FIFTY-YEAR CHANGES IN BREEDING BIRD POPULATIONS ON THE ALLEGHENY PLATEAU

Chandler S. Robbins and Barbara A. Dowell
USGS Patuxent Wildlife Research Center, Laurel, MD

INTRODUCTION

In the summer of 1949, the senior author conducted Breeding Bird Censuses (BBC) (Robbins et al. 1949, 1951) in seven representative habitats on the Allegheny Plateau of Maryland as part of his M.S. thesis at George Washington University (Robbins 1950). Two years later, he and the late R. E. Stewart censused four other sites in the Maryland portion of the plateau to obtain additional information on breeding bird densities for "Birds of Maryland and the District of Columbia" (North American Fauna No. 62, 1958). Fifty years later, the current authors returned to the same sites to study changes in the habitats and in the bird populations and to relate these to bird populations on the Allegheny Plateau as revealed by the Breeding Bird Survey (BBS).

METHODS

We used standard spot-mapping procedure (International Bird Census Committee 1970) to estimate breeding bird populations in 1949-51 and again in 1999-2001. We made eight to ten visits to each site, generally in the early morning. We sampled trees along transects in 1949 and 1951. In 1999-2001 we counted and measured trees along similar transects and also in random circular plots (James and Shugart 1970). Most of the sites could be relocated exactly by measuring from existing roads, lanes, fire breaks, footings of former fire towers, or tree stumps. The exceptions were the bog sites, the boundaries of which had to be estimated.

Major population changes in the study plots were measured by combining forest plots into six regions of Garrett County, MD, and counting the number of regions in which population densities for a species in the study plots doubled (50% increase) or halved (50% decrease) between 1949-51 and 1999-2001. The six regions were Cranesville and Swallow Falls in the west, Negro Mt. and Wolf Swamp in the center, and Backbone Mt. and Gorman in the eastern part of the county. If at least three of the six regions showed an increase (or decrease) of 50% or greater, the species was considered to have increased (or decreased) regionally.

Data from the Maryland sites (except the pasture sites and the pine plantation that was replaced by young deciduous growth) were also combined and the species ranked so changes in rank over the 50-year period in Maryland's diverse landscape could be compared with changes in rank in the extensive forest of the Unicoi Mountains (Haney et al. 2001).

Breeding Bird Survey trends (1966 to 2000) were down-loaded from the Patuxent web site: www.mp2-pwrc.usgs.gov/bbs/.

RESULTS

Habitat Changes

All of the 1949-51 sites were found again in 1999-2001. Several had changed ownership.

The block of lightly grazed pasture had become corn and hay cropland (contour farming); we censused the part of the original plot that was in hay, plus a larger strip of hayfield on the opposite side of the road that pproximated the size of the plot 50 years ago.

The young red pine plantation had been prematurely harvested, so we censused the young deciduous woods growing around its stumps. As a replacement for the pine, we censused a mature pine plantation of similar size elsewhere in the county at the same elevation.

The virgin hemlock tract at Swallow Falls State Park is rapidly losing its ancient hemlocks from exposure, soil compaction, construction of parking facilities, and other human interference. Hardwoods, especially red maple and black cherry, are replacing the hemlocks.

The mature hardwood forest had been selectively logged, and hemlock is now dominant.

Periodic timber cutting continued at the four ridge-top sites, with shifts in the dominant trees. Oaks are now less prevalent, while red maples and cherries have increased.

The former open bog sites had changed so much that the boundaries were no longer recognizable. Alder thickets are replacing open bogs, and most of the mature red spruces have died.

Changes in Bird Populations

The major increases (of 50% or more) in the Maryland plots were in Ruffed Grouse, Hairy Woodpecker, Blue-headed Vireo, Blue Jay, Black-capped Chickadee, Red-breasted Nuthatch, Hermit Thrush, American Robin, Cedar Waxwing, Common Yellowthroat, and Rose-breasted Grosbeak. Major decreases were in Black-throated Blue and Black-and-white Warblers.

Smaller increases were noted in Black-throated Green Warbler, but there were notable declines in Golden-winged, Nashville, Hooded, and Canada Warblers.

Southern species not recorded 50 years ago include Red-bellied Woodpecker, Acadian Flycatcher, and Tufted Titmouse. Several northern species have also moved in as breeders: Brown Creeper, Winter Wren, Myrtle Warbler, and Pine Siskin.

DISCUSSION

This is only the second quantitative regional study of changes in breeding songbird populations over a 50-year period. A 50-year study by Haney et al. (2001) in extensive forest of the southern Appalachians (Unicoi Mountains of NC/TE) some 700 km to the southwest presents an interesting comparison with our study, as most of the species encountered were the same.

In the Unicoi Mountains, the authors detected no evidence that structure of the bird community as a whole had changed significantly. The same four species remained dominant (Veery, Chestnut-sided and Black-throated Blue Warblers, and Dark-eyed Junco), and permanent residents as a group decreased.

On the Allegheny Plateau in Maryland, only the Red-eyed Vireo and Magnolia Warbler remained in the top four species. The Blackburnian and Chestnut-sided Warblers fell from first and fourth place to 9th and 10th and were replaced by Northern Waterthrush and Canada Warbler. Major increases in permanent residents were noted, especially chickadees, titmice, and nuthatches.

The greatest declines in rank (20 steps or more) on the Maryland plots were in

Yellow-billed Cuckoo, Whip-poor-will, Ruby-throated Hummingbird, Great Horned Owl, No. Saw-whet Owl, and five shrub- or ground-nesting warblers: Nashville, Golden-winged, Black-and-white, Hooded, and Yellow-breasted Chat. The greatest declines in the Unicois were in Ruby-throated Hummingbird, Northern Flicker, Eastern Wood-Pewee, White-breasted Nuthatch, and American Goldfinch.

The greatest increases in rank (20 steps or more) on the Allegheny Plateau of Maryland were in Eastern Wood-Pewee, Acadian and Alder Flycatchers, Black-capped Chickadee, Red-breasted Nuthatch, Hermit Thrush, Rose-breasted Grosbeak, and Indigo Bunting.

The greatest increases in the Unicois were in Red-eyed Vireo, American Crow, Brown Creeper, Winter Wren, Golden-crowned Kinglet, Northern Parula, Song Sparrow, and Indigo Bunting. (All but the kinglet and Parula also advanced in rank on the Allegheny Plateau.)

The great majority of the bird population changes detected are similar to those reported on the BBS (1966-2000) for the Allegheny Plateau. Thus, understanding the habitat changes in the present study can perhaps shed some light on the reasons for some of the changes detected by the BBS.

This in turn suggests management priorities for retaining regional biodiversity. The Mourning Warbler and Dark-eyed Junco stand out as prime examples where a very small, isolated population at the southern edge of their range has persisted 50 years because periodic selective timber cutting in portions of an extensive forest provided enough suitable habitat over a long period of years.

Nashville Warbler was a species of special concern during this study because it was missing from the two bog sites where it had nested 50 years ago. At one of these sites it had been the most common breeding species. In 2002 we made a special effort to find it, by locating singing birds during the spring migration. However, in each case the birds disappeared by the end of May. The BBS also shows it as declining on the Allegheny Plateau.

Examining the list of declining or disappearing species, plot by plot, the declining birds tend to be ground- or shrub-nesting neotropical migrants, which suffer the effects of over-browsing by deer, as well as predation and cowbird parasitism from habitat fragmentation. Tree-top nesters and cavity-nesters are stable or increasing. Decline in native red spruce has had a detrimental effect on avian diversity in the bogs; this has been partially offset, for some species, by the maturing pine and spruce plantations in the uplands. Selective tree harvest has preserved avian diversity in some sites, in contrast to the poor diversity in even-age management.

CONCLUSIONS

Nashville Warbler is the only species from our 1950 study plots that could not be found 50 years later. Bewick's Wren and Yellow-bellied Sapsucker, which were present on the Allegheny Plateau 50 years ago, are also now gone.

New breeding species are either those expanding their ranges from the south (Red-bellied Woodpecker, Acadian Flycatcher, Tufted Titmouse, Northern Cardinal) or are boreal species finding suitable nesting habitat in maturing evergreen plantations (Red-breasted Nuthatch, Brown Creeper, Winter Wren, Pine Siskin).

Many Neotropical migrants whose populations are stable in extensive forested regions of the southern Appalachians are declining in the more fragmented landscape of the Allegheny Plateau. This is especially true of the species that nest on or near the ground.

In spite of the loss of many of the ancient hemlocks at Swallow Falls State Park, and the decline in Blackburnian Warblers there, the extraordinary height of the forest is reflected in a high density and high diversity of breeding birds there.

The maturing pine plantations, which we sampled for the first time, proved to be especially important for the Blackburnian Warbler, a species of concern in Maryland. Harvest of any site where Blackburnian is the commonest nesting species should be delayed.

LITERATURE CITED

Boone, D. D. 1996. Nashville Warbler. Pp. 320-321 in Robbins, C.S., and E.A.T. Blom, Atlas of the Breeding Birds of Maryland and the District of Columbia. Univ. Pittsburgh Press.

Haney, J.C., D.S. Lee, and M. Wilbert. 2001. A Half-century Comparison of Breeding Birds in the Southern Appalachians. Condor 103:268-277.

International Bird Census Committee. 1970. Recommendations for an International Standard for a Mapping Method in Bird Census Work. Audubon Field Notes 24(6):723-726.

James, F.C., and H.H. Shugart, Jr. 1970. A Quantitative Method of Habitat Description. Audubon Field Notes 24(6):727-736.

Robbins, C.S., et al. 1949. Thirteenth Breeding Bird Census. Audubon Field Notes 3(6):254-272.

Robbins, C.S. 1950. Ecological Distribution of the Breeding Parulidae of Maryland. Masters thesis, George Washington University.

Robbins, C.S., et al. 1951. Fifteenth Breeding Bird Census. Audubon Field Notes 5(6):313-330.

ACKNOWLEDGMENTS

We thank the land owners for granting permission: Maryland Department of Natural Resources, The Nature Conservancy, The Maryland Salem Children's Trust, and private citizens. We also thank Shaun Sanders, Randy Storey and Roger Kitzmiller of the Garrett Soil Conservation District for providing old and current aerial photos of the study sites, Dan, Jon, and Jon K. Boone for conducting some of the censuses, Dan Stotts and Jon Boone for helping set up plots, Laura Mitchell and Jane Fallon for assistance with vegetation measurements, Jeff Spendelow for use of his Nashville Warbler photo, and Kinard Boone for constructing the poster.