# Recovery Strategy for Bicknell's Thrush (*Catharus bicknelli*) in New Brunswick

## Draft

Department of Natural Resources and Energy Development

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# PREFACE

Under the provincial *Species at Risk Act*, the Minister is required to conduct a recovery feasibility assessment for Extirpated, Endangered and Threatened species and, if recovery of the species is deemed to be feasible, prepare a recovery strategy. Recovery strategies are defined in the Act as advice to the Minister, landowners, and others.

Recovery strategies are one piece in a series of five documents that are prepared for the assessment, recovery, and protection of Extirpated, Endangered and Threatened species. Of particular importance in this series is the species status report, a background document that provides foundational material on the species abundance and distribution, ecology, habitat and population trends, and threats. Recovery strategies often incorporate this information in a condensed format, referring the reader to the status report for more details.

In the preparation of a recovery strategy the Minister may adopt, in whole or in part, a document prepared by another party with any modifications considered necessary to meet requirements under the Act. This clause favours collaboration with federal partners, a sharing of expertise, and efficiency of time and resources.

This recovery document describes priority threats and conservation measures for Bicknell's Thrush that are specific to New Brunswick. It was informed by work of DNRED's Species at Risk-Forest Sector Project funded through the Canada Nature Fund. It also incorporates several aspects of the 2020 national recovery strategy.[1]

### Bicknell's Thrush recovery feasibility assessment for New Brunswick

A Bicknell's thrush Recovery Feasibility Assessment was completed in spring 2022. The recovery of Bicknell's Thrush in New Brunswick was found to be feasible, though there is uncertainty regarding the threat of habitat loss on the wintering grounds and the impact of a warming climate on its breeding habitat in the province over the longer term. Recovery in this context will be defined as the persistence of the species at a viable population level in the cooler, high elevation forests of the northcentral and northwestern region of the province. It is still possible that the species may occur in coastal areas, particularly along the Bay of Fundy, but the potential to recover this aspect of its natural ecological distribution is limited.

Cover photo credit: Hubert Askanas

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Également disponible en français, au site web, sous le titre «Programme de rétablissement de la Grive de Bicknell (*Catharus bicknelli*) au Nouveau-Brunswick.» MRNDE. Fredericton (N-B). 11pp.

## Executive Summary

Bicknell's Thrush (*Catharus bicknelli*) is listed as Threatened under both the New Brunswick and Canadian Species at Risk Acts. Several factors may be contributing to declines in this species, with impacts occurring on its breeding or wintering grounds or during migration. In New Brunswick, maintaining sufficient habitat is key to its conservation. Bicknell's Thrush relies on dense, young or stunted conifer forest, mostly of Balsam Fir, in cool and moist conditions. This habitat occurs naturally and in the form of regenerating conifer stands dominated by Balsam Fir at high elevations and in Bay of Fundy coastal margins.

In 2020, Environment and Climate Change Canada released a national recovery strategy for Bicknell's Thrush. The purpose of this New Brunswick recovery strategy is to provide New Brunswick specific recovery information and to communicate provincial goals and recovery actions. This strategy applies to all lands in New Brunswick excepting federal lands.

New Brunswick's recovery goal is to stabilize the current population and, through forest management, ensure an increasing supply of high-quality habitat over time to facilitate a long-term increase of the population.

Survival and Recovery habitat have been identified and measures are recommended to immediately reduce incidental take of adults, eggs and chicks as well as maintain habitat supply. Provincial Crown lands will be the focus of habitat supply goals and provision of habitat. A model of Bicknell's Thrush habitat will be incorporated into forest management planning and a strategy to increase supply of high-quality habitat will be developed.

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# Species information

## Species status in New Brunswick

Threatened (2013)

## Species description

Bicknell's Thrush is a small, forest dependent species that is among North America's most rare songbirds. It has a small, fragmented breeding distribution in eastern North America that includes portions of New Brunswick. During the breeding season it is adapted to naturally disturbed habitats, regenerating forest caused by fir waves, wind and ice/snowstorms and root rot in montane and maritime landscapes. Since the 1980's, it has been found to utilize areas disturbed by timber harvesting. This species is usually detected by its song and is not easily spotted in the dense forests where it nests.

## Species Population and Distribution

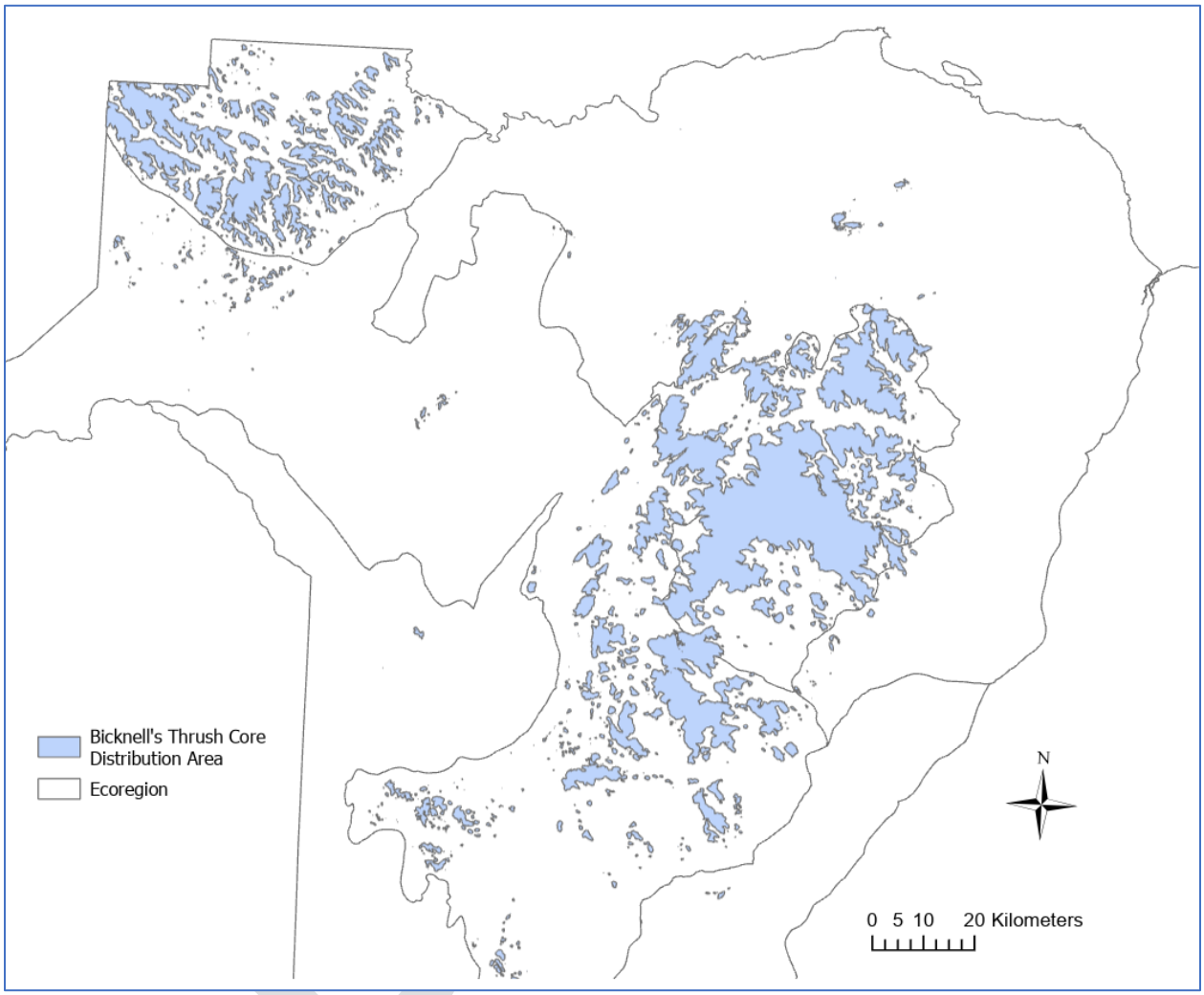
The Canadian population was estimated at 40,500-49,200 by COSEWIC (2009).[2]

Estimating the size of the provincial population is difficult as the species is hard to detect and may occur in a clustered distribution. Campbell and Stewart (2012) [3] estimated 2,851 individuals with a large confidence range (1,137-10,652) and noted an annual population decline of 11% using the same data. DNRED's Species at Risk-Forest Sector Project (2022) utilized up-to-date habitat models, forest inventories, recent female home range estimates from New Brunswick and occupancy estimates from Quebec, to produce a population estimate of approximately 1,100 individuals. This population estimate is consistent with past estimates and expected declines.

Continued refinement of habitat models and determination of local territory size and rates of occupancy are required for more accurate population estimates for New Brunswick.

The distribution of Bicknell's thrush includes high elevation areas in the northwestern and north central parts of New Brunswick as well as a narrow band along the bay of Fundy coastline. The continued occurrence of BITH in the coastal Fundy area is uncertain with very few recent observations occurring there. The core range in New Brunswick is the northern highlands areas, those areas above 460m elevation, where the species is still regularly detected. This includes about 267,500 ha (3.3 % of the province). The core area is highly fragmented due to the distribution of suitable elevations in the region (Figure 1). The Crown lands in this core area (about 85% of the core area) are the focus of recovery efforts in New Brunswick.

Figure 1. Bicknell's Thrush core distribution area (light blue) in New Brunswick. Ecoregion boundaries are shown in light grey.




## Habitat

Bicknell's Thrush is a habitat specialist that utilizes a relatively small range of bio-physical conditions.

Suitable habitat for Bicknell's Thrush is characterized as young or stunted conifer stands with high stem density, a significant Balsam Fir element, and occurring in regions of relatively cool climates. In New Brunswick this habitat can be found in high-elevation montane forest, mid- and high- elevation managed forests and coastal lowland forests. In the high montane and coastal settings habitat can occur in the form of the stunted thickets known as *krummholtz*.

In New Brunswick, the largest area of suitable habitat for Bicknell's Thrush is found in the cool climes of mid to high elevation coniferous forests. Habitat suitability in this setting is related in large part to regenerating forests following wood harvesting, but other important forms of disturbance include high winds, severe ice conditions, fire, and insect outbreaks. High quality habitat, at the territory scale, occurs when balsam fir stem densities are greater than 10,000 stems per hectare. Mapping of Bicknell's Thrush occurrences recorded to date [4,5] suggest that the species finds suitable conditions at elevations of 460m or more.

Bicknell's Thrush is also known from coastal areas along the Bay of Fundy, though breeding activity in this habitat over time has been described as "sporadic." [6]

Except perhaps in the rare form of stunted thickets known as *krummholtz*, the predominant habitat condition (regenerating Balsam Fir Forest) in New Brunswick uplands is naturally transitory on the landscape, resulting from various forms of natural disturbance such as fire, wind, and insect damage, as well as disturbance caused by timber harvesting under certain conditions. These regenerating areas mature over time resulting in much lower stem densities and less live canopy near the ground. The ephemeral nature of Bicknell's Thrush habitat quality provides a challenge to both monitoring and habitat conservation planning.

Figure 2. Typical Bicknell's Thrush habitat in New Brunswick showing dense, young balsam fir forest at high elevation. Photo credit: Hubert Askanas.

## Threats

The national recovery strategy includes a comprehensive list of threats, including those occurring on the wintering grounds or that would be assessed as having a low impact in the New Brunswick context. Four threats from this list were assessed at the provincial scale, using the IUCN- CMP* threat classification from Salafsky *et al*.[7] The threats were renewable energy,

utility and service corridors, logging and wood harvesting, and habitat shifting and alteration driven by climate change. Results are presented in Table 1. Any deviations from the national recovery strategy can be explained by our focus on the species' breeding distribution in the New Brunswick context only.

Wind farm development is a present and increasing threat in New Brunswick as we look to greener energy sources in the face of climate change. Exploration leases for suitable wind farm sites on Crown Land covers hundreds of thousands of hectares in the province. Threats associated with wind farms include permanent development of land, displacement of nesting sites, disturbance of individuals, and disruption of flight paths. Threats are similar for construction of telecommunication towers.

In the case of climate change, potential impacts are expected on the habitat and breeding success of Bicknell's Thrush, but there are several unknowns around the shape and timing of the impacts, as suggested in the national recovery strategy.

The conservation measures proposed for Bicknell's Thrush in New Brunswick are primarily in response to managing forest management activities and land development within the northern highlands areas where breeding occurs. The impacts of specific forestry operations are described in the following section.



*(IUCN-CMP refers to the International Union for the Conservation of Nature – Conservation Measures Partnership)

**Table 1.** Threats identified in the New Brunswick context, described using the IUCN-CMP threat classification.

| **Threat name and IUCN-CMP classification,** Level 1 with applicable level 2 threat. | **Scope** = % of population affected by the threat **Severity** = % of population harmed by the threat **Timing** = immediacy | **Impact on the population** (very high, high, medium, low) | **Potential impact on habitat or the species** |
|---|---|---|---|
| 3. Energy production and mining<br><br>3.3 Renewable energy | Scope = Large (36%)<br>Severity = Extreme (71-100%)<br>Timing = High - Moderate | High | This threat category includes wind farms, currently in place or projected to be in place over the next 10 years. Risk of collision - loss of individuals. Risk of Immediate effect by removing habitat/nests if installed during breeding season. Potential for long-term effect if sites are maintained through clearing around turbines/road building, etc., and through avoidance behaviour. |
| 4. Transportation and service corridors<br><br>4.1 Utility and service corridors | Scope = Negligible (<1%)<br><br>Severity = Extreme (71-100%)<br><br>Timing = High | Low | This threat category encompasses communication towers and the associated roads and clearings. Risk of collision and loss of individuals. Immediate effect by removing habitat/nests if installed during breeding season. Potential for long-term effect if sites are maintained through clearing around infrastructure. |
| 5. Biological resource use<br><br>5.3 Logging and wood harvesting | Scope = Large (31- 70% of population).<br><br>Severity = Extreme - Serious (31- 70%).<br><br>Timing = High - Continuing | High | Impact of precommercial thinning removes suitable habitat for a period of 3 to 10 years. Risk of loss of individuals and nests if it occurs during the breeding season. Suite of potential impacts of other forestry activities described below. |
| 11. Climate change and severe weather<br><br>11.1 Habitat shifting and alteration | Scope and Severity = Unknown | Impact scored as *Outside the assessment timeframe of ten years.* | Likely to significantly influence the growth and development of high elevation forest in the long term. |

### Effect of forestry operations on Bicknell's Thrush habitat.

#### *Stand level activities and impacts*

*Pre-commercial thinning (PCT)* is applied in regenerating conifer forest at a stand development stage that is characterized by a high stem density and thus highly suitable for Bicknell's Thrush. The goal of the activity is to reduce the number of trees to approximately 2,000 stems per hectare. In addition to lowering the suitability of the habitat for Bicknell's Thrush, it directly affects adults, eggs, and young if conducted during the breeding season. Existing research indicates strong initial negative effects on occupancy, with the potential for individuals to delay returning to sites that have been thinned for 3-10 years post thinning [8,9].

*Plantations* replace potentially suitable habitat by altering the structure and composition of the stand. Associated negative activities include planting of tree species less favourable to Bicknell's Thrush and applying treatments to reduce the Balsam Fir component and maintain a tree density (around 2,000 trees per hectare or below) considerably lower than preferred by Bicknell's Thrush.

*Forest roads* may have an immediate disruptive impact in the form of fragmenting or removing habitat, but the dense conifer regeneration that occurs roadside, and the narrowing alleys that follow the abandonment of roads, appear to favour the foraging activity of Bicknell's Thrush. The rate of creation of new forest roads in the province is expected to decline, adding to the complexity of assessing the overall impact on the population of Bicknell's Thrush.

*Clearcutting and salvage harvesting*. In general, clearcutting and salvage harvesting are not applied in the young, Balsam Fir dominated stands with high stem density favoured by Bicknell's Thrush (stands less than 30 years old). However, the regeneration that follows would potentially become suitable habitat for Bicknell's Thrush, as it could function similar to the natural processes that lead to creation of suitable habitat. While clearcutting may be followed by an increase in the proportion of hardwood in stands, most known Bicknell's occurrences are in areas that have a history of clearcutting and salvage harvesting indicating that suitable habitat is being created following these practices within this region of New Brunswick.

*Activities outside the breeding season.* Harvesting or treating previously occupied sites outside the breeding season could have a substantial indirect effect of disconnecting social cues from habitat quality, potentially resulting in habitat sinks.

#### *Landscape level impacts*

There are impacts on habitat suitability that operate at scales larger than a single territory, notably at the scale of social patches and across landscapes, both of which influence the potential of habitat to support populations. In a relevant study, Frey *et al*. [10] describe an interaction between local and landscape scale factors in predicting site occupancy for Bicknell's Thrush, using patch size and patch isolation to move beyond the local scale.

## Recovery Goals and Actions

### Population and Distribution Objective

The short- term population and distribution objective for Bicknell's Thrush in New Brunswick is:

> *to provide suitable habitat, in area and configuration, sufficient to support the current population* in the species *core range of northcentral and northwestern New Brunswick, in the ecodistricts and elevations where the species is known to occur on New Brunswick's Crown lands.*

The long-term objective is:

> *to provide suitable habitat, with increased percentage in high quality conditions, sufficient to support an increase in population, in the ecodistricts and elevations included under the short- term objective.*

The importance of establishing conservation objectives at the landscape scale is recognized in the national recovery strategy. This aligns well with the existing provincial approach of identifying suitable habitat for a suite of species across Crown lands over time.

### Survival and Recovery Habitat

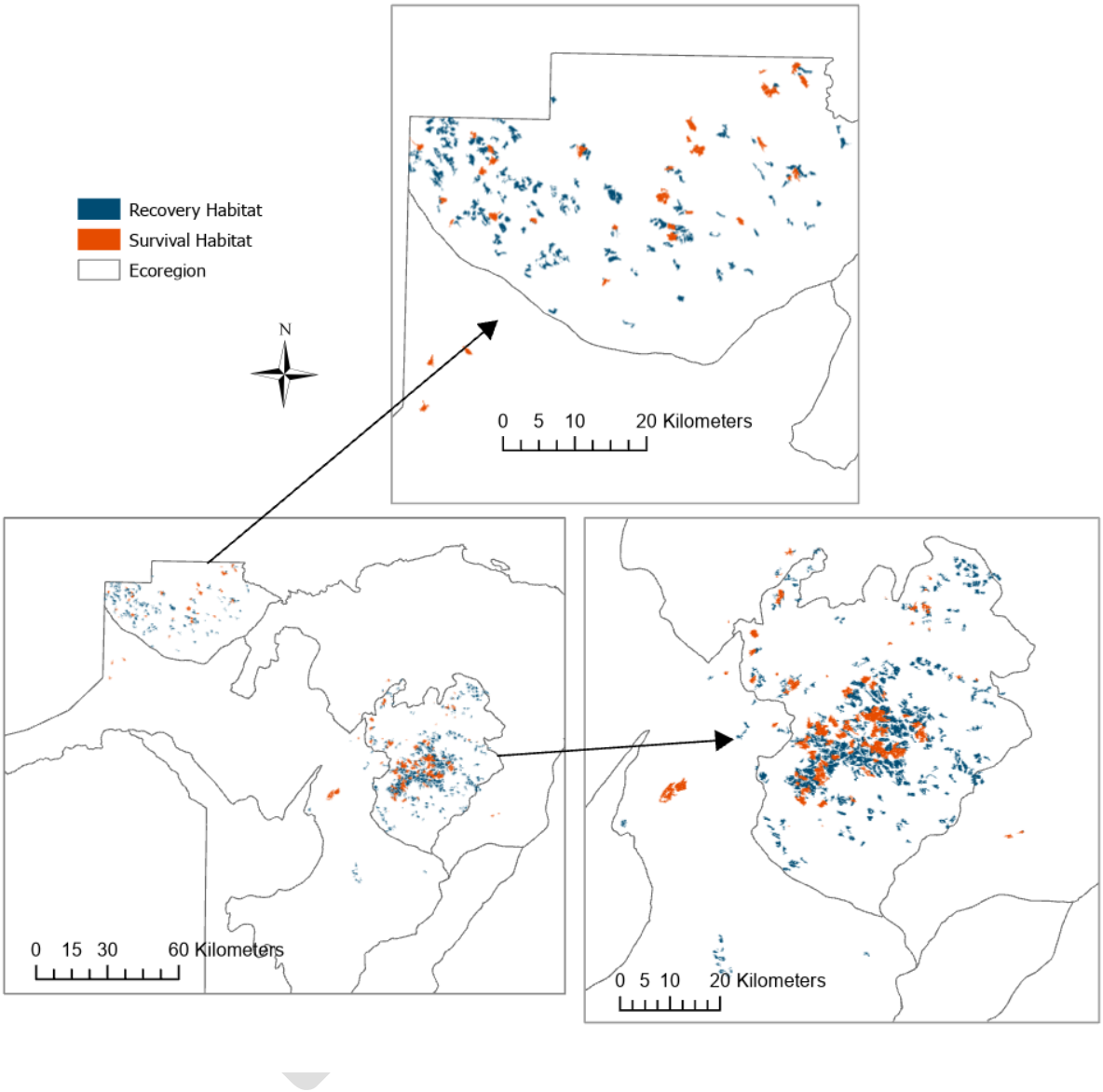
Under the New Brunswick *Species at Risk Act survival habitat* and *recovery habitat* may be identified in support of population and distribution objectives. *Survival habitat* is habitat that is *currently or regularly occupied* by individuals of the species. *Recovery habitat* is defined as *habitat that is necessary for the recovery of a wildlife species, but that is not* (known to be) *currently or regularly occupied by an individual of that species*.

Survival and Recovery habitat have been identified for Bicknell's Thrush. Forest stands within 100m of where the species has been detected during the nesting season within the last 15 years are considered Survival habitat. Areas modelled by DNRED's Species at Risk-Forest Sector Project biologists as suitable habitat but without evidence of recent use are identified as Recovery habitat.

Currently there are about 15,300 ha of Survival habitat and 29,200 ha of Recovery habitat (see Figure 2) in New Brunswick. About 98% of Survival and Recovery habitat is on provincial Crown lands managed for timber and non-timber values.

For long-term planning and development of a habitat supply strategy, DNRED's habitat model will be the basis for defining habitat amounts that will by default be Recovery habitat. The habitat model was developed using Bicknell's Thrush location data, elevation data, and forest inventory data related to tree species composition, tree height, stem density and stand age. For long term planning, the habitat model will be incorporated into the forest development model used for Crown lands (Woodstock Forest Planning software (Remsoft)) [11]. The forest development model will be used to investigate the potential supply of habitat under a variety of forest management scenarios. Modelled supplies will inform decisions related to establishing specific habitat objectives. This approach will result in landscape-scale conservation objectives as suggested in the national recovery strategy.

Figure 2. Bicknell's Thrush Survival (orange; 15,300 ha) and Recovery (blue; 29,200 ha) habitat in New Brunswick.




## Broad Strategies and Conservation Measures

### Actions already completed or underway

There has been considerable work on Bicknell's Thrush in New Brunswick since the early 1990's by a variety of researchers, non-governmental organizations, and government agencies across jurisdictions.

Of note are the long-term efforts of the Canadian Wildlife Service, the University of New Brunswick, and Birds Canada to increase understanding of the breeding biology, population status, and potential impacts of land use practices on this species.

Current efforts related to population monitoring, habitat model validation, and avoidance of incidental take of eggs and chicks continue with programs implemented by Birds Canada with the support of several industrial partners.

## Priority Conservation Measures

The following measures have been identified as priority actions by NBDNRED for the conservation of Bicknell's Thrush in New Brunswick. Some tasks will be accomplished in collaboration with partners. Actions are described below and the timeframe for implementation is indicated.

### Recommended Actions

#### Short-term population and distribution objective – support current population (survival habitat)

- Forest management activities on Crown lands will not be permitted in Survival Habitat for the next 5 years (April 2028). This measure will reduce/limit the potential for incidental take of adults, eggs, or chicks and reduction in habitat quality or supply. (immediately)
- Ensure that survival habitat is verified and avoided for future land development applications reviewed under the land use planning, the provincial Environmental Impact Assessment process, and Mineral exploration work authorization until April 2028. (ongoing)
- Pursue habitat protections under the Species At Risk Act for Survival Habitat with the intent of reviewing the survival habitat mapping every 5 years.

#### Long term population and distribution objective – provide habitat to support an increasing population (recovery habitat)

- Incorporate DNRED's Bicknell's Thrush recovery habitat model into the Crown forest management planning process and establish long-term habitat supply goals and associated forest management activities.
    - Produce a Bicknell's Thrush habitat management plan. (October 2024)
- Review and adaptively improve DNRED's recovery habitat model on the same 5 year timeframe as Survival Habitat with particular attention to that stage of stand development when use by Bicknell's Thrush is expected to decline. Ground-truthing is currently ongoing through a partnership with Birds Canada. (on-going)

#### Ongoing Research Questions

- Identify factors that affect the rate of habitat occupancy by Bicknell's Thrush (*i.e.,* patch size, habitat quality, regional habitat levels, *etc*.). Operationalize these factors to improve

modelling and, by extension, to refine the habitat supply required to meet population objectives.

- Establish the relationship between habitat supply and population levels. Identify the extent that habitat factors (configuration, amount, quality) influence how habitat supports populations.

- Explore the adaptability of the habitat model, or of other available tools, to identify habitat in coastal and high elevation settings.

- Evaluate the character and importance of habitats used outside the breeding season in New Brunswick (post breeding period).

- Evaluate the expected impact of climate change on stand and forest dynamics on future habitat supplies.

## Measuring results

Key markers of success in the implementation of this strategy are as follows:

- Stabilization of Bicknell's Thrush population index as indicated by analysis of data from the High Elevation Land Birds Monitoring program (Birds Canada).

- Verification of the recovery habitat model through ground truthing of habitat attributes and occupancy by Bicknell's Thrush.

- Improvement or verification of the estimates of rate of occupancy.

- Improvement in the precision of population estimates of Bicknell's Thrush.

- Generation of a habitat management plan that assures habitat supply goals are met and incidental take is minimized.

- Auditing of the amount of area in Survival and Recovery Habitat affected by disturbance.

## References

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