13

CONSERVATION STATUS AND MONITORING OF BICKNELL'S THRUSH IN THE ADIRONDACKS AND NEW ENGLAND:

A Brief Review

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ABSTRACT

Bicknell's thrush is among the most rare and probably most threatened species in North America and is considered the Nearctic-Neotropical migrant of highest conservation priority in the Northeast. The species breeds in high elevation spruce-fir forests in the northeastern US and Canada and is adapted to naturally disturbed habitats impacted by montane processes such as wind throw and fir waves. The U.S. Fish and Wildlife Service has recently issued a finding that the Bicknell's thrush may warrant listing as threatened or endangered under the Endangered Species Act. The challenges facing Bicknell's thrush are many, and New York State has a significant role to play in helping to safeguard the future of the species in the region. We provide a brief summary of regional monitoring and research efforts, what has been learned from them, and suggestions that may enhance the conservation of the species here and elsewhere.

KEYWORDS:

Adirondack Park, Bicknell's thrush, climate change, montane

INTRODUCTION

Bicknell's thrush (*Catharus bicknelli*) is a species of great interest in the northeastern United States, both for birders and scientists alike. It breeds in high elevation conifer forests, primarily above 900 m, on mountaintops from the Catskills in New York State, through Maine, and into southern Canada. It is among the most rare and probably most threatened species in North America, and is considered the Nearctic-Neotropical migrant of highest conservation priority in the Northeast (Rimmer et al. 2015). In August of 2012, the U.S. Fish and Wildlife Service issued a finding that the Bicknell's thrush may warrant listing as threatened or endangered under the Endangered Species Act of 1973; the proposal remains under review.

Bicknell's thrush habitat in the U.S. consists of montane forests dominated by balsam fir (*Abies balsamea*), with lesser amounts of red (*Picea rubens*) and black spruce (*Picea mariana*), white birch (*Betula papyrifera*), mountain ash (*Sorbus americana*), and other hardwood species (Rimmer 2008). It is adapted to naturally disturbed habitats and historically probably sought out patches of regenerating forest caused by fir waves, wind throw, ice and snow damage, fire, and insect outbreaks, as well as the chronically disturbed stunted conifer forests found at high elevations in the northeast. Highest densities of the species are often found in continually disturbed (high winds, heavy winter ice accumulation) stands of dense, stunted fir on exposed ridgelines or along edges of human-created openings, or in regenerating fir waves (Rimmer et al. 2015). A significant proportion of the global population is believed to breed in the U.S., with large areas of its montane breeding habitat found in NH, ME, NY, and VT (Lambert et al. 2005).

Bicknell's thrush wintering habitat is even more restricted than its breeding habitat and limited to only four islands in the Greater Antilles—Hispaniola, Cuba, Jamaica, and Puerto Rico. On its wintering grounds, Bicknell's thrush prefers mesic to wet broadleaf montane forest. Large-scale loss and degradation of wintering habitat poses the greatest threat to the long-term viability of this species (Rimmer et al. 2015).

Bicknell's thrush is not well-sampled by traditional bird monitoring methods due to its uncommon polygynandrous mating system and preference for high elevation, dense habitat that can be difficult to access (Rimmer et al. 1996). Both males and females mate with multiple partners, multiple paternity is common, and more than one male often feeds nestlings at a given nest. Estimates of breeding densities for the species are therefore unreliable at best (Rimmer et al. 2015), but Bicknell's thrush is nevertheless widely considered to be vulnerable to extinction and has been listed as such on the Red List of Threatened Species by the World Conservation Union since 2000. As a habitat specialist of high elevation conifer forests, it is susceptible to a number of threats on the breeding grounds, including pollution (e.g., acid rain, mercury), recreational development, cell tower construction, wind power development, and climate change (Rimmer et al. 2015).

The objective of this paper is to describe research and monitoring efforts focused on Bicknell's thrush in the Northeast and what we have learned from them. The majority of the research on Bicknell's thrush in the Adirondack Park has been conducted by the Wildlife Conservation Society (WCS) on Whiteface Mountain. Research in the rest of the region has been driven primarily by the efforts of the Vermont Center for Ecostudies (VCE), which is also responsible for much of what is known about the ecology of Bicknell's thrush on its wintering grounds (e.g., Atwood et al. 1996, Goetz et al. 2003, Strong et al. 2004, McFarland et al. 2013).

ADIRONDACK WORK

The WCS Adirondack Program has been involved with research on Bicknell's thrush on Whiteface Mountain (hereafter "Whiteface") since 2004. Whiteface is located in the High Peaks region of the Adirondacks and contains approximately 1,020 acres of suitable Bicknell's thrush breeding habitat (WCS, unpublished data). The mountain is characterized by spruce-fir forest at high elevations which then transitions into a mix of softwood and hardwood species, including paper birch and red maple (*Acer rubrum*) at lower elevations. It is a major destination for skiers in the northeast during the winter but in the summer months also hosts large numbers of visitors, who take advantage of the activities offered on the mountain, which include a scenic gondola, downhill mountain biking, 4x4 alpine expeditions, yoga, disk golf, nature trekking, and an adventure park. Because the mountain is accessible via the Veteran's Memorial Highway, Whiteface also hosts bike races, an uphill footrace, and untold numbers of birders every summer season in search of easy access to famously inhospitable Bicknell's thrush habitat. Several major changes have been made to the natural habitat and/or infrastructure on the mountain during the last 10 years. WCS has been involved in projects to try to determine the potential impact of these activities on Bicknell's thrush occurrence.

Ski Trail Expansion

The Olympic Regional Development Authority (ORDA), which manages Whiteface Mountain, submitted a proposed amendment to their Unit Management Plan to the Adirondack Park Agency in winter 2003/2004 outlining an expansion of existing ski trails on the mountain. WCS was contracted by ORDA beginning in 2004 to assess pre- and post-construction occurrences of Bicknell's thrush and four other montane species that regularly occur on Whiteface, including blackpoll warbler (*Setophaga striata*), Swainson's thrush (*Catharus ustulatus*), winter wren (*Troglodytes hiemalis*), and white-throated sparrow (*Zonotrichia albicollis*). These are high elevation target species that have been monitored annually since 2000 by the Mountain Birdwatch program of the Vermont Center for Ecostudies (Scarl 2013). WCS took the opportunity of working on the mountain to assess presence/absence of these species on other portions of the ski area as well as in the proposed ski trail expansion area and a nearby control, to determine how these species made use of available habitat on

the mountain, and, in part, to compare their results with findings from similar research that had been conducted on Stratton and Mansfield Mountains in Vermont by Rimmer et al. (2004). Sampling points were established in five different treatment types: (1) existing glades (n=1), (2) proposed glades (n=3), (3) existing trails (n=4), (4) proposed ski trail expansion area (n=5), and (5) control areas (n=14) for a total of 27 sample points. Configuration of habitat on the mountain resulted in small sample sizes within several of the treatment types (i.e., existing glades, proposed glades, existing trails). A standard 10 minute point count method (Ralph et al. 1995) was used, allowing for future calculations of density given adequate numbers, but requiring only that birds are recorded as being within or beyond 50 m of the search point. This point count method enables the determination of presence/absence as well as relative abundance among different site on the mountain.

Timing of trail construction was delayed on the mountain, and WCS continued to partner with ORDA to monitor Bicknell's thrush and other species, totaling four years of pre- and three years of post-construction surveys. Numbers of detections of all species were far below minimal standards required for calculating densities by distance sampling. In lieu of densities, we calculated relative abundances for Bicknell's thrush and the four other montane bird species. We used analysis of variance (ANOVA; Zar 1999) to test whether there were differences in the total number of individual birds, the total number of species, the total number of Mountain Birdwatch species, and the abundance of individual species among the treatment types. Analysis of data from 2006-2010 revealed no statistical difference in occurrence of any of the target species over time or among areas surveyed (Figure 1). Lumping of surveyed areas into those with and without a trail of any type similarly revealed no difference in the occurrence of target species in areas with and without trails except white-throated sparrow, which had higher occurrence in trail areas. In direct comparisons of pre- and post-construction abundance of target species, only winter wren and white-throated sparrow responded significantly, exhibiting higher relative abundance post-construction in the newly constructed trail area. Bicknell's thrush was the only species for which abundance declined in the new trail post-construction, but these declines were not statistically significant (Figure 2).

Helicopter Training

In addition to its role as a major recreational destination in both summer and winter, Whiteface is an attractive location for training soldiers from nearby Fort Drum in high elevation helicopter landings. WCS was contracted by the U.S. Department of the Army to assess the occurrence of Bicknell's thrush and other migratory bird species on Whiteface, specifically in the vicinity of the area used for the purpose of high-altitude helicopter flight training by the 10th Mountain Division Combat Aviation Brigade (CAB) through a maneuver license agreement with the State of New York, acting by and through ORDA. The monitoring of these species is a Class 1 National Environmental Policy Act compliance

mitigation action. WCS was asked to determine, at a minimum, the presence or absence of resident and migratory species, especially Bicknell's thrush, at a number of locations on the mountain, including the summit, the two summit parking lots, the Wilmington Turn, and the Lake Placid Turn on the memorial highway.

During the summers of 2011, 2013, and 2014, WCS conducted point count surveys to detect migratory species at a total of 15 locations along a linear transect beginning at the summit of the mountain and following the roadway downward to an elevation outside of which helicopter landings occurred (3700 ft). Monitoring points were sampled using the same standard point count methods described above (Ralph et al. 1995) to specifically monitor the presence of Bicknell's thrush and the four other aforementioned high elevation indicator species (blackpoll warbler, Swainson's thrush, winter wren, and white-throated sparrow), in addition to any other migratory species present. Each monitoring point was sampled twice during the early June monitoring period, which extends from June 1 to June 20. The mitigation monitoring was conducted by different organizations in 2012 and 2015. WCS, however, sampled the same 15 points for a different project (described below) in 2015.

Numerous authors have recently highlighted the perils of making inferences from uncorrected (raw) count data because few species are likely to be so evident that they will always be detected when present (MacKenzie et al. 2003, MacKenzie et al. 2006). These concerns, along with the increasing availability of tools for addressing them, led us to include an analysis of occupancy probability in our reporting on these and subsequent data collections on Whiteface. Occupancy is defined as species presence, or the proportion of area, patches, or sample units occupied by the species of interest (MacKenzie et al. 2006) and is used for many inferential purposes including questions about habitat selection, population dynamics, distribution, and range (MacKenzie et al. 2005).

Between 2011 and 2015, 110 total detections of Bicknell's thrush were recorded on the mountain. The species was detected at all but one of the sampling locations, although occurrence and calculated occupancy probability declined with elevation (Figure 3). A total of 14 other species have been detected to date in addition to the targets, and the numbers of additional species detected on the mountain has increased slightly over this five year period. These mitigation monitoring efforts did not detect any patterns to suggest a change in occupancy probability of Bicknell's thrush in response to helicopter landings on the mountain. It is important to note, however, that training missions on the mountain occurred outside of the breeding season when there was no potential for direct effects on Bicknell's thrush nest site selection or other behaviors. A study design to detect the impact of helicopters on Bicknell's thrush or any other migratory or resident species would require a more robust and rigorous approach beyond the scope and resources of this mitigation monitoring study.

Road Reconstruction

The Olympic Regional Development Authority undertook reconstruction of the Whiteface Memorial Highway in 2014 and 2015. Concern existed for the potential for disturbances to Bicknell's thrush from the elevated levels of human activity, noise, artificial lighting, and dust/pollutants that would occur during construction. The project entailed full roadbed reconstruction of two miles of the highway, with the rest resurfaced. The full reconstruction zones were anticipated to produce the greatest potential for disturbance to Bicknell's thrush. The New York State Department of Environmental Conservation (NYSDEC) previously requested that WCS provide information on the degree to which Bicknell's thrush habitat overlaps with these reconstruction zones such that any potential mitigation activities could be located in areas of highest potential benefit for the bird (Glennon 2014). The NYSDEC also recognized that, although the scope of potential mitigation opportunities may be limited, the understanding of Bicknell's thrush use of Whiteface Mountain and the roadside habitat specifically, coupled with monitoring during the construction activity, would help determine how these activities may impact the bird. To that end, WCS was contracted by Rifenburg Construction, Inc. to monitor Bicknell's thrush during the summer of 2014 and 2015 and to compare numbers of birds detected during these seasons with detections during previous years when no construction activity occurred on the mountain.

WCS surveyed Bicknell's thrush and other bird species at the 15 points previously used during the high-altitude helicopter training activities discussed above, as well as six additional points lower down the road in order to capture the full elevation range of potential Bicknell's thrush habitat. As per all other work by WCS on the mountain, standard point count methods (Ralph et al. 1995) were used to assess presence/absence and relative abundance of Bicknell's thrush and other high elevation species using counts 10 minutes in duration and divided into three time periods so that data could be compared with bird counts from other sources. At each sample point, birds were recorded by species, time period of detection (i.e., 0-3 minutes, 3-5 minutes, 5-10 minutes), activity (i.e., singing, calling, individual seen), and whether or not they were within 50 m of the observer. During these and other surveys, conditions believed to have the potential to influence detection probability for Bicknell's thrush were recorded, including date, time of survey, ambient air temperature, wind and sky conditions, and any nearby sources of noise interference, such as running water.

Bicknell's thrush and 17 other species were detected during these surveys, including all of the additional montane target species (blackpoll warbler, Swainson's thrush, winter wren, white-throated sparrow). During both 2014 and 2015, white-throated sparrow was detected most often on the mountain. Thirty-five and 23 detections of Bicknell's thrush were recorded in 2014 and 2015, respectively, with the vast majority occurring at the first 15 sampling locations at the upper elevations on the mountain.

Combined Information 2011–2015

Occupancy analysis (MacKenzie et al. 2006) was used to model the occurrence of Bicknell's thrush and other montane species using the five years of data collected during these two monitoring efforts (Glennon 2015). Bicknell's thrush was found to be positively influenced by elevation and, on average over 2011-2015, had a predicted occupancy probability of 0.87, indicating that 87% of sampling points were probably occupied by Bicknell's thrush. Naïve occupancy (uncorrected for detection probability) averaged over 2011-2015, based on the number of points at which Bicknell's thrush was detected out of the total of 15 points, was 0.71. Detection probability was variable over the five years of sampling and influenced by survey conditions, such as time of day (Bicknell's thrush is active at early hours of the day in comparison to many bird species), wind conditions, and observer. The average probability of detection was 0.6, which is high given the conspicuousness of this species. Occupancy analysis for the other four target species yielded slightly higher rates of detection and occupancy than those of Bicknell's thrush. These results indicate that all of these species are likely to occupy most sampling points on the mountain but that Bicknell's thrush is a more difficult species to detect. Calculation of multiyear trends from modeled occupancy data demonstrated a slightly declining trend for Bicknell's thrush and blackpoll warbler, while Swainson's thrush, winter wren, and white-throated sparrow were stable (Figure 4).

No Mountain Birdwatch occupancy trend data for 2011-2014 are available against which to compare this information because the Mountain Birdwatch program instituted a new protocol in 2010 and occupancy analyses of new data have not yet been made public. It is important to note that these are modeled occupancy trends and reflect only a five year time period from only a single location. As such, we caution against using them to draw conclusions about these species in other locations, and apparent trends should not be attributed to any specific causes. Results from both the uncorrected count data and the occupancy analysis provide a baseline which can continue to be used for comparison to future monitoring conducted on Whiteface Mountain. With these cautions in mind, we found no strong evidence to suggest that helicopter training or road reconstruction activities negatively affected usage of the study area by breeding Bicknell's thrushes (Glennon 2015). However, it cannot be determined from these data whether or not helicopter training or road reconstruction activities adversely affected other Bicknell's thrush behaviors or their nesting success.

BICKNELL'S THRUSH IN THE NORTHEAST

Our work on Bicknell's thrush in the Adirondacks has been focused intensely on one single location, primarily because Whiteface is so heavily used and is often subject to modifications in structure or use such that concerns arise over potential impacts to the species. Bicknell's thrush has been studied much more extensively elsewhere in the Northeast and on its wintering grounds by VCE (see Strong et al. 2002, Strong et al. 2004, Lambert et al. 2005, McFarland et al. 2013).

Vermont Field Studies

Rimmer and McFarland (2013) describe their initial entry into the study of Bicknell's thrush as having begun in 1992, when information about the species was practically non-existent and climate change was hardly on the radar, but concern over the impacts of acid rain, atmospheric pollution and recreation on mountaintops in the region warranted field studies to learn about the status and distribution of the species. An early coordination of volunteers from New York to Maine documented the occurrence of Bicknell's thrush on 234 locations in the four-state region, 91% of which were above 900 m in elevation (Atwood et al. 1996).

Bicknell's thrush became recognized as an independent species in 1995 (Monroe et al. 1995) and this, combined with information from these early surveys, catalyzed a period of intense work on two Vermont mountaintops – Mount Mansfield (Stowe Mountain Resort) and Stratton Mountain. Similar but much more extensive than the WCS work on Whiteface, Rimmer et al. (2004) examined the use of these two ski areas by Bicknell's thrush using a variety of field methods to investigate patterns in abundance, nesting ecology, home range sizes, and movements and other behaviors. Rimmer et al. (2004) found few significant differences for various population and reproductive parameters between areas developed for skiing and natural forests on each mountain. Nest predation rates did not differ between ski area and natural forest plots, nor did female brooding behavior, male feeding behavior, adult survivorship, nest success, breeding productivity, or movements of adults (Rimmer et al. 2004).

Mansfield and Stratton have continued to serve as intensive study sites for VCE scientists and their work has resulted in a number of key findings, including the identification of the species' uncommon and complex mating system (Goetz et al. 2003), the keystone importance of balsam fir in controlling Bicknell's thrush demographics indirectly through the effect of cone mast on predator abundance (McFarland 2003), and the risks posed to Bicknell's thrush and other high elevation spruce-fir species from climate change (Lambert et al. 2005).

Work by VCE biologists on Stratton Mountain revealed unexpected levels of mercury accumulation in Bicknell's thrush and other organisms (Rimmer et al. 2005). Mercury was found to increase with trophic position through the food web on Stratton, and these findings were included as part of a landmark partnership to compile mercury data from wildlife across the northeastern United States and Canada (Evers 2005). More recently, Bicknell's thrushes were found to have even higher blood mercury levels during winter on their Caribbean wintering grounds (Townsend et al. 2013). These high levels of mercury that have been observed in Bicknell's thrush have revealed that mercury is not only a potential threat to predatory species in aquatic environments, but also to wildlife species that occupy low trophic positions and live in terrestrial habitats, even in areas without point-source mercury pollution. Threshold effect levels of mercury in Bicknell's thrush and songbirds in general have not been well-established (Seewagen 2010), however, and it remains to be determined what specific adverse effects, if any, mercury pollution is having on the species.

Mountain Birdwatch

In addition to these localized field studies, Bicknell's thrush has been monitored throughout the Northeast since 2000 as part of the Mountain Birdwatch program of VCE. Mountain Birdwatch focuses primarily on Bicknell's thrush, but also tracks other songbirds that breed in the montane fir and spruce forests of the Northeast. These data provide the only region-wide source of population information on these species. Mountain Birdwatch also tracks red squirrels and the conifer seeds that these avian nest predators consume.

Mountain Birdwatch is a citizen science program fueled by the energies of more than 100 volunteers who count birds annually at 722 survey points within 130 mountaintop transects distributed in Maine, New Hampshire, Vermont, and northern New York. It was created in 2000 in order to monitor the abundance of montane birds in the region and to guide stewardship of high elevation forests by understanding the influence of landscape and habitat features on mountain bird distribution and abundance. In 2010, VCE launched a revised and updated Mountain Birdwatch 2.0, which improved upon the original program by (1) establishing a set of 130 routes randomly selected from within all U.S. potential Bicknell's thrush habitat, (2) adopting modern count procedures that allow accurate estimates of avian density and occupancy, (3) establishing unified, measurable monitoring objectives linked to an international Bicknell's thrush conservation action plan, and (4) developing a collaboration with Canada to systematically monitor Bicknell's thrush across its entire breeding range. The change in protocol between the first and second versions of Mountain Birdwatch makes it challenging to conduct a direct analysis of long-term trends since the inception of the program. Separate analyses of different parts of these data reveal a mix of trends, with evidence of declines in core areas such as the White Mountains but no clear increase or decrease in others (Rimmer and McFarland 2013, Scarl 2011, Lambert et al. 2008). Canadian trends are more troubling, with steep declines in the maritime provinces of New Brunswick and Nova Scotia and lesser declines in Quebec (Rimmer and McFarland 2013).

CONCLUSIONS

Bicknell's thrush remains a subject of intense study and interest in the scientific and recreational birding community. As a species that thrives in some of the most inhospitable habitat in the region, it tests our reserves just to be willing to get out and study it. Its propensity for thick and impassable mountaintop forest, its tendency to make itself heard only at the very earliest and very latest hours of the day, and a mating system that makes regular assumptions about its numbers based on territorial behavior tenuous at best, provide a challenge to researchers and others who wish to document or even to catch a glimpse of this rare species. None of this has stopped a multitude of researchers and volunteer citizen scientists, however, and as a result, we now know much more about a bird that was only first described in 1882 (Ridgeway 1882) and was not recognized as a distinct species until 1995 (Monroe et al. 1995).

Fitting with the scope of the Adirondack Journal of Environmental Studies, this paper has focused primarily on the breeding grounds of Bicknell's thrush. What has been learned about the species on the breeding grounds has been in some cases surprising (e.g., no apparent change in occupancy in response to heavy levels of disturbance from ski area development, helicopters, and road construction), wildly puzzling (e.g., female defense polygynandry, a breeding system known in only one other North American songbird), and concerning in other cases (e.g., rapidly declining populations in some areas, elevated levels of mercury, and dependence on a habitat type that is being pushed off the globe by climate change). While Bicknell's thrush may be able to thrive in ski areas in New York and Vermont, and although population trends in the Adirondacks appear positive (Scarl 2013), we cannot make conclusions about the fate of this migratory bird in our region without a consideration of the place in which it spends the majority of its life cycle – the Caribbean wintering grounds.

The overwhelming majority of Bicknell's thrushes winter on the island of Hispaniola. Unrelenting deforestation on Hispaniola, in Haiti in particular, highlights the fact that no future can exist for Bicknell's thrush anywhere in its breeding range without significant efforts to conserve the Caribbean forests on which it depends for six months out of the year (Rimmer and McFarland 2013). Although most birds have been found to overwinter in government-protected lands in Haiti and the Dominican Republic, paper protection does not appear to translate to actual protection, and charcoal production, subsistence agriculture, logging, and squatting persist unchecked (Rimmer and McFarland 2013). Findings from both breeding season and wintering ground research have resulted in the creation of a large coalition of partners working to advance Bicknell's thrush conservation. The International Bicknell's Thrush Conservation Group (IBTCG), which has nearly 100 partners, aims to increase the global species population by 25% over the next 50 years, with no further net loss of distribution (IBTCG 2010). The mere existence of this group suggests that all is not lost, but much is required to achieve these ambitious goals.

The northeastern U.S. holds a significant proportion of the global breeding range for Bicknell's thrush. Of a species that may number fewer than 100,000 individuals worldwide, 24% of its potential U.S. habitat is in New York State (Lambert et al 2005). The potential role that New Yorkers can play in helping to safeguard the species is perhaps greater than in any other state. As the only endemic songbird in the Northeast, we have a responsibility for ensuring its future in our part of its range. Although climate change threatens the extent of its habitat in the Northeast, stable or increasing trends in Bicknell's thrush population sizes in the Adirondacks and Catskills indicate that hope remains. There are several meaningful actions we can take. We suggest the following:

1. Understanding, educating, and combating climate change.

2. Carefully managing the placement and design of ski areas, wind power facilities, and other forms of development on mountaintops occupied by Bicknell's thrush and other high-elevation specialists.

3. Understanding and supporting efforts to reduce mercury pollution on both the breeding grounds and wintering grounds.

4. Supporting efforts to conserve broadleaf forests in the Caribbean.

5. Participating in citizen science efforts to monitor Bicknell's thrush and other montane bird species.

Figure 1. *Montane bird abundance on Whiteface Mountain Study Sites 2004 – 2010*

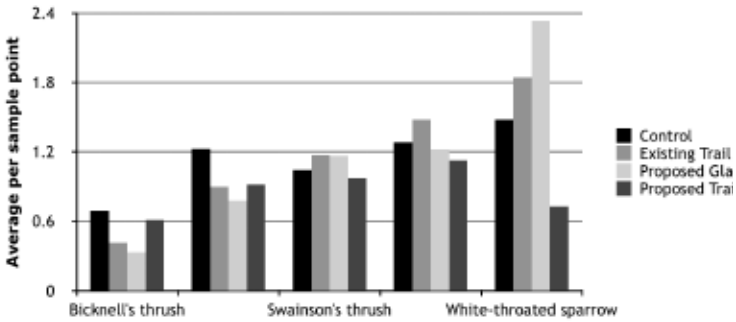


Figure 2. *Pre- (2004 – 2007) and post- (2008 – 2010) construction abundance of montane birds in ski trail expansion area on Whiteface Mountain*

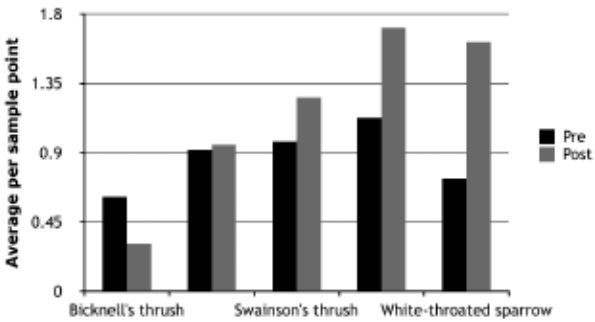


Figure 3. *Average probability of occupancy by Bicknell's thrush in relation to elevation at 15 monitoring points on Whiteface Mountain, 2011-2015. Bicknell's thrush was detected at least once at all sampling points except 14.*

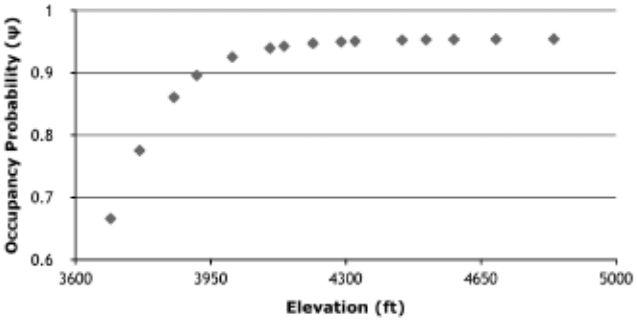
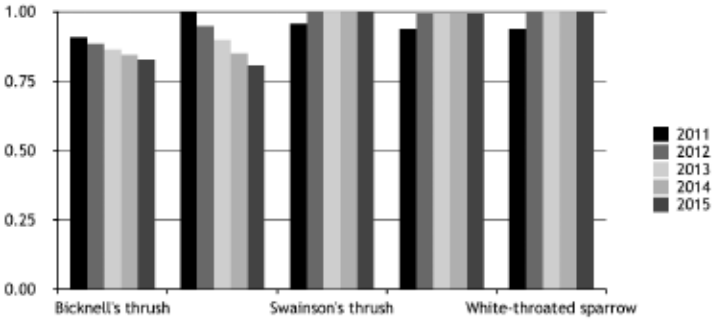


Figure 4. *Modeled 5-year occupancy rates for Bicknell's thrush, blackpoll warbler, Swainson's thrush, winter wren, and white-throated sparrow on 15 sample points on Whiteface Mountain, Wilmington, NY, 2011-2015*



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—THEODORE ROOSEVELT

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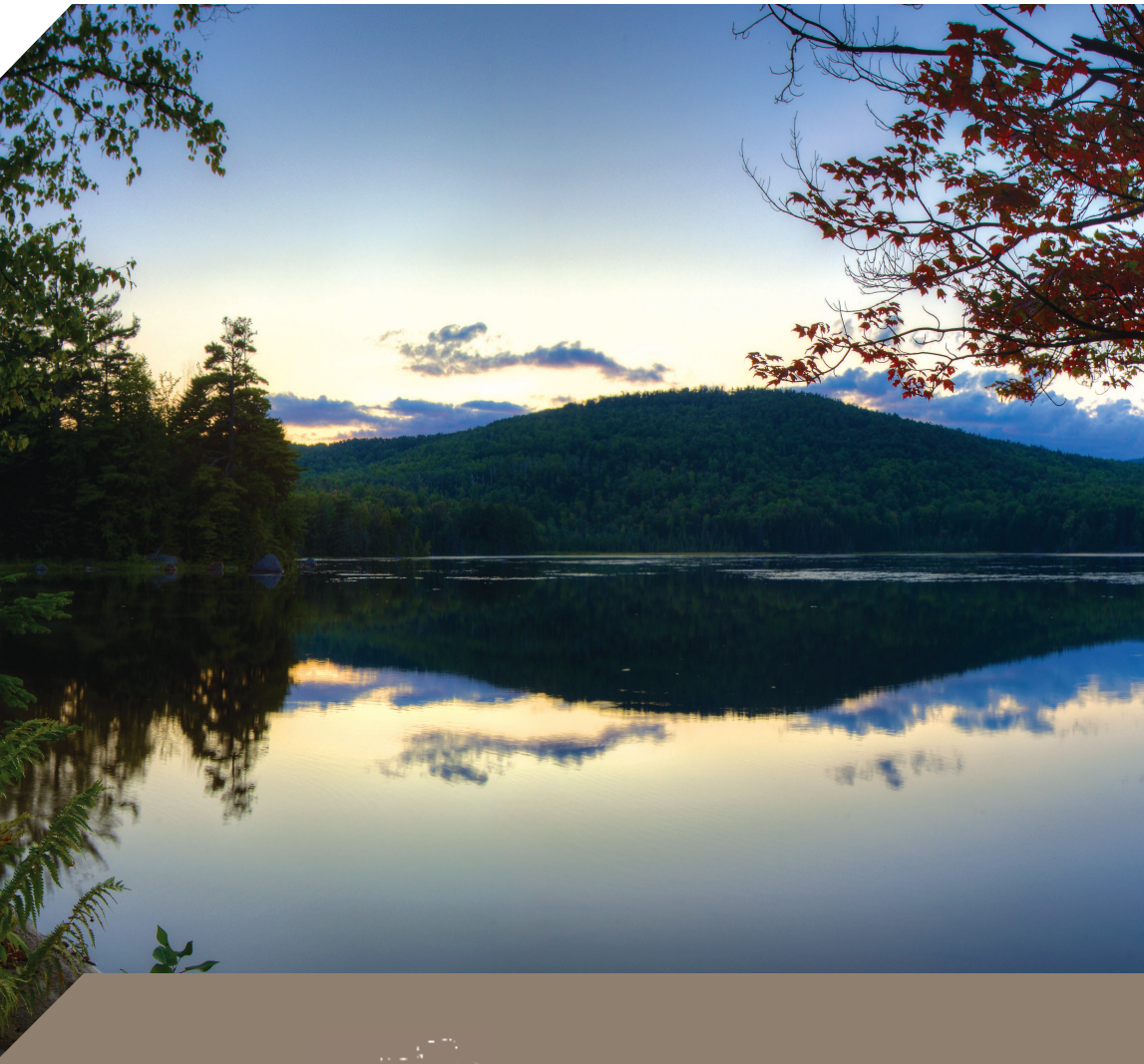

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