catharus minimus aliciae (Baird 1858) – Northern Gray-cheeked Thrush

Synonyms:

Turdus minimus (Lafresnaye 1848)

Hylochicla minima (Baird 1858)

Hylocichla minima (Lafresnaye 1848)

Turdus aliciae (Baird 1858)

Hylochicla aliciae (Baird 1858)

Other Common and Colloquial Names:

Newfoundland vernacular – Wild eyes, Wide eyes (Montevecchi and Tuck 1987)

French – Grive à joues grises

Spanish – Zorzal cara gris

Inuktitut – Ittipornippiok, Viu [the latter may be a reference to the typical call of the species, variously described as “bjiew”, “phreu”, or “pheu”]

Innu – No known name

Mi'kmaq – No known name

Family: Turdidae (Thrushes)

Life Form: Animal, Vertebrate, Bird, Thrush

Systematic/Taxonomic Clarifications:

This report follows the consensus of Godfrey (1986), Phillips (1991), Ouellet (1996), Pyle (1997), and Lowther *et al.* (2001) in recognizing two distinct subspecies of Gray-cheeked Thrush: *Catharus minimus minimus* (Newfoundland Gray-cheeked Thrush), and *Catharus minimus aliciae* (Northern Gray-cheeked Thrush).

It should be noted however that Marshall (2001) followed Wallace (1939) in considering the two forms to be mere races or clinal extremes within the same subspecies, *C. m. minimus*. Marshall and Wallace also recognized similar birds, now known to breed in New England, southern Quebec, New Brunswick and Cape Breton Island, as a second subspecies *C. m. bicknelli* (Bicknell's Thrush). Bicknell's Thrush is now recognized as a distinct species (*C. bicknelli*; Ouellet 1993, AOU 1998, Rimmer *et al.* 2001). See Appendix B for details.

Distribution

Global (for the species as a whole) (Figure 1):

North America (excluding Canada):

United States of America: Breeds throughout central and southern Alaska to north of tree line.

France: Breeds on Saint-Pierre et Miquelon

Central America and the Caribbean: May winter in Panama, Costa Rica, and Trinidad.

South America: Regularly winters east of the Andes in northwestern Brazil, Colombia, eastern Ecuador, eastern Peru, Venezuela, Guyana, and Suriname.

Asia: Breeds in extreme eastern Siberia.

National (for the species as a whole) (Figure 1):

The northern limit of the breeding range of Gray-cheeked Thrush extends just north of the tree line in the Yukon, the Northwest Territories, Nunavut, and the Labrador Peninsula north to Ungava Bay and possibly Cape Chidley. The southern limit of the species' breeding range extends south to northwestern British Columbia, the southern Yukon, northern Alberta, northeastern Saskatchewan, northern Manitoba, northwestern Ontario, central Quebec south to the north shore of the Gulf of St. Lawrence near La Tabatière, and the entire Island of Newfoundland [plus the French islands of Saint-Pierre et Miquelon] (Ouellet 1996, Lowther *et al.* 2001).

Note that most published range maps indicate that Gray-cheeked Thrushes breed along the north shore of the Gulf of St. Lawrence west to approximately Sept-Isles and in some cases include the Gaspé Peninsula (e.g. Godfrey 1966, 1986). However both Ouellet (1993, 1996) and Marshall (2001) indicate that the species has not been confirmed along the north shore west of La Tabatière, Québec.

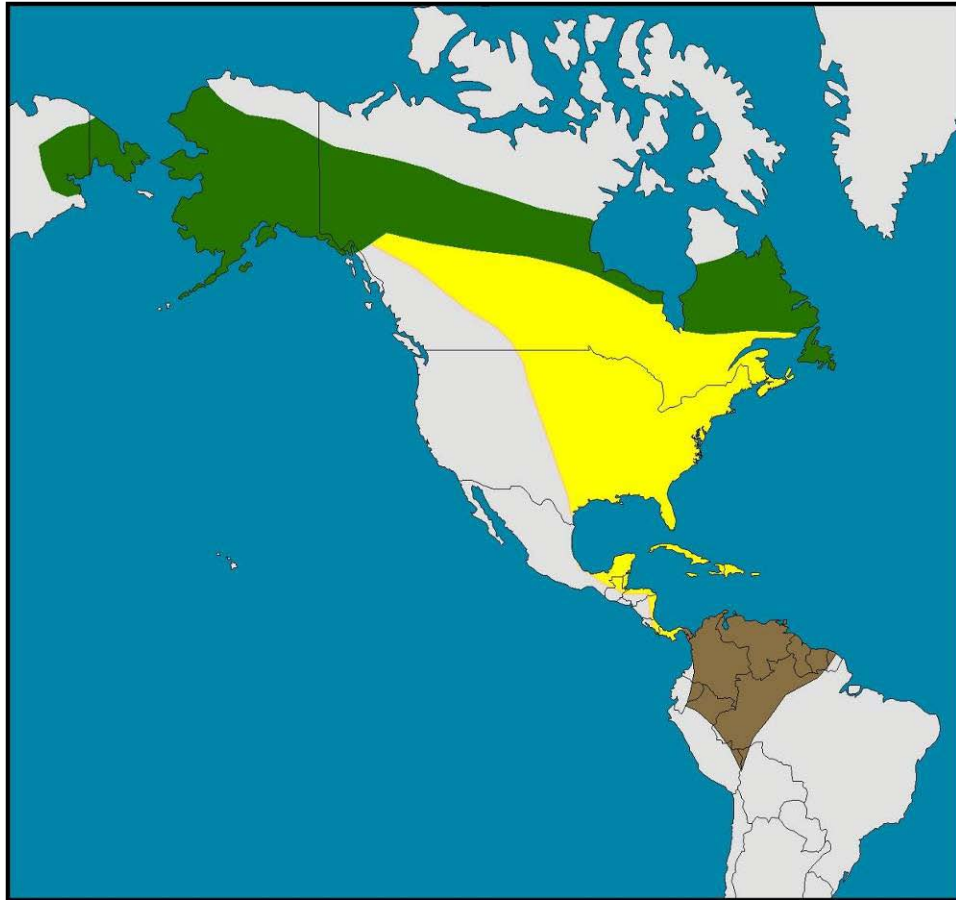


Figure 1. Global breeding (green) and winter ranges (brown) of Gray-cheeked Thrush, with approximate zone of migration in yellow (adapted from Godfrey 1986, Lowther *et al.* 2001, Marshall 2001).

Provincial (Figure 2):

Gray-cheeked Thrushes (*C. minimus*) have been found in suitable habitat throughout most of Newfoundland and Labrador (Peters and Burleigh 1951, Todd 1963, Godfrey 1986; W.A. Montevecchi, Memorial University, unpublished data).

On the island of Newfoundland, the species has been reported as being most common on the Northern Peninsula and the northeast coast, and less common on the west coast and in the interior (Peters and Burleigh 1951, Marshall 2001). Other sources report observations from Glovertown, Glenwood, several sites in western and southwestern Newfoundland, Placentia Bay, and the islands along the northeast and south coasts, including Ramea [as well as the French islands of Saint-Pierre et Miquelon]; (Thompson *et al.* 1999, Marshall 2001, W. A. Montevecchi, Memorial University, unpublished data). Marshall (2001) considered the

species' distribution to be "capricious" in southwestern Newfoundland being locally common around Port aux Basques and the Codroy Valley but likely not breeding on the Port au Port Peninsula. On the Island of Newfoundland, all breeding birds are considered to represent the Newfoundland Gray-cheeked Thrush, *C. m. minimus*.

The breeding range of *C. m. minimus* also extends across the Strait of Belle Isle to adjacent portions of the North Shore of Quebec in the Gulf of St. Lawrence and to southern Labrador. Nonetheless, its distribution in this region is not well documented and literature on the subject is confused by inconsistencies in both nomenclature and recognition of subspecies. The most careful analyses available indicate that the subspecies' range extends northeastward along the coast from La Tabatière, Québec to the vicinity of Cape Charles and Battle Harbour in southeastern Labrador (Ouellet 1993, Marshall 2001; see Figure 2).

Further north, all or most, breeding birds are thought to represent *C. m. aliciae*, the Northern Gray-cheeked Thrush. Todd (1963) indicated that Gray-cheeked Thrush was not observed along the coast between Cape Charles and Cartwright, noting that north of Cartwright the species once again became common, suggesting the possibility of a distributional gap between the two subspecies in southeastern Labrador. However no contemporary data are available to assess this, and virtually all records for this area are from coastal sites.

Lowther *et al.* (2001) indicated that Gray-cheeked Thrush is found north to the tip of Cape Chidley. Observations of apparently territorial Gray-cheeked Thrushes at Nachvak Fiord in 2008 and 2009 (D. Whitaker, Parks Canada, personal observation) indicated that the species does occur at least slightly north of the range limit indicated by Godfrey (1986), although suitable shrub thicket habitat becomes increasingly rare farther north.

From 2000 to 2003, Chaulk *et al.* (2004) conducted breeding bird surveys on 172 small islands (<30 ha) along the Labrador coast from Rigolet north to Nain but did not observe Gray-cheeked Thrush (K. Chaulk, Labrador Institute of Memorial University, personal communication).

Within the South American wintering range, individuals identified as the Newfoundland subspecies (*C. m. minimus*) have been collected near Santa Marta and Bogota, Colombia (Todd 1963, Marshall 2001), though it is important to note that reliable identification of subspecies is problematic.

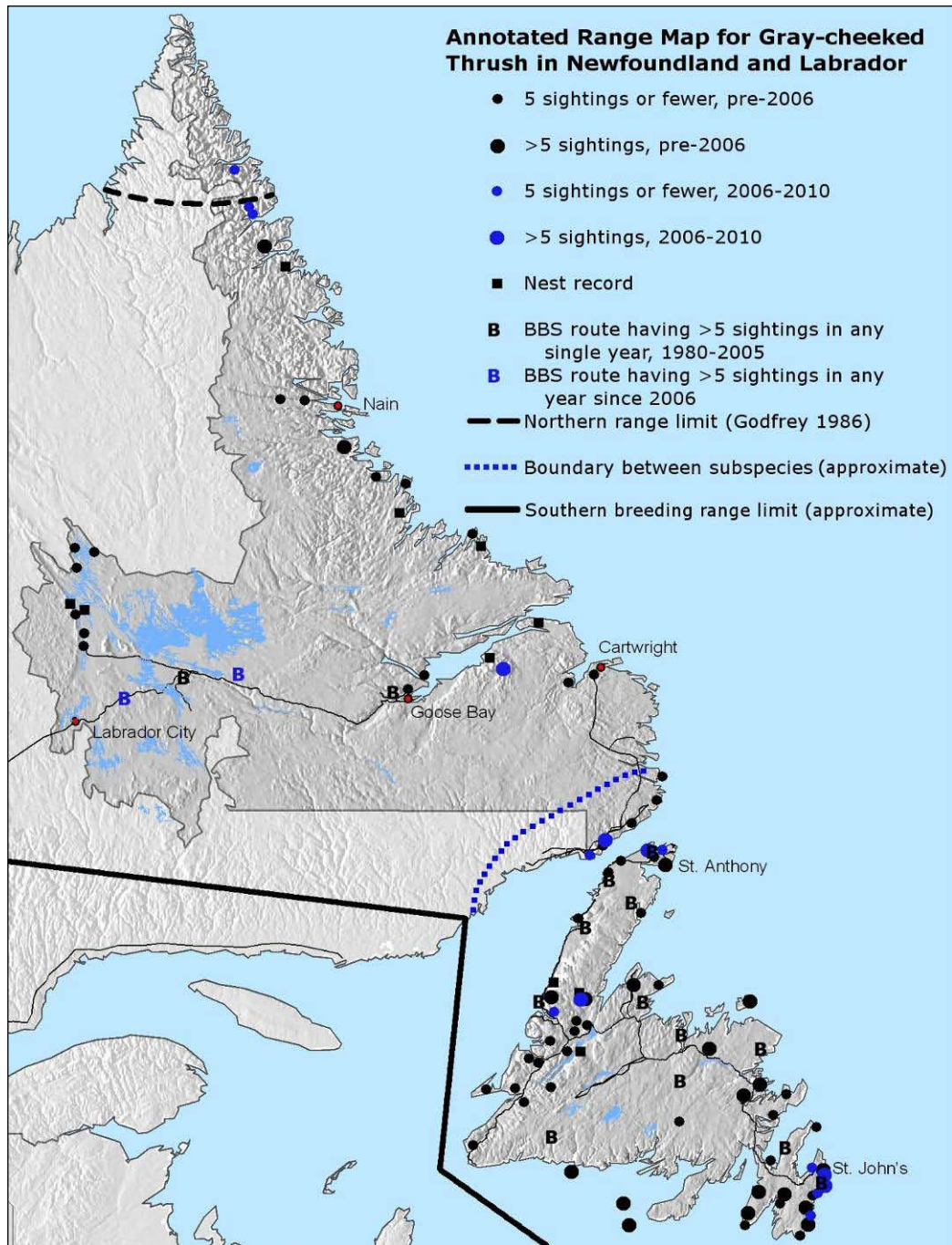


Figure 2. Annotated range map for Gray-cheeked Thrushes in Newfoundland and Labrador, with new observations reported since the original (2005) provincial status assessment portrayed in blue. See the text for discussion of range limits.

Description

Thrushes are a family of medium-sized songbirds that characteristically have somewhat long legs adapted for ground foraging, as typified by the ubiquitous American Robin (*Turdus migratorius*). Thrushes in the genus *Catharus* are associated with wooded habitats and are noted for their pleasing songs which have distinctive flute-like tones.

The Gray-cheeked Thrush is slightly larger than other *Catharus* thrushes and has a grayish face and upperparts, indistinct mottling on the ear coverts, grayish lores, and a grayish-white supercilium (Lowther *et al.* 2001). In the field, clear views of the bird are difficult, owing to the species' secretive nature and affinity for thick, brushy habitat. The Gray-cheeked Thrush is most often recognized by its somewhat nasal, descending-spiral song or its typical call, variously described as "bjiew", "phreu", or "pheu".

The Newfoundland subspecies (*C. m. minimus*) has brownish-olive upperparts, grayish-brown to brownish-olive flanks, a cream washed breast, and a lower mandible having an extensive pale base with a bright yellow tone (Pyle 1997, Marshall 2001). It may also show some chestnut edging on wings and tail. Two subtly-different colour phases have been noted on the Island (see Appendix B and Marshall 2001). Birds are typically smaller than the Northern Gray-cheeked Thrush, though considerable overlap exists (Ouellet 1993, Lowther *et al.* 2001, Frey *et al.* 2008).

The northern subspecies (*C. m. alicae*) has grayish-olive upperparts and flanks, a lightly washed cream breast, and a lower mandible having a reduced pale base and a dull yellow tinge.

Differences in parts III and IV of the song may also exist between the two subspecies (Marshall 2001).

Habitat

On the breeding grounds, the Gray-cheeked Thrush is primarily a bird of dense, low, coniferous and deciduous thickets (Godfrey 1986, Lowther *et al.* 2001). In Newfoundland and Labrador, this habitat includes willow and alder thickets, dense young regenerating coniferous forest, coastal elfin forest, and dense coniferous scrub (tuckamore or krummholtz; Todd 1963, Lamberton 1976, Marshall 2001; Figure 3).

In western Newfoundland, the species also occupies old-growth balsam fir forests having a dense growth of shrubs and fir saplings in the understory and a broken canopy (Lamberton 1976, Thompson *et al.* 1999, Whitaker 2009). Marshall (2001) reported that Newfoundland Gray-cheeked Thrushes differ from those in mainland North America in that they do not typically occupy deciduous

thickets, though they have been found in this cover (P. Thomas, Canadian Wildlife Service, personal communication). Dominant tree species in various Gray-cheeked Thrush habitats include alders (*Alnus* spp.), willows (*Salix* spp.), black spruce (*Picea mariana*), white spruce (*Picea glauca*), balsam fir (*Abies balsamea*), eastern larch (*Larix laricina*), balsam poplar (*Populus balsamifera*), and white birch (*Betula* spp.). For a summary of a detailed study of habitat use in western Newfoundland, see Appendix B or Whitaker (2009).

In Labrador, Gray-cheeked Thrushes are found in mature coniferous stands of boreal forest including lichen woodlands, tall shrubby enclaves in taiga north of the tree line, and sparsely forested valleys north of Hamilton Inlet (Todd 1963, Lowther *et al.* 2001). In the Torngat Mountains National Park, the species is confined to highly localised riparian alder and willow thickets in river valleys (e.g., Figure 3).

During migration, Gray-cheeked Thrushes use a variety of woodland and shrub habitats (Bent 1949, Godfrey 1986) although true to their nature they favour well-wooded areas having a thick understory (Lowther *et al.* 2001). On the wintering grounds, birds are found in forests, forest borders, and secondary woodlands in understory growth (Lowther *et al.* 2001).

Overview of Biology

Gray-cheeked Thrushes are long distance migrants, with most migratory movement occurring at night. During migration the species is rarely seen in large numbers. Migration is primarily through the eastern part of the continent between the Mississippi Valley and the Atlantic Coast (Bent 1949, Ouellet 1996; see Figure 1). More specifically, the Newfoundland subspecies is thought to migrate east of the Appalachian Mountains, while the northern subspecies is known to migrate primarily through the mid-continental United States (Marshall 2001). The Gray-cheeked Thrush is one of the latest spring migrant thrushes, typically arriving on the breeding grounds between mid-May and early June; southward migration occurs from mid-August to October (Bent 1949, Lowther *et al.* 2001).

Individuals are secretive during the breeding season, typically staying out of sight in dense thickets. They are usually overlooked unless a knowledgeable observer hears their vocalisations. Ouellet (1996) reported that territories are well spaced and distant from one another, whereas Marshall (2001) reported that, in Newfoundland, the species was often clustered in aggregations of up to 25 pairs. These “colonies” were apparently separated by large areas of seemingly suitable habitat, suggesting that conspecific aggregation or perhaps even hidden lekking (Wagner 1997, Tarof *et al.* 2005) is an important factor influencing the distribution of Gray-cheeked Thrushes across the landscape. While Gray-cheeked Thrushes are assumed to be monogamous, it is important to note that the closely related (and much more studied) Bicknell’s Thrush also breeds in loose “colonies” and has been found to be polygynandrous (Rimmer *et al.* 2001). That is, both males

and females may have multiple mates and more than one male may feed young in a nest.

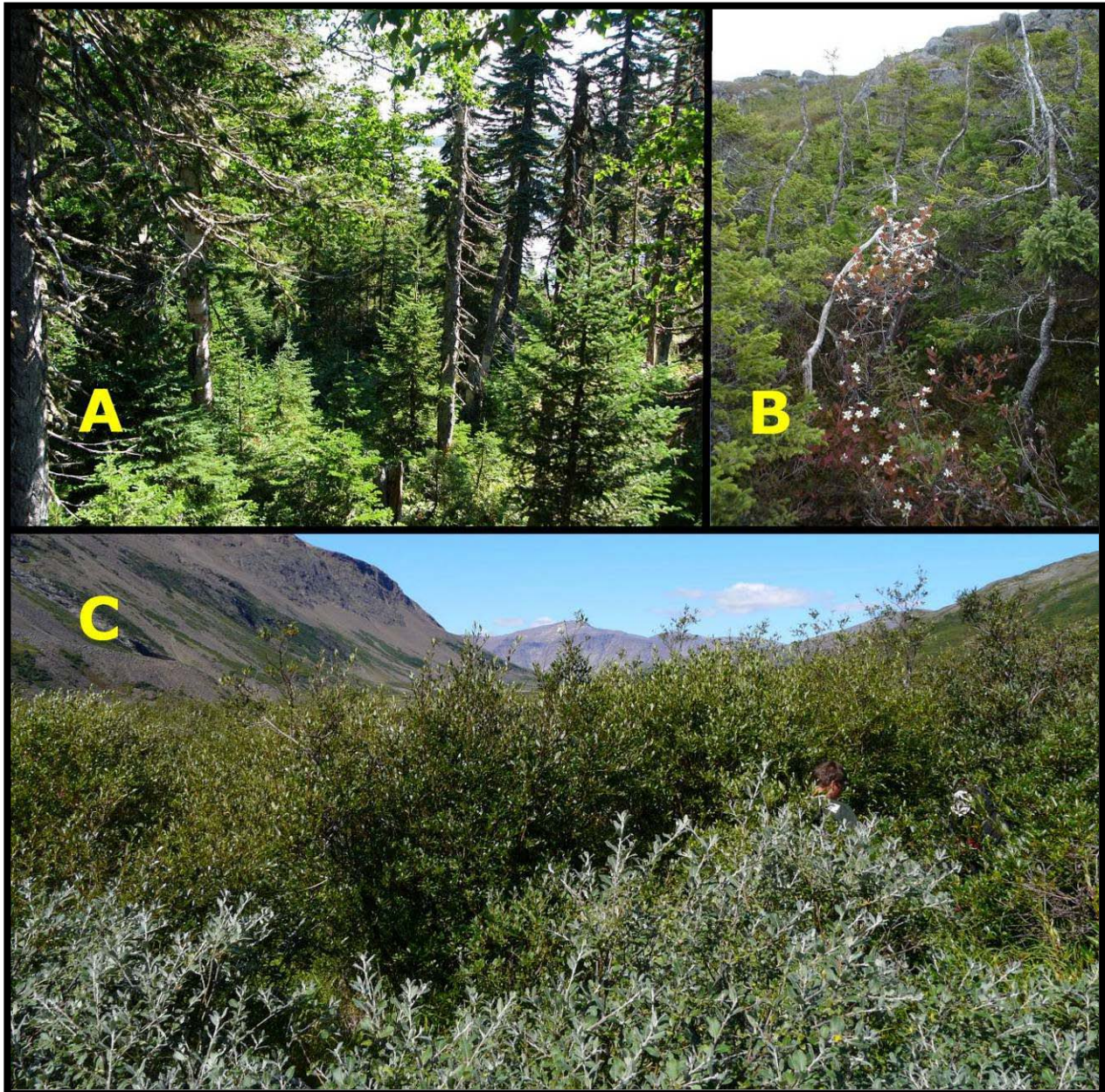


Figure 3. Typical habitats of Gray-cheeked Thrushes in Newfoundland and Labrador: (A) Old growth balsam fir forest in western Newfoundland. (B) Conifer scrub in the Main River watershed. (C) Willow thicket along Nachvak Brook, Torngat Mountains National Park. (All photos by Darroch Whitaker)

Gray-cheeked Thrushes begin breeding during their second summer (i.e. 1 year of age). Nests are built on the ground or in low shrubs, typically < 2 m high. Only one brood is raised per breeding season and clutches typically contain 4 eggs (range 3 to 5) that are incubated by the female (Bent 1949, Ouellet 1996, Lowther *et al.* 2001). Eggs are light greenish blue and are marked with varying amounts of light brown spotting and are incubated for 13-14 days; nestlings fledge 11-13 days after hatching. Young are altricial and are cared for by both male and female parents. Ten nests containing eggs have been reported for Newfoundland and Labrador, all of which were found between June 18 and July 9 (Bent 1949, Todd 1963; W.A. Montevecchi, Memorial University, unpublished data). Two nests with young were found in the Main River watershed in 2006, both of which would have hatched between July 1 and 10 (D. Whitaker, unpublished data).

Due to their northerly breeding range and secretive habits, little is known about Gray-cheeked Thrush demographic parameters including survival, productivity, and dispersal. DeSante and Kaschube (2009) reported an annual apparent survival rate of 0.441 ± 0.044 based on mark-recapture analysis of data collected at six banding stations in Alaska and the Yukon ["apparent survival" is the probability of an individual surviving and also returning to the study site (i.e. losses represent the combined effects of both death and emigration)]. The reported value is typical of thrushes in boreal forests including the island of Newfoundland (Whitaker *et al.* 2008, DeSante and Kaschube 2009). The current longevity record for the species is 7 years, 4 months (Ouellet 1996, Lowther *et al.* 2001). Of 30 adults banded in the Main River watershed in western Newfoundland 37% were second-year birds (i.e. entering their first breeding season), 30% were after-second-year birds (i.e. entering at least their second breeding season), and 33% were of unknown age (Appendix A, Table 3).

Gray-cheeked Thrush diet consists mainly of insects, arachnids, and grubs (75%), as well as fruits and berries (25%; Bent 1949).

Lowther *et al.* (2001) present a recent and thorough account of the biology of Gray-cheeked Thrush.

Population size and area of occupancy

The global Gray-cheeked Thrush population is estimated to be approximately 12,000,000 individuals (Rich *et al.* 2004). The size of the provincial population has not been studied, though in 2009 a panel of experts provided estimates of 2,500-10,000 individuals for the island of Newfoundland and 2,500-100,000 for Labrador (Newfoundland and Labrador General Status of Wild Species Assessment 2010, unpublished data). These provincial estimates were, nevertheless, subjective, being based upon expert opinion, not quantitative data analysis. In order to properly estimate the population of Gray-cheeked Thrush, based upon actual data, it is necessary to have, in addition to a good estimate of

breeding density, a similarly good estimate of the bird's area of occupancy.

While Gray-cheeked Thrushes are widespread and have been observed throughout most of Newfoundland and Labrador (see Figure 2), it is also clear that large expanses of apparently suitable habitat are currently unoccupied (e.g. Marshall 2001). In the absence of detailed distribution surveys it is not possible to make a definitive assessment of the area of occupancy for the species in the province, though existing surveys do offer some insight into area of occupancy, occurrence rates and local densities. For example, Gray-cheeked Thrushes were observed on 21 out of 24 Breeding Bird Survey (BBS) routes sampled on the island of Newfoundland from 1975-1984, but were only detected on 7 of the 21 routes sampled from 1999-2008 (Appendix A, Table 4). Similarly, T. Leonard (Parks and Natural Areas Division, unpublished data) observed the species at 2 of 4 provincial protected areas surveyed on the island of Newfoundland in 2008 and 2009 (Appendix A, Table 2). While Thompson *et al.* (1999) reported a detection rate of 0.13 birds per 10 min point count ($n = 65$) in mature balsam fir forests (>80 years-old) of western Newfoundland, no individuals were observed in the 40-60 year-old ($n = 60$) and 60-80 year-old stands ($n = 50$) which account for much of the forest cover in the region. Thus these diverse sources of data indicate that contemporary occurrence rates are relatively low on the island of Newfoundland (i.e. only $\leq 50\%$ of areas sampled [in supposedly suitable habitat] were occupied) and BBS surveys suggest that the area of occupancy on the island may have declined by as much as $\sim 62\%$ over ~ 25 years.

For the island of Newfoundland, overall detection rates of Gray-cheeked Thrushes (*C. m. minimus*) range from 0-13% of sampling points, and estimated breeding densities range from 0-0.18 territories per hectare, in surveys conducted since 1990. These contemporary density estimates are lower than those reported for Alaska, which have ranged from 0.25 territories per hectare in black spruce dwarf forest to 0.39 territories per hectare in white spruce forest (Lowther *et al.* 2001). The notable historical exception from the island of Newfoundland is Lamberton's (1976) estimate of >0.5 territories per hectare in the highlands of Gros Morne National Park during the mid-1970s; this estimate was obtained when Newfoundland Gray-cheeked Thrushes were at an historically high population level (see Figure 4).

As can be seen from the above numbers, breeding density on the Island of Newfoundland has been highly variable. Complicating the issue is the fact that both population numbers and area of occupancy numbers, for the Newfoundland Gray-cheeked Thrush [although, apparently not for the Northern Gray-cheeked Thrush] have declined dramatically in recent years.

In contrast, Labrador Gray-cheeked Thrushes (*C. m. alicae*) were observed on 2 of the 3 Labrador BBS routes sampled from 1973-1978 and then on 4 of 5 routes sampled between 1999 and 2008. The subspecies has further been reported as regular or common in other Labrador areas, including the Mealy Mountains

where it was observed at ~20% of 114 survey points; thus, it is apparently still widespread throughout much of Labrador.

In summary, in the absence of robust distribution surveys, either on the Island, or in Labrador, it is not possible to make a definitive assessment of the area of occupancy for either of the subspecies recognized in this report. While breeding density numbers are available, at least to a limited extent, particularly on the Island, they are quite variable, and difficult to interpret, though it is apparent that a marked decrease in detections has occurred.

Given the difficulties outlined above, it is clearly impossible to make a reasonable population estimate, based upon available data.

Aboriginal, traditional and local ecological knowledge

Historically, small birds including Gray-cheeked Thrushes have been pursued by Aboriginal children in the North, who sought the challenge to hone their hunting skills (Bent 1949, Todd 1963). Gray-cheeked Thrushes are reclusive, nondescript and easily overlooked, hence it is perhaps not surprising that Aboriginal groups in the province were unable to provide contemporary information on the species. Groups and individuals contacted include K. Chaulk (Labrador Institute - who indicated that Inuit elders along the central Labrador coast reported no traditional knowledge relating to this species), T. Sheldon (Nunatsiavut Government), Mr. R. Nuna (Innu Nation), R. Gallant (Federation of Newfoundland Indians), and W. Russell and R. Kemuksigak (NunatuKavut [Labrador Metis Nation]).

Trends

Range-wide trends:

Available data are insufficient to allow for a rigorous analysis of range-wide population trends for Gray-cheeked Thrush (Lowther *et al.* 2001). Though an earlier Canada-wide analysis of BBS data indicated that Gray-cheeked Thrush had declined nationally from 1969-2000 (Downes and Collins 2003), a recent reanalysis using data from 1968-2008 found no significant national trend (Collins and Downes 2009). Similarly, data from a migration monitoring station in Alaska suggested that numbers of Gray-cheeked Thrush had declined during spring migration from 1992 to 2006, although numbers rebounded somewhat from 2007-2009 (Guers 2006, Morgan and Guers 2009). No clear trend in numbers of Gray-cheeked Thrush has been detected on BBS routes in the Yukon, but data are limited (C. Eckert, Yukon Department of Environment, personal communication). Ouellet (1996) reported that data collected on the wintering grounds indicated that Gray-cheeked Thrush may have suffered a decline. However, the documents Ouellet cited to support this statement appear to refer specifically to Bicknell's Thrush, which was classified as a subspecies of Gray-cheeked Thrush at that time and occupies a disjunct and restricted wintering

range in the Caribbean. No other reports or data on trends in numbers of Gray-cheeked Thrushes on wintering grounds were identified at the time this assessment was conducted. Thus there is no conclusive evidence of a range-wide decline in Gray-cheeked Thrush populations. Nonetheless, the adequacy of the data used to reach this conclusion remains problematic and stems from the dearth of bird population monitoring data being collected in both the remote northern breeding grounds and the Neotropical wintering grounds of the species.

Newfoundland:

Peters and Burleigh (1951) reported that the Gray-cheeked Thrush was a locally common summer resident on the island of Newfoundland from 1937-1947. As recently as the early to mid-1980s, Gray-cheeked Thrush was considered one of the most widespread and abundant landbird species on the Island, much as American Robin is today (B. Mactavish and P. Linegar, personal communication). Indeed during the mid-1970s, Gray-cheeked Thrush was the fifth most abundant landbird in Gros Morne National Park (Lamberton 1976), and various editions of the checklist of the birds of insular Newfoundland have listed it as being common in appropriate habitat (e.g. Mactavish *et al.* 1999, 2003).

However, the species is now considered rare in most areas of the Island of Newfoundland, including Gros Morne, and sightings are now considered noteworthy among birders (D. Whitaker, personal observation; see the nf.birds online newsgroup [<http://groups.google.ca/group/nf.birds/topics>]). Thus anecdotal and experiential information clearly indicates there has been a pronounced recent decline in the Newfoundland Gray-cheeked Thrush (i.e. *C. m. minimus*).

Breeding Bird Survey (BBS) routes are used to monitor landbird populations across North America; each BBS route consists of 50 three-minute point counts spaced at 800 m intervals along a 40 km route. An analysis of counts of Gray-cheeked Thrush from 21 BBS routes on the Island of Newfoundland was presented in the original 2005 status assessment and indicated that a significant decline had occurred between 1980 and 2003 ($n = 132$ individual BBS counts).

For this report, the BBS dataset was reanalysed with the addition of 65 new surveys conducted from 2004-2008, as well as 10 surveys conducted from 1974-1979 that had been overlooked in the original 2005 assessment (Appendix A, Table 4). Thus the dataset considered here spans 11 additional years (1974-2008) and includes 236 individual counts from 27 BBS routes. Note that only routes where a Gray-cheeked Thrush was detected on at least one occasion were included in statistical testing (23 routes yielding 198 counts). Data were analysed using linear mixed effects regression with route included as a random effect and specifying a Poisson error distribution (lmer procedure; R development core team; <http://www.r-project.org/>). The resulting model fit indicated that Gray-cheeked Thrush on the island of Newfoundland have experienced a precipitous, population decline since the 1970s and early 1980s ($z = -19.19$, $P < 0.001$;

Figure 4).

This assessment is supported by simple inspection of the data: from 1974-1984 counts averaged 7.3 individuals per 50-stop BBS route and were routinely more than twice this value, but no count has exceeded 6 individuals since 1988 (Figure 4). Similarly, a Canadian Wildlife Service analysis of BBS data from Newfoundland and Labrador indicated that the species experienced a statistically significant decline of 11.6% per year from 1973 to 2008 (Collins and Downes 2009). It should be noted carefully that data from Newfoundland and Labrador were pooled during that analysis; assuming that Labrador populations remained relatively stable during this period, as suggested by Newfoundland and Labrador Breeding Bird Survey data, the decline in Newfoundland would have been even more striking.

On the island of Newfoundland, the average number of Gray-cheeked Thrushes per BBS route per year declined from 6.2 ± 1.8 (mean \pm SE) in the decade from 1975-1984 to 0.4 ± 0.2 from 1999-2008 (93% decline), and the statistical model indicated that the expected annual count per BBS route had declined from 3.07 to 0.14 ($z = -10.414$, $P < 0.001$; note that expected counts are lower than the average counts because they approximate the median and count data are strongly skewed; Figure 5). Thus there is reliable quantitative evidence that the once ubiquitous Newfoundland Gray-cheeked Thrush (*C. m. minimus*) population on the Island of Newfoundland has declined by ~95% over a period of 35 years; the rapidity of the decline in recent decades has the characteristics of a threshold shift in numbers rather than a steady decline.

In order to generate a reliable estimate of the magnitude of the change in relative abundance of Gray-cheeked Thrushes on the island of Newfoundland a comparison was made between the subset of BBS routes that were surveyed in at least 3 years during the decade from 1975-1984 and then 3 more times during the decade from 1999-2008. Twelve routes met these restrictive criteria and a comparison between decades was made using a generalised linear mixed model including route as a random term and specifying a Poisson error distribution and random slopes and intercepts (lmer procedure; R development core team; <http://www.r-project.org/>).

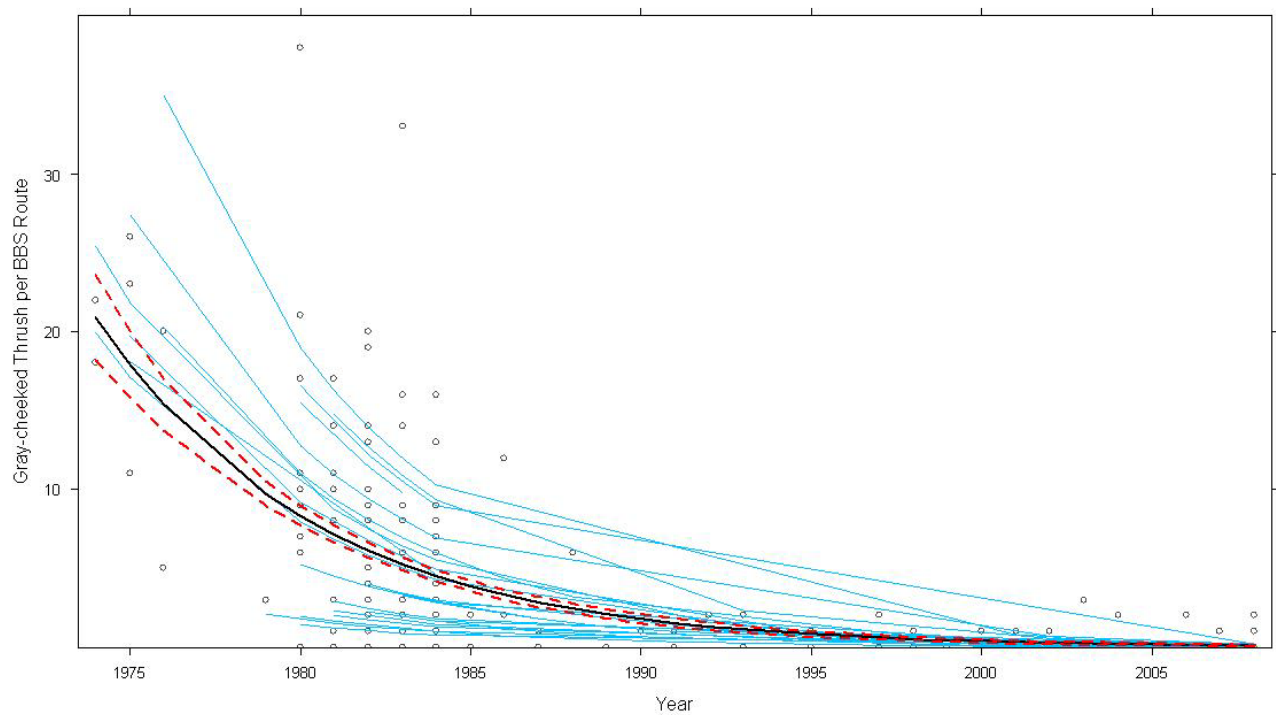


Figure 4. Trend in counts of Gray-cheeked Thrush from 23 BBS routes on insular Newfoundland (1974-2008), with the overall trend in black and the 95% confidence interval on this trend in red.

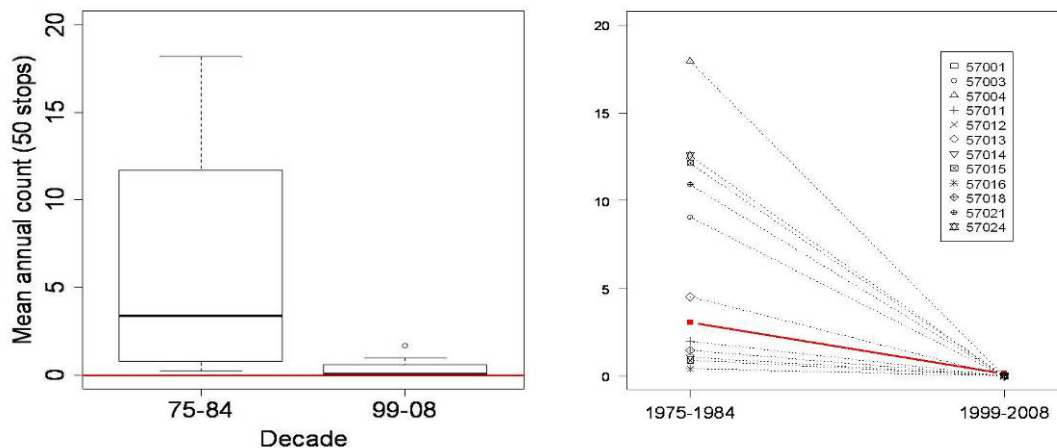


Figure 5. Annual counts of Gray-cheeked Thrushes on 12 Breeding Bird Survey routes on the island of Newfoundland compared between the decades of 1975-1984 and 1999-2008. Each BBS route was sampled at least 3 times during each decade. The box and whisker plot on the left compares the distribution of average annual counts across the 12 routes between the two decades; the bold central bars indicate the median decadal counts, while the upper and lower limits of the boxes depict the 25% and 75% quartiles and the whiskers indicate the range of outlying values. The plot on the right depicts the results of a generalized linear mixed model comparing counts on these 12 routes between the two decades, and shows estimated changes for each route. The overall change is shown in red and depicts an estimated drop from an expected annual count of 3.07 Gray-cheeked Thrushes per BBS route to just 0.14 individuals per route ($z = -10.414$, $P < 0.001$). The legend in this plot indicates the BBS route number corresponding to each symbol (see Appendix A, Table 4 for route locations).

Labrador:

Based on extensive fieldwork from 1901-1958 and a thorough review of museum collections and other reports, Todd (1963) indicated that “conditions on the Labrador coast seemed favourable for [Gray-cheeked] Thrush; at any rate there is no dearth of records of its occurrence.” He also reviewed numerous records from inland sites.

Nonetheless, contemporary data and even recent anecdotal information, on population trends for Gray-cheeked Thrush in Labrador (i.e. primarily Northern Gray-cheeked Thrush, *C. m. aliciae*) are limited.

The available information does suggest that the species remains abundant and widespread in Labrador. The six Labrador BBS routes, all located at approximately the same latitude, are distributed from Cartwright to Labrador City, all within the range of the Northern Gray-cheeked Thrush. Trends in counts from

these BBS routes were evaluated using linear mixed effects regression with route included as a random effect and specifying a Poisson error distribution. The resulting model fit indicated no statistically significant trend in numbers of Gray-cheeked Thrushes in central Labrador since the mid 1970s ($z = -1.59$, $P = 0.112$), with an average of 5.9 ± 1.1 individuals being detected per BBS route each year.

Threats and limiting factors

There is insufficient information available for a rigorous assessment of factors that threaten or limit Gray-cheeked Thrush populations (Lowther *et al.* 2001).

In Newfoundland, within the boreal forest, Gray-cheeked Thrushes (*C. m. minima*) often occupy old growth stands which have been reduced in extent due in large part to industrial forestry (Thompson *et al.* 1999). Rigorous landscape planning and conservation as well as careful stewardship are required to maintain the remnants of this important habitat (Thompson *et al.* 1999, Settingington *et al.* 2000). Red squirrels (*Tamiasciurus hudsonicus*) are a major predator of songbird nests in western Newfoundland (Lewis and Montevecchi 1999) and have become widespread throughout most of the Island since their introduction in 1963 and 1964 (Dodd 1983), though the extent of impact that they might have had on Gray-cheeked Thrush is unknown.

The near-disappearance of Gray-cheeked Thrush from non-commercial coastal woodlands and krummholz on the Island is even less easily explained.

In Labrador, where large-scale timber harvesting has had only a minor effect to date, no information suggests that Gray-cheeked Thrush (*C. m. aliciae*) populations are being affected by human activity.

Given the limited nature of the available evidence, it is reasonable to suggest that primary threats to Gray-cheeked Thrush may not be significantly related to events or conditions encountered on the breeding grounds, but, may rather be related to events or conditions encountered on the wintering grounds and during spring and fall migration (Lowther *et al.* 2001, Faaborg *et al.* 2010). A significant threat to songbirds during migration (which primarily occurs at night) is collisions with man-made structures such as radio towers. There is no evidence however to indicate a sharp increase in such collisions during the period of the recent decline of the Newfoundland Grey-cheeked Thrush population.

As mentioned above, individuals putatively identified as the Newfoundland subspecies of Gray-cheeked Thrush (*C. m. minimus*) have been collected in the Colombian Andes (Todd 1963, Marshall 2001). This region has experienced rapid and massive deforestation over the past 40 years that has greatly exceeded that of other portions of the tropics including the Brazilian Amazon (Viña and Cavelier 1999, Viña *et al.* 2004, Armenteras *et al.* 2006). Thus, while

Gray-cheeked Thrushes are apparently still regularly observed in bird conservation reserves in central Colombia, the landscape surrounding these protected areas has experienced extensive deforestation since the 1970s (T. Donegan, Fundacion ProAves, personal communication), suggesting a large loss of potential wintering habitat. Given that this loss parallels the concurrent decline of Gray-cheeked Thrush on the Island of Newfoundland, it seems reasonable to infer that the two events are causally linked. However the association is so far speculative, owing to the general dearth of information on the ecology and conservation of Gray-cheeked Thrush [and for migratory songbirds in general (Faaborg *et al.* 2010)] during the non-breeding period. Consequently it is vital that future research be directed towards 1) elucidating the ecology of Gray-cheeked Thrush during the ~7-8 months of the year in which the birds are away from their breeding grounds, and 2) identifying the wintering range of individuals breeding in Newfoundland and Labrador. It would be significant, in conservation terms, if it were to be found that birds from the island of Newfoundland had a very restricted wintering area, and, further, if it were to be found that this restricted wintering ground was separate from that of the Northern Gray-cheeked Thrush.

Existing protection

This species has been protected since 1916 under the Migratory Birds Convention Act (Department of Justice of Canada 1994). In 2005, the Government of Newfoundland and Labrador listed the Gray-cheeked Thrush as vulnerable under the Endangered Species Act (2001). While a status rank of vulnerable does not confer any specific legal protection it requires development of a species management plan that could lead to additional consideration, for example in regulation of land management that could affect Gray-cheeked Thrush habitat.

Special significance

The available evidence demonstrates that the Newfoundland Gray-cheeked Thrush (*Catharus minimus minimus*) is endemic to insular Newfoundland and adjacent portions of coastal Labrador.

The Newfoundland Gray-cheeked Thrush is an important component of the distinct avian communities inhabiting old-growth balsam fir forests that are a unique and important ecosystem and wildlife habitat in the province (Thompson and Curran 1995, Thompson *et al.* 1999).

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<http://www.museum.lsu.edu/~Remsen/NEOORNintro.html>

Electronic distribution list of the Neotropical Bird Club:
<http://www.neotropicalbirdclub.org/>

Rank or Status (species as a whole)

Global	
G-rank	G5 - Secure ^a
IUCN	LC – Least Concern ^a
National	
N-rank	N5B - Secure ^a
National General Status	4 - Secure ^b
COSEWIC	Candidate List: Group 2 – Mid priority candidate [<i>C. m. minimus</i> , Newfoundland population]
Provincial	
Provincial General Status	3 - Sensitive
Newfoundland S-rank	S3 - Vulnerable
Newfoundland General Status	2 – May be at Risk
Labrador S-rank	S4B - Secure
Labrador General Status	4 - Secure
Adjacent Jurisdictions	
Nova Scotia S-Rank	SNA - Not assessed ^a
Nova Scotia General Status	4 - Secure ^b
Prince Edward Island S-Rank	SNA - Not assessed ^a
Prince Edward Island General Status	8 - Accidental ^b
New Brunswick S-Rank	SNA - Not assessed ^a
New Brunswick General Status	5 - Undetermined ^b
Québec S-Rank	S4 ^a
Québec General Status	4 - Secure ^b

^a NatureServe explorer (<http://www.natureserve.org/explorer/>)

^b Canadian Endangered Species Conservation Council (CESCC) 2006. Wild Species 2005: The General Status of Species in Canada (<http://www.wildspecies.ca/wildspecies2005/index.cfm?lang=e>)

Collections examined

None

TECHNICAL SUMMARY

Distribution and Population Information (on breeding grounds)	<i>C. m. minimus</i>	<i>C. m. aliciae</i>
• extent of occurrence (EO)(km ²)	~115,000 km ² ^a	~290,000 km ² ^a
• area of occupancy (AO) (km ²)	Unknown	Unknown
• number of extant locations	Widespread	Widespread
• specify trend in # locations, EO, AO (decline, stable, increasing, unknown)	Likely decreasing ^b	Unknown
• habitat trend: specify declining, stable, increasing or unknown trend in area, extent or quality of habitat	Relatively stable but likely reduced due to loss of old growth forest	Stable
• generation time (average age of parents in the population) (indicate years, months, days, etc.)	~2-3 years	~2-3 years
• number of mature individuals (capable of reproduction) in the Provincial population (or, specify a range of plausible values)	2,500-10,000 ^c	2,500-100,000 ^c
• total population trend: specify declining, stable, increasing or unknown trend in number of mature individuals or number of populations	Declining	Unknown, possibly stable
• are there extreme fluctuations (>1 order of magnitude) in number of mature individuals, number of locations, AO and/or EO?	No	No
• is the total population severely fragmented (most individuals found within small and isolated populations between which there is little exchange, i.e., ≤ 1 successful migrant / year)?	No	No
• does species exist elsewhere?	No ^d	Yes
• status of the outside population(s)?	Not applicable	Unknown, possibly stable
• is immigration known or possible?	No ^d	Yes
• would immigrants be adapted to survive here?	Not applicable	Yes
• is there sufficient habitat for immigrants here?	Not applicable	Yes

^a In suitable habitat

^b Gray-cheeked Thrushes no longer occur on many Newfoundland BBS routes where the species was previously common

^c Newfoundland and Labrador General Status of Wild Species Assessment 2010 (qualitative assessment)

^d *C. m. minimus* is found on insular Newfoundland and adjacent portions of Labrador along the Strait of Belle Isle, though some may occur along the Québec north shore as far west as La Tabatière (see annotated provincial range map)

Appendix A. Population Information

Table 1. Recent verified occurrences and range use of Gray-cheeked Thrush in Newfoundland and Labrador (W. A. Montevecchi, Memorial University of Newfoundland and Labrador, unpublished data). New records added to the revised 2010 assessment (i.e. those made from 2005 onwards) were taken from reports to the nf.birds online discussion group and the various personal communications reported above. A verified occurrence is a known sighting of a Gray-cheeked Thrush by an individual able to distinguish this species from similar *Catharus* species.

Date	Observer	Location	Count	Comments
May 27, 1980	B. S. Jackson	Long Pond	1	
May 27, 1980	W. A. Montevecchi, A. Burger	Portugal Cove	1	
May 29, 1980	J. Wells	Cape St. Mary's	1	
May 30, 1980	J. Wells	Cape St. Mary's (Golden Bay)	1	
Jun 4, 1980	R. Burrows	Louil Hills, Terra Nova NP	4	
Jun 10, 1980	R. Burrows	Glovertown	1	
Jun 1, 1980	R. Burrows	Terra Nova NP		
Jun 12, 1980	W. A. Montevecchi	Portugal Cove	1	singing
Jun 12, 1980	J. Wells	Cape St. Mary's (Golden Bay)	2	
Jul 8, 1980	P. Barkhouse, D. Morten	Goose River, Labrador		nest with 3 eggs
Jul, 1980	R. Burrows	Terra Nova NP	1	
Sep 5, 1980	R. Burrows	Newman Sound	1	
Sep 5, 1980	R. Burrows	Terra Nova NP	1	
Jul 9-10, 1982	B. Maybank	Shallow Bay, Gros Morne NP		nest with 3 young
Sep 14, 1982	R. Burrows	Glovertown	1	Calling
May 27, 1983	W. A. Montevecchi, A. Burger	Portugal Cove	11	
Jun 10, 1983	R. Burrows	Glovertown	1	
May 29, 1984	B. Mactavish	Waterford Valley, St. John's	2	singing
May 31, 1984	W. A. Montevecchi	Portugal Cove	1	
Sep 8, 1984	B. Mactavish	Bowring Park, St. John's	1	
May 23, 1985	B. Mactavish	Cape Race	1	
Jun 4, 1985	R. Etcheberry	Langlade	1	Singing
Jul 19, 1985	R. Etcheberry	Langlade	2	adult feeding fledgling
Sep 2-14, 1985	R. Etcheberry	Miquelon	unknown	several reports

Date	Observer	Location	Count	Comments
May 23, 1986	R. Etcheberry	St. Pierre & Miquelon	1	
May 3, 1987	R. Northcott	Ramea	1	
May 23, 1987	R. Etcheberry	Langlade	1	Calling
May 28, 1987	R. Etcheberry	St. Pierre & Miquelon	1	Singing
May 31, 1987	D. Phelan	Terra Nova NP	1	
Jun 1, 1987	W. A. Montevecchi	Portugal Cove	1	Singing
Jun, 1987	R. Etcheberry	Langlade	1	calling and singing
Jun 3, 1987	W. A. Montevecchi	Witless Bay	1	Singing
Jun 4, 1987	R. Etcheberry	St. Pierre & Miquelon	1	Singing
Jul 6, 1987	R. Etcheberry	Langlade		adults feeding fledgling young
Jul 19, 1987	R. Etcheberry	Langlade		adult feeding fledgling
Aug 5, 1987	W.A. Montevecchi	Jubilee Lake, eastern NL	1	
May, 1988	R. Etcheberry	St. Pierre & Miquelon		several calling
May 21, 1988	R. Etcheberry	Langlade	1	Calling
May 28, 1988	R. Burrows	Long Pond	1	calling
May 28, 1988	R. Burrows	Oxen Pond, St. John's	1	
May 29, 1988	R. Etcheberry	Miquelon		several calling
May 29, 1988	B. Mactavish, J. Pratt, D. Lemon	St. John's		
May 30, 1988	R. Etcheberry	Langlade		several calling
May 30, 1988	W. A. Montevecchi	Portugal Cove	1	singing
Jun 1, 1988	W. A. Montevecchi	Portugal Cove		many singing
Jun 2, 1988	R. Etcheberry	St. Pierre & Miquelon	1	singing
Jun 20, 1988	J. Pitocchelli	Red Bay, Labrador	1	
Jun 22, 1988	J. Pitocchelli	St. Anthony	1	
Jun 22-Jul 29, 1988	B. Mactavish	Hawkes Bay	2	singing
Jun 25, 1988	J. Pitocchelli	Baccalieu Island	1	
Jun 26, 1988	R. Burrows	Barachois Pond, Stephenville Crossing	1	
Jul 17, 1988	R. Burrows	Oxen Pond, St. John's	1	singing

Date	Observer	Location	Count	Comments
Jul 23, 1988	R. Etcheberry	Langlade	1	adult carrying food
Sep 10, 1988	R. Etcheberry	St. Pierre & Miquelon	1	
Sep 15, 1988	B. Mactavish	Cape Spear	2	
May 25, 1989	B Mactavish	White Hills, St. John's	2	
May 28, 1989	R. Burrows	Oxen Pond, St. John's	1	
May 30, 1990	B. Mactavish	Harpoon Brook, Millertown area	1	
Jun 2, 1990	R. Burrows	Kents Pond, St. John's	1	
Jun 2, 1990	R. Northcott	Ramea	1	
Jun 24, 1990	W. A. Montevecchi	Bellevue		many singing
Jul 10, 1990	J. Brazil	Hebron Fjord, Labrador	1	
Sep 23, 1990	K. Knowles	Renews	1	
May 26, 1991	R. Burrows	Pinchgut Lake, Corner Brook	1	
Jun 5, 1991	R. Northcott	Ramea	1	
Jun 7, 1991	R. Northcott	Ramea	1	
Jun 14, 1991	W. A. Montevecchi	Portugal Cove	1	
Jun 19, 1991	W. A. Montevecchi	Portugal Cove	1	singing
Jul 7, 1991	R. Burrows	Dunville	1	
Jul 22, 1991	R. Burrows	Western Brook Pond, Gros Morne NP	1	
Jul 24, 1991	W. A. Montevecchi	Pistolet Bay	1	singing
Jul 25, 1991	W. A. Montevecchi	Berry Hill Pond, Gros Morne NP	1	singing
Jul 26, 1991	W. A. Montevecchi	Cormack	1	singing
Apr 28, 1993	R. Northcott	Ramea	1	
Jun 7, 1993	R. Northcott	Ramea	1	
Jun 14, 1993	W. A. Montevecchi	Windsor Lake, St. John's	1	singing
Jun 20, 1993	W. A. Montevecchi	North Harbour		many singing
Jul 12, 1993	W. A. Montevecchi	Cook's Brook, Western NL Model Forest	1	singing
Jul 13, 1993	W. A. Montevecchi	Cow Head	1	
Jul 14, 1993	W. A. Montevecchi	Gros Morne Mountain	1	singing
Sep 3, 1993	R. Etcheberry	Miquelon		several calling

Date	Observer	Location	Count	Comments
May 29, 1994	J. Pratt	Cape Spear	1	
Jun 1, 1994	B. & N. Montevecchi	Portugal Cove	1	
Jun 5, 1994	R. Northcott	Ramea	1	
Spring, 1995	D. Whitaker	Portugal Cove	1	
Jun 3-4, 1995	B. & G. Montevecchi	Portugal Cove		many singing
May 27, 1996	R. Northcott	Ramea	1	
Jun, 1996	I. Stenhouse, W. A. Montevecchi, C. Walsh	Tors Cove	1	
Summer, 1996	J. Gosse	Hebron Fjord, Labrador	10	
Jun 2, 1997	T. Boland	Forest Pond, Goulds	1	
Aug 22, 1997	B. Mactavish, K. Knowles	Bear Cove Point, Renews	4	
Sep 9, 1997	P. Jones	Upper Ferry, Codroy Valley	1	
May 16, 1998	R. Northcott	Ramea		
May 26, 1998	R. Etcheberry	Miquelon		
Jun 1, 1998	D. Fifield	Gull Island, Witless Bay	1	
Jul 9, 1998	W. A. Montevecchi	Eddies Cove East	1	
Summer 1998, 1999, 2000	M. Krawchuk	Gros Morne Ecosystem		see Table 2
June 6, 2002	R. Northcott	Ramea	1	
Summer 2003, 2004	K. Dalley, P. Goulet, K. Powell, D. Whitaker	Main River Watershed		see Table 2
June 12, 2005	T. Boland	Maddox Cove Rd.	1	nf.birds report
Sep 4, 2005	B. Mactavish	Cape Spear Rd.	1	nf.birds report
Sep 8, 2005	B. Mactavish	Cape Spear Rd.	1	nf.birds report
Oct 25, 2005	D. Brown	Bear Cove	1	nf.birds report
Jun 10, 2006	B. Mactavish	Maddox Cove	1	Singing; nf.birds report
Jul 8, 2006	A. Hughes	Old Broad Cove Rd., Portugal Cove	2	Singing; nf.birds report
Jun 10, 2007	B. Mactavish	Cape Spear Rd.	1	Singing; nf.birds report
Jul 9, 2007	M. Parmenter	Lamanche Rd.	1	Singing & seen; nf.birds report
Aug 26, 2007	B. Mactavish	Cape Spear Rd.	2	nf.birds report

Date	Observer	Location	Count	Comments
Sep 23, 2007	B. Mactavish	Cape Spear Rd.	1	nf.birds report
Jun 20, 2008	M. Parmenter	Intersection Maddox Cove & Cape Spear Rds	1	singing; nf.birds report
Jul 11, 2008	T. Leonard	Main River Watershed	3+	nf.birds report
Jul 13, 2008	T. Leonard	Pistolet Bay Provincial Park	2	2 individuals detected on 10 point counts
Jul 15, 2008	T. Leonard	St. Anthony- Raleigh	Many	nf.birds report
Jul 16, 2008	D. Whitaker	Highlands 10 km south of Gros Morne Mountain	1	nf.birds report
Aug 9, 2008	D. Whitaker	Nachvak Brook ~10 km north of Saglek Fiord	1	calling in willow thicket, respond to pishing
Jun 22, 2009	B. Rodrigues	L'Anse-au-Clair	1	heard informal bird survey
Jun 23, 2009	B. Rodrigues	Heading SW from St. Modeste	8	Heard at 8/20 survey points over 20 km
Jul 2, 2009	T. Leonard	LaManche Provincial Park	1	1 detected during 10 point counts
Jul 15, 2009	A. Huges	Cape Spear Road	1	singing; nf.birds report
Jul 29, 2009	P. Lineagar	Gull I, Witless Bay	Many	nf.birds report
2009	D. Whitaker	Mouth of Nachvak Brook, Saglek Fiord	1	
2009	D. Whitaker	McCornick River ~ 5 km south of Nachvak Fiord	1	calling at this location on 3 visits
Aug 22, 2009	B. Mactavish	Bear Cove Point	1	nf.birds report

Table 2. Density or frequency of Gray-cheeked Thrush observed during breeding songbird surveys conducted in Newfoundland.

Date	Location	Area	Source	Methods	Abundance
1975	Candlestick Lake, Gros Morne N.P.	18 ha	Lamberton (1976)	Territory mapping in old growth balsam fir forest	50.5 territorial males/100 ha (Long Range Highlands)
1991 & 1992	Humber River south to Little Grand Lake	140 km north to south	Thompson, Hogan & Montevecchi (1999)	point counts (n=175)	0 birds in 40-80 year-old forest, 0.13 +/- 0.06 per point in 80+ year-old forest
1994 & 1995	Grindstone Pond south to Corner Brook Lake	60x75 km	Whitaker & Montevecchi (1997), Whitaker & Montevecchi (1999)	200 m transects (n=52)	Present in area but not detected on surveys of riparian habitat
1998-2000	Greater Gros Morne Ecosystem	30x40 km	Taylor & Krawchuk (2005)	point counts (n=1,263)	Avg. 24.3 birds detected/year at 9.1% points
2003 & 2004	Main River Watershed	17x11 km	Powell (2005)	point counts (n=120),	0.13-0.18 singing males/ha (total 31 individuals)
2003-2006	Main River Watershed	17x11 km	Whitaker <i>et al.</i> (2008); also P. Taylor, I. Warkentin and D. Whitaker (unpublished data)	Passive mist netting using 25 x 12 m nets on 18 sites	2003: 6 captures/66,641 m-net hours 2004: 4 captures/155,648 m-net hours 2005: 10 captures/154,406 m-net hours 2006: 25 captures/158,923 m-net hours Overall: 0.00084 captures/m-net hour
2006 & 2007	Main River Watershed	200 km ²	Whitaker (2009)	Broadcast surveys using Gray-cheeked Thrush vocalisations to sample a grid of points spaced 500 m apart	Observed at 119 of 1,613 points (7.4%) 2006: 56/812 (6.9%) 2007: 63/801 (7.9%)
2007 & 2008	Mealy Mountains ~20 km south of Lake Melville	64 km ²	K. Lewis and B. Starzomski, Memorial University (unpublished data)	100 m radius point counts (n = 114)	Observed at 23 of 114 points (20.1%); not observed above ~600 m elevation
2008 & 2009	Various provincial protected areas	Not applicable	T. Leonard, Parks and Natural Areas Division (unpublished data)	5 minute point counts follow by 3 minute playback of chickadee mobbing calls	Pistolet Bay Prov. Park: GCTH at 2/10 survey points Bay Du Nord C.H.R.: GCTH at 0/20 survey points LaManche Prov. Park: GCTH at 1/10 survey points Lockston Path Prov. Park: GCTH at 0/10 survey points

Table 3. Summary data for Gray-cheeked Thrush banded in the Main River watershed from 2003-2006. AHY=after hatch year; SY=second year; ASY=after second year, TY = third year. Landscape is the dominant cover type on the banding site, where CUT = clearcut and NAT = forest characterised by natural openings (bogs and scrub). Distance and Interval refer to the spatial and temporal interval between consecutive captures of an individual. See Whitaker *et al.* (2008) for additional details.

Band number	Date	Age	Sex	Wing chord	Weight (g)	Landscape	Distance (m)	Interval (days)
164131319	July 16, 2003	AHY	F	95	27.5	CUT	-	-
(recapture)	July 17, 2003	AHY	F	96	27	CUT	67	1
164131327	June 8, 2003	SY	M	99	30	NAT	-	-
(recapture)	July 22, 2003	SY	M	95	28	NAT	41	43
164131376	June 22, 2003	AHY	M	98	31	CUT	-	-
164131412	July 17, 2003	AHY	?	104	23.5	CUT	-	-
164131554	July 15, 2004	ASY	F	96	NA	CUT	-	-
164131619	June 7, 2004	ASY	F	98	33	CUT	-	-
164131620	June 7, 2004	SY	F	95	29.5	CUT	-	-
164131626	June 2, 2004	ASY	F	103	31	NAT	-	-
220151118	June 9, 2005	AHY	?	102	31	CUT	-	-
220151120	June 12, 2005	ASY	M	101	33	CUT	-	-
220151155	July 12, 2005	AHY	?	NA	32	CUT	-	-
220151162	July 19, 2005	SY	F	97	27	CUT	-	-
220151172	July 20, 2005	SY	M	101	31.5	NAT	-	-
(recapture)	June 21, 2006	TY	M	104	34	NAT	1333	336
220151240	June 27, 2005	AHY	M	101	32	CUT	-	-
220151257	July 9, 2005	AHY	M	101	NA	NAT	-	-
220151603	August 14, 2005	HY	?	96	NA	NAT	-	-
220151671	July 11, 2006	ASY	F	100	NA	NAT	-	-
220151713	June 13, 2006	ASY	M	103	30	CUT	-	-
220151723	June 20, 2006	SY	F	97	34	NAT	-	-
(recapture)	July 19, 2006	SY	F	93	30.5	NAT	214	29
220151724	June 20, 2006	SY	M	101	32	NAT	-	-
220151734	June 24, 2006	SY	M	101	34	NAT	-	-
220151759	July 11, 2006	ASY	M	105	34	NAT	-	-

Band number	Date	Age	Sex	Wing chord	Weight (g)	Landscape	Distance (m)	Interval (days)
220151760	July 12, 2006	SY	M	100	NA	CUT	-	-
220151783	July 20, 2006	AHY	M	99	33	CUT	-	-
220151845	June 25, 2006	AHY	M	100	31.5	NAT	-	-
(recapture)	July 10, 2006	AHY	M	100	27	NAT	31	15
220151876	July 10, 2006	SY	F	99	26.5	NAT	-	-
220151877	July 10, 2006	SY	?	97	28	NAT	-	-
220151882	July 11, 2006	SY	M	NA	NA	CUT	-	-
(recapture)	July 19, 2006	SY	M	NA	NA	CUT	202	8
220151885	July 11, 2006	AHY	M	98	NA	CUT	-	-
220151888	July 12, 2006	ASY	F	100	NA	NAT	-	-
225149878	August 17, 2006	HY	?	98	31.5	NAT	-	-
225149880	August 17, 2006	HY	?	98	31	NAT	-	-
225149881	August 17, 2006	HY	?	95	NA	NAT	-	-
225149883	August 17, 2006	HY	?	97	NA	NAT	-	-
225149884	August 17, 2006	HY	?	99	NA	NAT	-	-
225149968	August 18, 2006	HY	?	99	36	CUT	-	-

According to the Bird Banding Office (Canadian Wildlife Service, unpublished data), [in addition to the recaptures listed above] only 1 Gray-cheeked Thrush banded in Newfoundland has been recovered. This bird was banded June 30, 1994 near Cormack in Newfoundland (49°18'N, 57°30'W), and recovered nearby the next year (July 2, 1995; 49°30'N, 57°67'W).

Table 4. Counts of Gray-cheeked Thrush detected during Breeding Bird Surveys conducted in Newfoundland (data obtained from <http://www.pwrc.usgs.gov/bbs/>; see also Downes and Collins (2003)). Data not included in the original 2005 Gray-cheeked Thrush provincial status assessment are highlighted with grey shading.

Route Name	Route	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Trepassey	57001	-	-	-	-	-	-	0	0	0	3	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	0	0	-	0	-	
Lawn	57002	-	-	-	-	-	-	-	-	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0		
St. John's	57003	-	-	20	-	-	-	11	10	2	5	7	-	12	1	6	-	-	-	-	-	-	-	-	-	1	0	1	0	0	0	2	-	0	1	
Heart's Delight	57004	-	-	5	-	-	-	38	17	8	33	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	2	0	1	
Harbour Mille	57005	-	-	-	-	-	-	-	-	0	3	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	
Grand Bank	57006	-	-	-	-	-	-	-	-	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	
Burgeo South	57008	-	-	-	-	-	-	-	-	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	
O'Regan's	57010	-	-	-	-	-	-	0	0	0	0	0	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bonavista	57011	-	-	-	-	-	-	-	3	2	3	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	-	0	-	-	
Terra Nova	57012	-	-	-	-	-	3	0	0	1	1	0	-	2	-	-	-	0	-	-	-	-	-	-	0	0	0	0	0	0	-	0	0	0	-	
Gander River	57013	-	-	-	-	-	-	17	3	3	0	1	2	-	0	-	0	-	1	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	
Buchans	57014	-	-	-	-	-	-	-	0	2	1	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	0	-	0	0	
Burgeo Road	57015	-	-	-	-	-	-	-	14	19	6	9	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	1	3	2	0	-	0	0
St. David's	57016	-	-	-	-	-	-	0	1	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
Wareham	57017	-	-	-	-	-	-	7	-	13	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	
Gander Bay	57018	-	-	-	-	-	-	-	1	0	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0
Northern Arm	57019	-	-	-	-	-	-	-	-	-	5	3	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Burlington	57020	-	-	-	-	-	-	-	-	4	6	1	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
St. Paul's	57021	22	26	-	-	-	-	-	1	20	6	4	-	-	-	-	-	-	2	0	1	0	-	2	-	-	-	-	-	-	-	-	0	0	0	0
Roddickton	57022	-	26	-	-	-	-	6	-	5	8	4	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	
Port Saunders	57023	18	11	-	-	-	-	10	11	9	8	2	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	
St. Anthony	57024	-	23	-	-	-	-	9	8	14	14	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	0	-	-	-	2	
Big Brook	57025	-	11	-	-	-	-	-	-	-	-	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Woody point	57121	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	0	-	0	-	-	-	-	-	0	0	0	0	
Flowers Cove	57125	-	-	-	-	-	-	21	-	10	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Clode Sound	57919	-	-	-	-	-	-	-	-	-	-	-	1	0	2	0	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Trout River	57921	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Table 5. Counts of Gray-cheeked Thrush detected during Breeding Bird Surveys conducted in Labrador (data obtained from <http://www.pwrc.usgs.gov/bbs/>; see also Downes and Collins (2003)). Data not included in the original 2005 Gray-cheeked Thrush provincial status assessment are highlighted with grey shading.

Route Name	Route	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Happy Valley	57036	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	3	7	0	0	-	0	0	0	0	-	0
Ossok	57037	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	5	0	3	-	1	-	1	7	10	6	10	7
White Hills Rd	57038	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	
Orma Road	57039	10	0	-	26	11	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0	-	7	-	3	18	27	12	17	18
Churchill Falls	57040	6	7	7	11	7	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	1	0
Labrador City	57041	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0

Recent Search Effort (areas searched within the last 25 years with estimate of effort)

This province has been searched by ornithologists and birders for almost two centuries (for a comprehensive account see: Montevecchi and Tuck, 1987), and interest in birds remains high. Scientific research projects, the efforts of birding groups across the Island, Christmas bird counts, breeding bird surveys, the nf.birds Internet discussion group, birders hotlines, and other sources of up-to-date information demonstrate the degree of interest that birds continue to inspire in the Province. Particular research efforts on Gray-cheeked Thrush, in the Province, have been carried out by Marshall (2001) and Whitaker (2009)

Potential Sites Unexplored

While, understandably, many areas within the interiors of both Newfoundland and Labrador have been less well surveyed than more coastal areas, Figure 2 provides good indication that representative areas throughout the Province have been well covered.

Appendix B. Supplementary Details

Systematic/Taxonomic Clarifications

Previously the Newfoundland Gray-cheeked Thrush (*C. m. minimus*) was known as *Turdus minimus* (Lafresnaye 1848) based on a type specimen collected during winter in Bogota, Colombia, while the Northern Gray-cheeked Thrush (*C. m. aliciae*) was variously known over time as *Turdus aliciae*, *Hylochicla aliciae*, and *Hylochicla minima* (Baird 1858) based on a type specimen collected during spring migration in Illinois. Wallace (1939) considered these two type specimens to represent the same species, which he referred to as *Hylocichla minima* (Lafresnaye 1848), later changed to *Catharus minimus* based on the recognition that there is no difference in generic stature between the spotted northern thrushes and their Neotropical relatives in the genus *Catharus*.

Marshall (2001) followed Wallace (1939) in considering “*minimus*” and “*alicae*” to be simply races or clinal extremes within the same subspecies, *C. m. minimus*.

These authors recognized similar birds, now known to breed in New England, southern Quebec, New Brunswick, and Cape Breton Island, as a second subspecies *C. m. bicknelli* (Bicknell’s Thrush). Bicknell’s Thrush is now recognized as a distinct species (*C. bicknelli*; Ouellet 1993, AOU 1998, Rimmer *et al.* 2001).

Bicknell’s Thrush and Gray-cheeked Thrush are allopatric (ranges do not overlap), with Bicknell’s Thrush (*C. bicknelli*) breeding in the Maritime Provinces, southern Québec, and New England and utilizing a separate and restricted wintering range in the Caribbean. Gray-cheeked Thrushes are distinguishable from Bicknell’s Thrushes by song and morphometrics and by subtleties of plumage and bare parts colouration (Ouellet 1993, Marshall 2001, Frey *et al.* 2008).

Recent genetic analyses support a Pleistocene divergence between Bicknell’s Thrush and the Gray-cheeked Thrush/Veery (*C. fuscescens*) complex (Outlaw *et al.* 2003, McEachen *et al.* 2004). Johnson and Cicero (2004) place the date of this divergence at about 900 000 years ago.

Note that Todd’s (1963) “St. Lawrence Thrush” apparently represents an erroneous confounding of Newfoundland Gray-cheeked Thrush and Bicknell’s Thrush (Ouellet 1993, Marshall 2001). Also, Godfrey (1966, 1986) incorrectly indicated that the range of Newfoundland Gray-cheeked Thrush included the Gaspé Peninsula; that population is considered Bicknell’s Thrush (Ouellet 1993, Wallace 2001).

Description

Peters and Burleigh (1951) reported two colour phases of Gray-cheeked Thrush, one having greyer upperparts and the other having browner upperparts, were intermixed in approximately equal proportions on the island of Newfoundland. A similar dichotomy has been observed during contemporary bird banding activities, with greyer birds apparently being more prevalent in eastern Newfoundland (P. Thomas, Canadian Wildlife Service, personal communication). This is reminiscent of the contrast between *C. m. aliciae* [= greyer] and *C. m. minimus* [= browner].

Coupled with this plumage variation is variation in bare part colouration; individuals breeding in eastern Newfoundland apparently have a flesh-coloured to dull yellow base to the lower mandible and a noticeably yellow tone to the soles of their feet (Figure 6), reminiscent of the Northern subspecies of Gray-cheeked Thrush. In contrast Gray-cheeked Thrushes in western Newfoundland have a brighter yellow to yellow-orange base to the lower mandible and flesh coloured soles to their feet (P. Thomas, Canadian Wildlife Service, personal communication). Both of these traits as well as the browner plumage reported for western Newfoundland birds are reminiscent of Bicknell's Thrush (Ouellet 1993, Rimmer *et al.* 2001).

Marshall (2001) speculated that there may have been some genetic intergradation between Gray-cheeked and Bicknell's Thrushes along the North Shore of Quebec, as the wing chords of Gray-cheeked Thrush collected there are intermediate between the typical values for these two species. The reported pattern of variation in plumage and bare parts colouration on the island of Newfoundland is suggestive that if intergradation with Bicknell's Thrush has occurred then it may extend to western Newfoundland. Though this inference is speculative, it is clear that elucidating patterns of variation in Gray-cheeked Thrush in Newfoundland and southern Labrador warrants further careful investigation. This is particularly important in the context of confirming the validity of the current subspecies distinction between Newfoundland and Northern Gray-cheeked Thrush. A comprehensive genetic study of the Gray-cheeked Thrush complex is also clearly warranted.



Figure 6. Variation in bare part coloration between individual Gray-cheeked Thrushes. Note in particular the colour of the soles of the feet and the tone and extent of the coloured base of the lower mandible.

Distribution

As mentioned in the main text, Gray-cheeked Thrushes winter primarily in South America east of the Andes in northwestern Brazil, Colombia, eastern Ecuador, eastern Peru, Venezuela, Guyana, and Suriname (Figure 1; Lowther *et al.* 2001).

In preparing this revised status assessment, requests for contemporary information on the status, trends, and distribution of wintering Gray-cheeked Thrushes were sent to electronic member distribution lists of both the Neotropical Ornithological Society and the Neotropical Bird Club. None of the respondents were able to provide information on population status or trends from wintering sites and, although specifically requested, no reports yielded any insight into the winter distributions of the two recognized subspecies. However, contemporary occurrence records have been reported for the Pongos Basin, Amazonas Department, Peru (Brooks *et al.* 2009); Sipaliwini and Brokopondo Districts, Suriname (Ottema *et al.* 2009); and various unspecified locations in Venezuela (9

observations since 2005; J. Kvarnäck, personal communication). Also T. Donegan (Fundacion ProAves, personal communication) reported that Gray-cheeked Thrush were regular in Colombia in bird conservation reserves located near Cerro de la Paz, Santander Department, and Serrania de San Lucas, Bolivar Department. He also noted that this region had borne the brunt of severe deforestation since the 1970s. This information is compelling given that these locations are bounded by sites where putative Newfoundland Gray-cheeked Thrushes have been collected [Santa Marta and Bogota, Colombia (Todd 1963, Marshall 2001)].

Habitat

Throughout western Newfoundland Gray-cheeked Thrushes regularly occur in old-growth balsam fir forests having numerous canopy gaps, but they have not been found in second growth closed-canopy forests (Thompson *et. al.* 1999, Marshall 2001). Broadcasts of Gray-cheeked Thrush song and calls were used during 1,613 point surveys to conduct a systematic assessment of Gray-cheeked Thrush distribution throughout a 200 km² study area in the upper Main River watershed in Western Newfoundland in 2006 and 2007 (Whitaker 2009).

Occurrence of Gray-cheeked Thrushes was positively associated with the amount of 0-12.5 m-tall scrub forest in the local neighborhood of a survey point (i.e. within 115 m or ~4.2 ha) and also with the amount of low scrub (i.e. scrub <6.5 m-tall) in the broader landscape (i.e. within 1,250 m or ~490 ha of a survey point). There was a curvilinear (humped) relationship with the amount of old-growth forest in the landscape, where Gray-cheeked Thrushes were most likely to occur in landscapes having ~20% cover of old-growth forest within 1,250 m. Second growth forest was virtually absent from this landscape so its relative value as habitat could not be assessed. Occurrence of Gray-cheeked Thrushes was negatively related to the amount of 6-7 year-old clear cut within 1,250 m, but in contrast occurrence was highest when clearcuts made up ~50% of the habitat within 115 m. This suggests that the species uses clearcuts locally but is intolerant of landscapes dominated by this cover. Note however that they also appeared to avoid landscapes dominated by forest cover so this does not necessarily indicate that clearcutting of forests reduced the amount of habitat available. Finally, there also appeared to be a strong positive association with the amount of modified harvesting (i.e. selective cut or patch cut) within 115 m, though this habitat was highly localised in the study area so this observation must be viewed with caution. Taken together these observations suggest that in upper Main River watershed Gray-cheeked Thrushes were sensitive to both local and landscape-scale habitat factors and were strongly associated with conifer scrub. However they selected landscapes where the remaining cover comprised a mix of forested and open habitats that had a dense cover of shrubs and saplings within a few meters of the ground (Whitaker 2009).