Mountain Birdwatch
2010-2011

Winter Wren © Julie Hart

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VERMONT CENTER FOR ECOSTUDIES
UNITING PEOPLE & SCIENCE FOR CONSERVATION

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EXECUTIVE SUMMARY

Mountain Birdwatch is a long-term monitoring program for songbirds that breed in high-elevation forests of the northeastern United States. Initiated in 2000, Mountain Birdwatch has prepared skilled volunteers to conduct annual surveys along 1-km point-count routes located in Massachusetts, New York, Vermont, New Hampshire, and Maine. Primary emphasis is placed on Bicknell's Thrush, a montane-fir specialist that breeds only in the Northeastern U.S. and adjacent portions of Canada. Other focal species include Blackpoll Warbler, Swainson's Thrush, White-throated Sparrow, and Winter Wren. In 2010, Mountain Birdwatch volunteers conducted point-count surveys on 92 routes. Bicknell's Thrush was detected at 57% of the point-count locations in 2010, with an average of 0.32 Bicknell's Thrush detected per point count. Swainson's Thrush detections continued to increase, with an average of 1.1 individuals detected per point, the highest detection average of the five target species. Blackpoll Warblers, Winter Wrens, and White-throated Sparrows were detected at similar rates as in 2009, with .75, .75, and .91 individuals detected per point, respectively.

In addition to volunteer surveys of existing routes, The Vermont Center for Ecostudies launched a new, revised monitoring program- Mountain Birdwatch 2.0- in June of 2010. Technicians set 529 points along 96 routes throughout New York, Vermont, New Hampshire, and Maine. Partners in Quebec and the Maritimes developed similar routes in Canada, initiating an international monitoring program that will allow comparisons of high-elevation bird trends across the entire breeding range of the Bicknell's Thrush.

BACKGROUND AND RATIONALE

The high-elevation forests of the northeastern United States provide habitat for a unique assemblage of breeding birds, many of which reach the southern limits of their distribution in these montane forests of spruce and fir. Most notably, mountain forests provide habitat for Bicknell's Thrush (*Catharus bicknelli*), the region's only endemic songbird. However, due to the inaccessibility of the high-elevation forests of the Northeast, this assemblage of birds is not included in any of the standardized state or federal bird monitoring schemes (e.g., the Breeding Bird Survey). As such, generating even rudimentary estimates of population trends or population size has proven difficult for species in this habitat, and the development of scientifically-defensible conservation strategies have lagged accordingly. Mountain Birdwatch, a program of the Vermont Center for Ecostudies (VCE), was created to fill these information gaps. The

objectives of Mountain Birdwatch are to: 1) monitor the distribution and abundance of mountain-breeding birds in northern New England and New York; 2) describe the influence of landscape and habitat features on mountain bird distribution and abundance; and 3) guide stewardship of high-elevation forests.

Mountain Birdwatch began under the auspices of the VCE (at the time part of the Vermont Institute of Natural Science) Forest Bird Monitoring Program. Volunteers surveyed 12 mountains from 1993 to 1999 in order to monitor changes in the status of Bicknell's Thrush and other high-elevation songbirds. In 2000, VCE biologists launched Mountain Birdwatch as an independent program with fifty additional routes in Vermont and offered observers the option to concentrate on five species: Bicknell's Thrush, Swainson's Thrush (*Catharus ustulatus*), Blackpoll Warbler (*Dendroica striata*), White-throated Sparrow (*Zonotrichia albicollis*), and Winter Wren (*Troglodytes troglodytes*). The survey region was expanded in 2001 to include over 100 new routes in New York, New Hampshire, Massachusetts, and Maine.

Data collected under Mountain Birdwatch have been put to a variety of uses: we have assessed the power of Mountain Birdwatch to detect population trends (Lambert et al. 2001); examined the influence of landscape structure on high-elevation bird communities (Lambert et al. 2002); measured habitat characteristics on 45 survey routes (Lambert 2003); quantified short-term population trends (Lambert 2005); produced and validated a Bicknell's Thrush distribution model (Lambert et al. 2005); and projected effects of climate change on Bicknell's Thrush distribution (Lambert and McFarland 2004). We have also identified key management units and conservation opportunities for Bicknell's Thrush (Lambert 2003). Most recently, we have begun to use data from Mountain Birdwatch to develop a tool that can be used to evaluate the likely impact of wind-energy development on mountains and ridgelines throughout the Northeast.

Mountain Birdwatch is also integral to the ongoing efforts of the International Bicknell's Thrush Conservation Group (www.bicknellsthrush.org), and serves as the main tool to evaluate progress towards the group's goals. In 2010, the International Bicknell's Thrush Conservation Group unveiled a Conservation Action Plan for Bicknell's Thrush, the goals of which were determined based on current population status and trend information for Bicknell's Thrush across its breeding range. The best source of information about this bird in the United States is Mountain Birdwatch, and analyses of population trends and occupancy based on Mountain Birdwatch data informed development of the Bicknell's Thrush Conservation Action Plan.

Although Mountain Birdwatch has been hailed as a model citizen science project, and although it has provided essential data for the conservation of the Bicknell's Thrush, this program is limited by several important shortcomings. First, Mountain Birdwatch lacks a probabilistic sampling design, which limits statistical inference. Second, historically the Mountain Birdwatch project has only surveyed Bicknell's Thrush in the southernmost area of its breeding range, the northeastern United States. Separate programs in Canada monitor this bird in its more northern breeding areas. However, differences in survey timing and protocols hamper integration of results between programs. Third, existing Mountain Birdwatch survey protocols are not ideal for modeling abundance and occupancy.

As a result of these limitations, a core group of biologists and statisticians collaborated to develop a new, revised monitoring program called Mountain Birdwatch 2.0. In June of 2010, Mountain Birdwatch 2.0 was launched by technicians in the United States, while our volunteers conducted their final year of surveys on existing routes using the original protocol. We discuss both the culmination of the original Mountain Birdwatch and the launch of Mountain Birdwatch 2.0 in this report.

METHODS

Volunteer engagement

We announced the opportunity to volunteer for Mountain Birdwatch on our web site (http://www.vtecostudies.org/MBW/) and in other VCE publications, such as our biannual Field Notes. Cooperating conservation organizations publicized the project through electronic and print media, and the Appalachian Mountain Club hosted a workshop for hired naturalists. Mountain Birdwatchers received maps, survey instructions, an identification guide to high-elevation songbirds, and a training CD with an auditory identification quiz. The Mountain Birdwatch listserv (http://groups.yahoo.com/group/MountainBirdwatch/) and other on-line information (http://www.vtecostudies.org/MBW/) helped to inform, coordinate, and engage participants in the survey. More than 100 people participated in Mountain Birdwatch surveys in 2009, including both the primary monitors and their companions.

Site selection, route placement and coverage

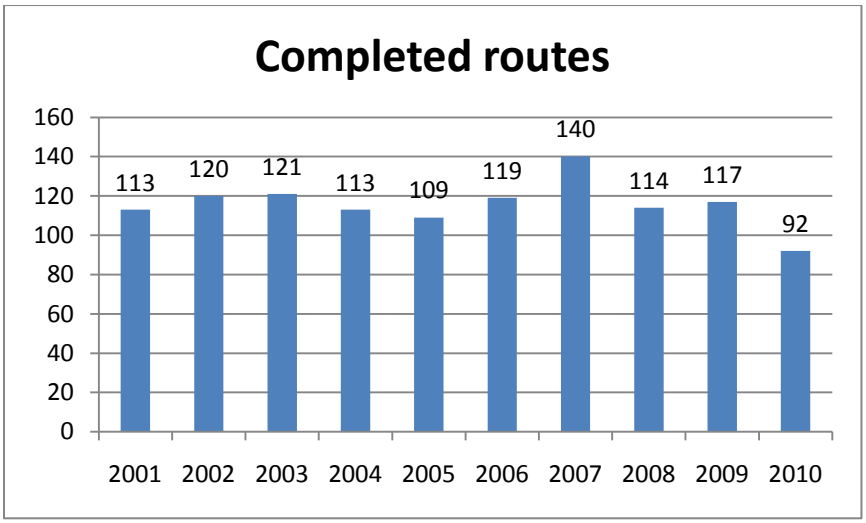
Site selection was based on a GIS model of potential Bicknell's Thrush habitat that incorporates elevation, latitude, and forest type (see Lambert et al. 2005). The model depicts conifer-dominated forests above an elevation threshold that drops 81.63 m for every one-degree

increase in latitude (-81.63 m/1º latitude). The threshold's slope corresponds closely with the latitude-elevation relationship for treeline in the Appalachian Mountain chain, which is -83 m/1º latitude (Cogbill and White 1991). Four routes have been established on peaks lying below the elevation threshold, while forty routes cross the threshold due to the limited availability of trails or land area above the threshold. We made an attempt to randomize site selection by randomly assigning priority ranks to discrete units of high-elevation habitat. However, the choice of sites was constrained by the availability of volunteers and the location of existing trails.

When placing routes, we favored discrete starting points (e.g. trail junction), extensive conifer stands, and upper elevations. Volunteers establishing a route for the first time placed five points at 200- to 250-m intervals along a mapped course. Monitors submitted a detailed description of each station in order to facilitate its location in future years.

In 2010, Mountain Birdwatchers completed 26 surveys in New York, 34 surveys in Vermont, 23 surveys in New Hampshire, and 9 surveys in Maine. On approximately half of the routes, observers recorded all species seen or heard, and observers recorded only the five focal species on the remainder of routes. Volunteers surveyed fewer routes in 2010 than in previous years (Figure 1), since the program's focus was shifting towards Mountain Birdwatch 2.0 and we did not make special efforts to recruit new volunteers for 2010.

Figure 1. Mountain Birdwatch survey effort 2001-2010.



Survey Methods

Surveys were conducted under acceptable weather conditions (no precipitation, temperature >2 °C, wind speed <32 km/h) from 1 to 28 June. Surveys were conducted between

04:30 and 08:00 EDT and most were completed by 06:30 EDT. Observers listened quietly for ten minutes at each of five stations.[1] They recorded the number of each focal species seen or heard during three time periods: 0-3 minutes, 3-5 minutes, and 5-10 minutes. If Bicknell's Thrush was not detected during or between point counts, surveyors returned to each point immediately after the full route survey and broadcast a one-minute recording of the bird's vocalizations in order to elicit a response from present but silent birds. A two-minute listening period followed each broadcast.[2] Audio playbacks were discontinued upon detection of one or more individuals. If no Bicknell's Thrush responded to the broadcasts, the status of the species at that location was classified as unknown. Monitors who completed their surveys without encountering Bicknell's Thrush were asked to conduct follow-up audio playback surveys at dusk or dawn before 15 July (after Atwood et al. 1996). If no observations of Bicknell's Thrush were made during the second visit, the species was presumed to be absent from that site.

Data analysis: avian distribution and abundance

To include data from as many routes as possible across years, we sub-sampled records of the five focal species from the first five minutes of each ten-minute count. Where two point count series were conducted, we used results from the first survey only. We measured frequency of occurrence and relative abundance for each of the focal species. To calculate frequency of occurrence, we divided the number of routes on which a species was detected during point counts (first five minutes only) by the total number of routes surveyed.

For between-year comparisons, we calculated the average number of individuals per point on a route-by-route basis. This correction was necessary because close to 30% of the routes surveyed in 2001 contained fewer than five stations (mean = 2.87 stations). These routes were extended below the original elevation threshold in 2002 to meet the 5-point standard. For each focal species, we averaged per-point values across routes to produce an overall index of relative abundance for every year from 2001 to 2010. We did the same for the subset of routes that were surveyed in each of the ten years (n = 20).

[1] In 2003, we increased the 5-species point count length from five to ten minutes in order to gather more information and to achieve methodological consistency with the all-species protocols and with Canada's High-Elevation Landbird Program.

[2] Prior to 2003, the broadcast duration was three minutes.

Data analysis: ten-year trend analysis

We used a Poisson generalized linear model (GLM) with mixed effects to assess trends in observed abundance of the five target species along Mountain Birdwatch routes[3]. The Poisson model was fit allowing for overdispersion, with year as a fixed effect and route as a random effect. We used Proc GLMMIX in SAS to perform this analysis. We also investigated incorporating effects of observer and survey start time into the analysis, which generally resulted in slightly lower point estimates for percent annual change for most species and regions, although without any change in the level of statistical significance.

For this analysis, we used 92 Mountain Birdwatch routes that were surveyed in at least 6 of the 10 years from 2001-2010. Because the MBW protocol changed from a 5-minute to a 10-minute survey between 2002 and 2003, we used only the data from the first 5 minutes of the 2003-2010 surveys in this analysis. We conducted the trend analysis for both the full set of 92 routes as well as by 5 regions within this overall data set (Catskill Mountains, Adirondack Mountains, Green Mountains, White Mountains, and Maine High Peaks).

Mountain Birdwatch 2.0

In collaboration with Canadian partners BirdStudies Canada and Régroupment Québec Oiseaux, VCE launched Mountain Birdwatch 2.0 (MBW2) in 2010. MBW2 includes an international partnership to consistently and effectively survey breeding birds in spruce-fir forest across the entire breeding range of Bicknell's Thrush. This monitoring program includes a randomized, spatially balanced selection of routes, which will allow scientists to extrapolate information about target species across the entire range of study. In addition, MBW2 utilizes an improved survey methodology that allows for more accurate estimates of abundance and occupancy than previous protocols. These new protocols also require all participants to focus on eleven target species, ensuring standardization of effort between surveyors.

[3] Randy Dettmers of the U.S. Fish and Wildlife Service conducted these trend analyses.

RESULTS

Avian distribution and abundance: 2010

Bicknell's Thrush was detected during point counts on 52 of 92 routes (56.5%) surveyed in 2010. At the points where Bicknell's Thrush was detected, 71% (145/205) of detections occurred during the first five minutes. On the subset of 20 routes surveyed each year for ten years (2001-2010), average counts of Bicknell's Thrush (0.39 individuals per count, standard error [se] = 0.11) were similar to the 2001-2009 average (0.30 individuals per count; Fig. 2). Across all routes, average counts of Bicknell's Thrush were slightly higher in 2010 (0.32 individuals per point count, se = 0.04) than the 2001-2009 average (0.27 individuals per point count) but were similar to the average counts observed in 2007 (.34 individuals per count), 2008 (.30 individuals per count), and 2009 (.33; Fig. 3)[4].

Average counts of Blackpoll Warbler in 2010 were similar to counts recorded in previous years (0.75 individuals per point count; Figs. 2 and 3). Swainson's Thrush continued to increase in abundance, reaching a high of 1.10 individuals per point count on all counts, a dramatic increase from the average of .85 recorded in 2009. Winter Wren numbers remained steady in 2010 after sharp increases in 2008 and 2009. White-throated Sparrow numbers were consistent with previous years, and this species continues to be one of the most frequently encountered by Mountain Birdwatch volunteers.

[4] Average counts of Bicknell's Thrush were incorrectly calculated in the 2009-2010 report submitted in March 2010; these errors have been fixed and the data presented here is correct.

Figure 2. Relative abundance of focal species on 20 routes surveyed each year, 2001-2010.

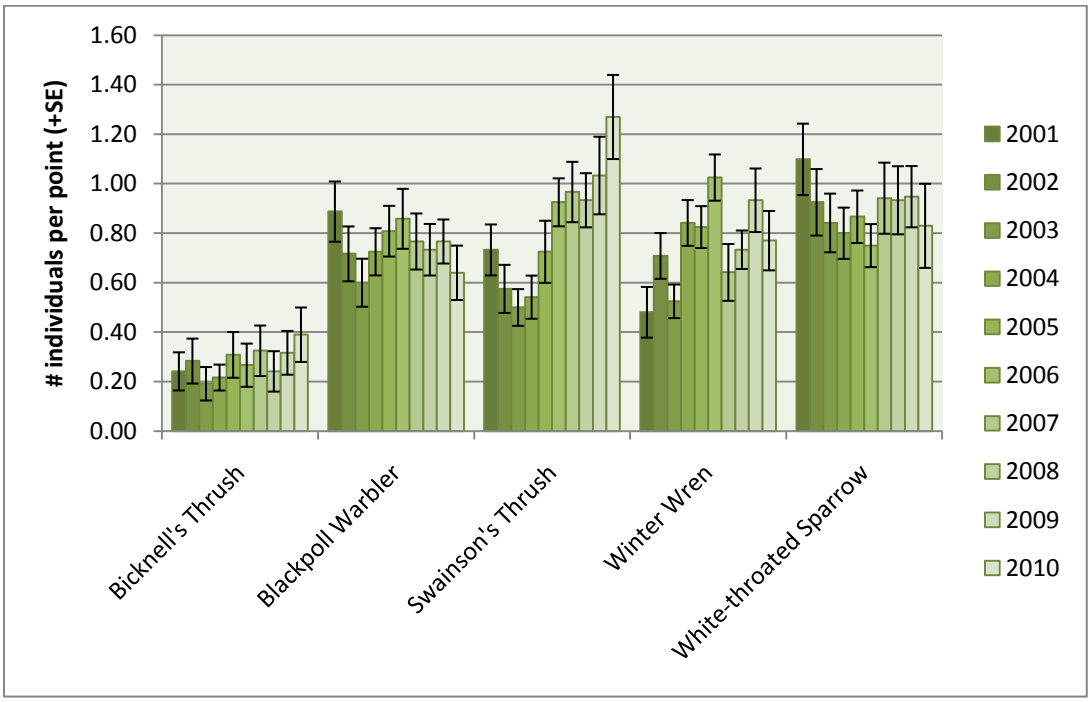
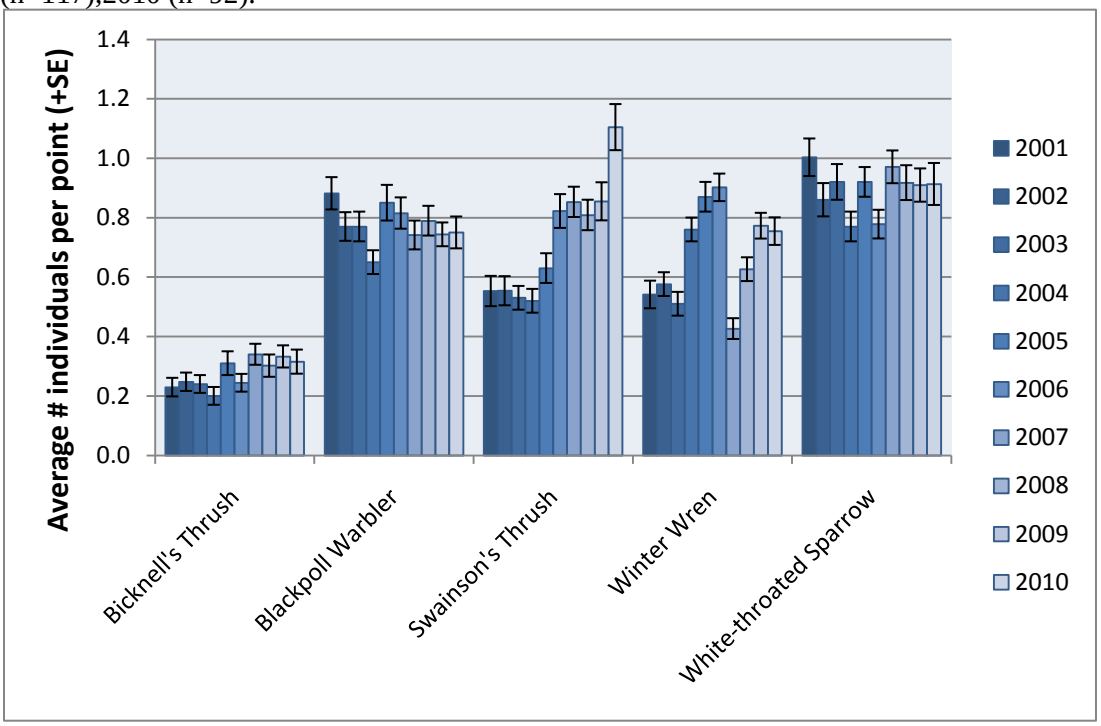


Figure 3. Relative abundance of focal species in 2001 (n=113 survey routes), 2002 (n=120), 2003(n=121), 2004 (n=113), 2005 (n=109), 2006 (n=119), 2007 (n=140), 2008 (n=114), 2009 (n=117),2010 (n=92).

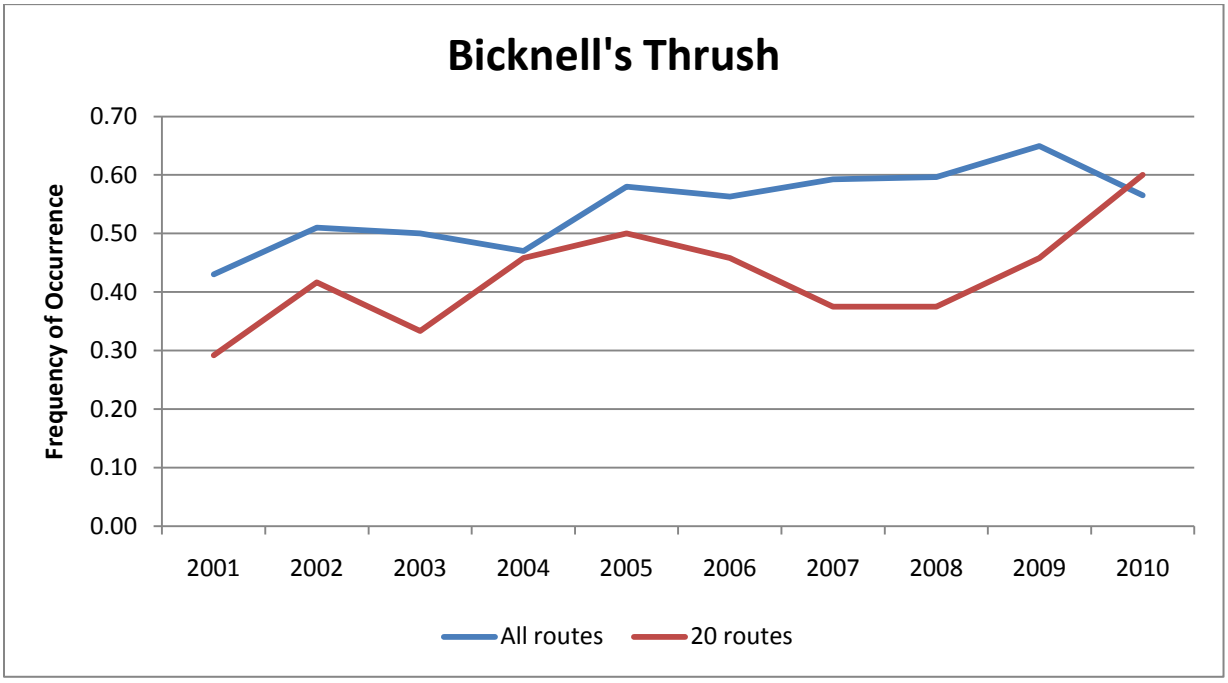


Across ten years of regional monitoring, frequency of occurrence has fluctuated by as little as 0.07 (White-throated Sparrow) and as much as 0.26 (Swainson's Thrush) across all routes surveyed (Table 1). Frequency of occurrence for Bicknell's Thrush shows slightly more fluctuation for the 20 routes consistently surveyed than for all routes combined, although the two samples show similar trends (Figure 4).

Table 1. Occurrence frequency of focal species, 2001-2010, based on five-minute point counts.

	Bicknell's Thrush		Blackpoll Warbler		Swainson's Thrush		Winter Wren		White-throated Sparrow	
Year	All routes	20 routes	All routes	20 routes	All routes	20 routes	All routes	20 routes	All routes	20 routes
2001	0.43	0.29	0.93	0.75	0.71	0.71	0.73	0.54	0.91	0.75
2002	0.51	0.41	0.88	0.71	0.76	0.71	0.91	0.83	0.93	0.79
2003	0.50	0.33	0.91	0.67	0.76	0.63	0.80	0.75	0.89	0.71
2004	0.47	0.45	0.88	0.79	0.82	0.71	0.91	0.83	0.88	0.71
2005	0.58	0.50	0.87	0.71	0.87	0.79	0.97	0.79	0.95	0.79
2006	0.56	0.46	0.87	0.71	0.87	0.79	0.94	0.83	0.95	0.79
2007	0.59	0.38	0.84	0.79	0.94	0.79	0.73	0.63	0.93	0.79
2008	0.60	0.38	0.92	0.79	0.88	0.79	0.91	0.83	0.90	0.79
2009	0.65	0.46	0.91	0.75	0.90	0.79	0.92	0.79	0.91	0.75
2010	0.57	0.60	0.89	0.85	0.97	1	0.91	0.85	0.90	0.85
Range	0.22	0.31	0.09	0.18	0.26	0.37	0.24	0.31	0.07	0.14

Figure 4. Frequency of occurrence for Bicknell's Thrush from 2001-2010 for all routes surveyed annually and for the 20 routes surveyed each year.



Ten-year trend analysis

Bicknell's Thrush

The trend analysis of the observed abundance of Bicknell's Thrush across all regions indicated a significant increase at an annual rate of about 4.0%. Regionally, the observed abundance of this species significantly increased in the Adirondacks (9.41%/year) and Catskills (11.28%/yr), while showing no statistical trend in the other regions (Table 1).

Table 1: Bicknell's Thrush trends, 2001-2010.

Region	Number of Routes	Slope from Poisson GLM	SE of Slope	P-Value for Slope	% Annual Change	Lower CI for % Annual Change	Upper CI for % Annual Change
Overall	92	0.039	0.0115	0.001	3.98	1.63	6.31
Catskills	8	0.107	0.0324	0.002	11.28	4.23	18.71
Adirondacks	21	0.09	0.0252	0.001	9.41	4.08	14.96
Green Mtns	34	-0.002	0.018	0.918	-0.20	-3.67	3.41
White Mtns	20	0.011	0.0259	0.659	1.10	-3.91	6.46
Maine	9	0.013	0.0444	0.774	1.29	-7.34	10.67

Swainson's Thrush

Overall, Swainson's Thrush increased significantly at an annual rate of 8.87%. Regionally, the observed abundance of this species increased in all five regions (Table 2).

Table 2: Swainson's Thrush trends, 2001-2010.

	Number of Routes	Slope from Poisson GLM	SE of Slope	P-Value for Slope	% Annual Change	Lower CI for % Annual Change	Upper CI for % Annual Change
Overall	92	0.085	0.0085	0.0001	8.87	7.08	10.72
Catskills	8	0.122	0.0338	0.0007	12.96	5.52	20.86
Adirondacks	21	0.125	0.0175	0.0001	13.31	9.44	17.27
Green Mtns	34	0.0631	0.0124	0.0001	6.51	3.94	9.13
White Mtns	20	0.086	0.0208	0.0001	8.98	4.61	13.59
Maine	9	0.0485	0.0304	0.117	4.96	-1.25	11.55

Blackpoll Warbler

The observed abundance of Blackpoll Warbler across the entire survey area exhibited a non-significantly decline at an annual rate of –0.7%, which is interpreted as no trend. Regionally, the observed abundance of this species significantly increased in the White Mountains and Catskills, declined significantly in the Green Mountains, and showed no statistical trend in the Adirondacks or Maine (Table 3).

Table 3: Blackpoll Warbler trends, 2001-2010.

	Number of Routes	Slope from Poisson GLM	SE of Slope	P-Value for Slope	% Annual Change	Lower CI for % Annual Change	Upper CI for % Annual Change
Overall	92	-0.007	0.007	0.324	-0.7	-2.03	0.68
Catskills	8	0.051	0.0201	0.015	5.23	1.02	9.52
Adirondacks	21	-0.014	0.0172	0.424	-1.39	-4.67	2.04
Green Mtns	34	-0.028	0.0103	0.007	-2.76	-4.72	-0.77
White Mtns	20	0.033	0.0158	0.039	3.35	0.16	6.64
Maine	9	-0.037	0.0224	0.105	-3.64	-7.84	0.79

Winter Wren

Winter Wrens observed across the entire survey area increased significantly at an annual rate of 2.94%. This species significantly increased in the Green Mountains and White Mountains and showed no statistical trend in the other regions (Table 4).

Table 4: Winter Wren trends, 2001-2010.

Region	Number of Routes	Slope from Poisson GLM	SE of Slope	P-Value for Slope	% Annual Change	Lower CI for % Annual Change	Upper CI for % Annual Change
Overall	92	0.029	0.0077	0.0002	2.94	1.37	4.47
Catskills	9	0.019	0.0286	0.506	1.91	-3.78	7.94
Adirondacks	21	0.033	0.0176	0.061	3.35	-0.16	7.03
Green Mtns	34	0.027	0.0103	0.01	2.74	0.63	4.81
White Mtns	20	0.048	0.0209	0.023	4.91	0.66	9.33
Maine	9	-0.005	0.0268	0.863	-0.51	-5.66	5.00

White-throated Sparrow

The observed abundance of this species across the entire survey area showed no trend from 2001-2010 (-0.3%/year). This species significantly increased in the Adirondacks, significantly declined in the Green Mountains and in Maine, and had no statistical trend in the other regions (Table 5).

Table 5: White-throated Sparrow trends, 2001-2010.

Region	Number of Routes	Slope from Poisson GLM	SE of Slope	P-Value for Slope	% Annual Change	Lower CI for % Annual Change	Upper CI for % Annual Change
Overall	92	-0.003	0.0062	0.631	-0.3	-1.52	0.93
Catskills	8	0.055	0.0389	0.165	5.64	-2.32	14.09
Adirondacks	21	0.049	0.0131	0.0002	5.02	2.37	7.80
Green Mtns	34	-0.02	0.008	0.012	-1.98	-3.54	-0.45
White Mtns	20	-0.019	0.014	0.186	-1.88	-4.53	0.91
Maine	9	-0.088	0.028	0.003	-8.43	-13.42	-3.13

Mountain Birdwatch 2.0

In June and July of 2010, nine technicians and Mountain Birdwatch director Judith Scarl assessed 125 routes across New York, Vermont, New Hampshire, and Maine. 96 of these routes were suitable to survey based on trail or road location and accessibility, and technicians mapped and documented these routes using GPS points, written descriptions, and photographs. 27 of the newly-set routes were established in Maine, 40 in New Hampshire, 17 in Vermont, and 12 in New York. Most routes had six points, while some had as few as three; all new routes combined contained 529 independent survey stations. Technicians conducted point counts at 410 of these stations in June and July of 2010. Since MBW2 aims to compare avian population trends with habitat characteristics, technicians also measured habitat variables at up to three subplots around each survey station.

Mountain Birdwatch 2.0 preparations will continue in 2011. Technicians were unable to assess all projected routes in the U.S. in 2010, and these routes will be assessed in 2011. In addition, in June and July technicians will set and survey 25 additional routes throughout New York and Vermont. New York's Catskills Mountains and Vermont's southern Green Mountains represent the southernmost areas of high-elevation spruce-fir forest in the Northeast, and thus the effects of climate change will be detected first in these regions. Sub-sampling from these areas will allow MBW2 to detect climate-related changes more rapidly and accurately. Partners in Quebec and the Maritimes of Canada will also set the remainder of their projected routes in 2011, and thus in this year we expect to have a complete international survey. In 2011, volunteers will survey our newly-set MBW2 routes, adopting the new survey protocols. As of April 30, 2011, volunteers had adopted 74 out of 96 new routes.

DISCUSSION

Avian distribution and abundance

Bird population levels change in response to a wide variety of natural and anthropogenic factors (Askins et al. 1990). Often, data gathered over brief periods belie long-term trends (Holmes and Sherry 2001). Furthermore, counts uncorrected for detectability and spatial variation, as presented in this report, may mask even strong trends in population size (e.g., Martin et al. 2007). As a result, it is difficult to interpret uncorrected counts conducted over a

short time frame. Reaching meaningful conclusions may require many years of continuous effort and a thorough assessment of factors that influence the detectability of individuals. These caveats aside, several notable patterns emerge from Mountain Birdwatch data collected between 2001 and 2010. Both thrush species (Bicknell's and Swainson's) demonstrate increases in observed abundance. Winter Wrens exhibit large annual fluctuations but no overall trends, and neither Blackpoll Warblers nor White-throated Sparrows show obvious trends in abundance throughout the decade of Mountain Birdwatch. As Mountain Birdwatch 2.0 becomes the dominant high-elevation monitoring program in the region, these data will be essential to assess longer-term trends in avian abundance.

Ten-year trend analysis

The ten-year trend analysis mirrors the abundance estimates; both Swainson's and Bicknell's Thrushes demonstrate significant increases in observed abundance. For both species, the most substantial increases occur in New York's Adirondack and Catskill Mountains. Given the steep declines detected for Bicknell's Thrush in Canada (Campbell et al. 2009; Y. Abry, unpubl. data), it appears that the U.S. population of Bicknell's Thrush is more stable. Since the majority of Bicknell's Thrush habitat in Canada is government-owned and much is managed for timber, heavy logging in Canada may influence Canadian declines of this species. The Mountain Birdwatch 2.0 program, which will incorporate measurements of habitat with avian trend analyses, may shed light on the driving factors behind these changes.

Observed abundance of Blackpoll Warbler and White-throated Sparrow show no significant overall trends. This is consistent with the point count data shown in Figure 3. Winter Wren significantly increased at an annual rate of 2.9%. More robust trend measures with greater statistical inference will be possible with the implementation of Mountain Birdwatch 2.0.

Mountain Birdwatch 2.0

Scientists in the U.S. and Canada launched Mountain Birdwatch 2.0 in 2010, setting points that we anticipate will be surveyed each year for decades to come. Mountain Birdwatch 2.0, like its predecessor Mountain Birdwatch, is a citizen science monitoring program, and volunteers will learn the new survey protocols for the 2011 season.

Information sharing

We disseminated information on trends in mountain bird populations and abundance to several key audiences over the last year, including scientists, government agencies, conservation groups, and the general public. We presented a poster featuring the transition to Mountain Birdwatch 2.0 in Plymouth, MA at the Power Of Partnerships: Bird Conservation Conference In the Northeast in October of 2010. In November of 2010, Mountain Birdwatch held an international planning session as part of the International Bicknell's Thrush Conservation Group conference in the Dominican Republic. Mountain Birdwatch 2.0 was included as a lead article in the Fall 2010 issue of *Field Notes*, the VCE newsletter (circulation 2,000), while the spring 2011 issue of this publication featured Mountain Birdwatch ten-year trends. Mountain Birdwatch director Judith Scarl was featured on the Mark Johnson show on WDEV radio in February 2011 to discuss the Mountain Birdwatch program.

Delivering useful information to land stewards remains a high priority for Mountain Birdwatch. We continue to upload Mountain Birdwatch data to the Avian Knowledge Network. This online data management system features innovative display options (tables, graphs, and maps) and powerful tools for analyzing the relationship between observational data and nearly 200 environmental variables. All Mountain Birdwatch data from 2001 through 2010 are publicly available through the Avian Knowledge Network (AKN), and MBW2 data and metadata have been submitted to the AKN for public distribution. In addition, in 2010 Mountain Birdwatch data was provided to the Maine Department of Inland Fisheries and Wildlife upon request, and VCE assisted this organization with data interpretation and management. MBW2 routes fall within private lands in many locations in Maine, and we have provided landowners with copies of all data collected within their lands.

Acknowledgments

We gratefully acknowledge the hundreds of volunteers who participate in Mountain Birdwatch. This dedicated group was recruited with assistance from the Adirondack Mountain Club, the Appalachian Mountain Club, the Appalachian Trail Conservancy, Audubon New York, Maine Audubon, the Maine Department of Inland Fisheries and Wildlife, and the Wildlife

Conservation Society. We are thankful for permission to conduct surveys on lands owned and/or managed by:

The American Ski Corporation, the Carthusian Monastery, Plum Creek Timber Company, Inc., the Green Mountain Club, the Maine Department of Inland Fisheries and Wildlife, the National Park Service, the New York State Department of Environmental Conservation, the U.S. Forest Service, the Vermont Agency of Natural Resources, Wagner Forest Management, American Forest Management, the Dallas Company LLC, Seven Islands Land Company, Maine Department of Conservation, and the Sugarloaf Mountain Corporation. Mountain Birdwatch is funded by the U.S. Fish and Wildlife Service through a cooperative agreement administered by Assistant Nongame Bird Coordinator and Mountain Birdwatcher Randy Dettmers. We also receive generous support from the National Park Service, Vermont Agency of Natural Resources, US Forest Service, New York State Department of Environmental Conservation, and private donors.

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