Monitoring Matters

Citizen Scientists Help Track America's Rarest Thrush

Mountain BirdWatch, the A.T., and Citizen Science

Since the year 2000, hundreds of tenacious trekkers have found a way to combine their passion for birds with their love of the mountains by becoming citizen scientists for the Vermont Center for Ecostudies' (VCE), Mountain Birdwatch (MBW) program. These dedicated volunteers rise before first light and hike to designated points along trails to count 10 high-elevation mountain bird species. Mountain birds, a specific category of breeding birds, are a primary interest of the NPS Northeast Temperate Network's (NETN) Appalachian National Scenic Trail's (APPA) resource managers. These birds are particularly dependent upon mountain-clinging spruce-fir forests: an uncommon and restricted habitat type in northern New England. Regionally rare as it may be, it is actually the dominant forest type along almost 140 miles of the Trail in Vermont, New Hampshire, and Maine.

The MBW program demonstrates how APPA plays a key role in supporting regional species conservation through habitat protection and by supporting access for citizen science activities, and is a great example of a regional monitoring effort that combines APPA interests with those of the public and adjacent lands. This is critically important for management of APPA because activities and actions that happen on nearby lands have a major influence on the relatively narrow ribbon of land that surrounds the trail.

VCE's MBW is the only region-wide source of population information on high-elevation breeding birds in the region - including the rare and secretive Bicknell's Thrush.

A Rare Bird Indeed: The Bicknell's Thrush

The Bicknell's Thrush is one of the most range-restricted bird species in all of North America. They are only known to breed in disturbed forests of balsam fir and spruce in the high mountain zones of New York, Vermont, New Hampshire, Maine, and parts of Canada. It is considered to be one of the migratory songbirds at greatest risk of extinction, and its numbers appear to be falling. Populations in Canada have declined by at least 9% *per year* from 1968 to 2008. Trends in the United States are uncertain, but populations in New Hampshire have likely declined, perhaps by as much as 7% per year over the decade of 1993 to 2003.

How Might Climate Change Impact Bicknell's?

The short answer is that it very likely already is impacting them and probably has been for years. Since the U.S. Bicknell's Thrush populations largely make their living above 2,600 feet, climate change is likely to affect them much sooner and more rapidly than critters that persist at lower elevations. As climate change continues there is serious doubt about the future survival of the species since over the next few hundred years the exclusive habitat of Bicknell's Thrush is likely to be diminished. Short-term impacts are much harder to quantify. Warmer and wetter summers are predicted for the Northeast U.S. which may mean greater insect abundance (and theoretically more food to eat for Bicknell's) at higher elevations during the summer. It remains to be seen how climate change will impact this species and other high elevation breeding species in the short-term (the next 50 to 100 years).

Bicknell's Thrush

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Spruce and fir stands abut much of the length of NH's Appalachian Trail

Citizen scientist volunteer monitors have and will continue to be crucial for tracking populations of Bicknell's Thrush and other mountain bird species. VCE/Wendy Cole image.

The A.T. Corridor as Important Habitat Protector

Some number crunching by VCE ecologist Jason Hill has revealed that almost 13% of the entire U.S. Bicknell's Thrush habitat lies within 1 mile of the Trail. A bit more impressive for the NETN region, over 20% of the bird's spruce-fir habitat within ME, NH, and VT combined is within 1 mile of the Trail.

This habitat varies in quality, however, which affects the density of Bicknell's living there. For example, 25% of NH's Bicknell's Thrush habitat is near the AT in NH, and this is some of the best habitat in the U.S., supporting almost 50% of NH's Bicknell's Thrush population. For Maine, about 27% of the birds live within a mile of APPA, and 18% in Vermont. All together, the three states are home to about 37% of all Bicknell's living within just a mile of the Trail. These numbers not only emphasize how important the available habitat in these states is to supporting bird populations, but also indicate the need to have continued support from citizen science monitors along the APPA.

There is a distinct possibility that the APPA corridor will support an even greater proportion of the Bicknell's Thrush populations in the future. The reason being that as climate warms, the birds will keep having to move upslope and will be concentrated at even higher elevations than they are now.

What Can be Done to Help Preserve Bicknell's Habitat? Recomendations for Managers

Since the current extent of spruce-fir forests is linked to long-term patterns in regional climate, slowing the effects of global climate change is the best approach for lessening further impacts to these forests and thus Bicknell's populations. As the range of spruce-fir forest is predicted to shift under climate change it is also expected that Bicknell's Thrush and other high-elevation breeding species will shift as well.

From a short-term management perspective, the answer to "what can we do" is much harder to determine. Without further critical research, it will be difficult to design effective management strategies. Ways to bolster Bicknell's Thrush populations on their breeding grounds have yet to be identified, much less be planned or implemented. Ideally, some very basic research about the thrush would need to be completed first. A couple of examples include: How does fledgling production vary across habitat, elevation and latitude? How does fledgling and adult survival vary across its range and with habitat features? A basic first step may be to identify the habitat features associated with relatively high Bicknell's Thrush productivity and then identify management strategies which increase those features. Continued monitoring is perhaps the best tool currently available for assessing local and regional trends in Bicknell's Thrush abundance.

Current Trail management activities are not likely having significant impacts on Bicknell's Thrush populations, for good or ill. The default management strategy for the bird's breeding habitat up to this point has been to take a "leave it alone" approach. That has worked so far, but is unlikely to continue to do so, given the substantial declines predicted for the spruce-fir forest community over the next 200 years.

For More on the Bicknell's Thrush

NETN thanks the biologists at VCE for helping in the preparation of this article by providing facts and contributing to the discussion on management. You can read more about the MBW program at VCE's website (https://vtecostudies.org/projects/mountains/mountain-birdwatch/) and the research highlighted here by visiting: http://onlinelibrary.wiley.com/doi/10.1002/ecs2.1921/full.

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