



60-YEAR CHANGES IN PATUXENT BREEDING BIRDS

Chandler S. Robbins

USGS Patuxent Wildlife Research Center, Laurel, MD



Three methods, Point Counts, Breeding Bird Survey, and Atlas are used to detect bird population changes on and adjacent to the Patuxent Research Refuge (PRR). The initial count of 5,429 pairs of birds of 80 species nesting on the original 2,656 acres of the Patuxent Research Refuge was conducted during the summer of 1943. We marked the location of each pair on a species map (Fig. 1), and the totals were published by Stewart et al. (*Am. Mid. Nat.* 47(2):257-363) in 1952. Subsequent field projects have documented habitat preferences and changes in species composition and abundance, the most recent being point count surveys by Danny Bystrak in 1996 (Fig. 2) and 1997 and the MD/DC atlas projects of 1983-87 and 2002-06.

The Bystrak study (Fig. 2) was a systematic sample of 110 5-minute point counts throughout the then 4,700 acres of PRR, the points being 402 m apart. These counts recorded 78 species, and for some species they revealed dramatic declines from the 1943 counts. Although both the methodology and the boundaries of the area covered were different from the 1943 survey, a comparison reveals major changes in relative abundance of common species.

The North American Breeding Bird Survey (BBS) is designed to track continental and regional changes in bird populations. Maryland is sampled by 53 50-stop BBS routes, but the closest that one of these random routes comes to PRR is 2 miles, so the Maryland trend is used here.

Atlas methodology enables one to detect changes in species composition over a period of years. Most of the Patuxent Research Refuge lies in Laurel USGS 7.5 minute Quadrangle, so the six 5x5 km blocks (24 quarterblocks) of Laurel Quadrangle (Fig. 3) provide a convenient way to monitor changes on the refuge and its immediate vicinity. Although more than half of Laurel quadrangle is occupied by federal land, thousands of new homes and dozens of new shopping centers have altered the surrounding habitat in the past two decades.

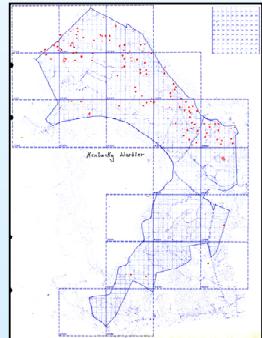


Figure 1. Kentucky Warbler distribution in 1943.

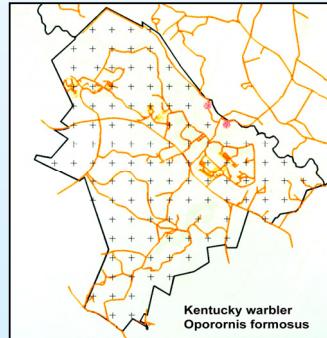


Figure 2. Kentucky Warbler distribution in 1996.

RESULTS

Most of the changes in bird populations can be related to local environmental changes (Table 1).

Since 1943, 126 breeding species have been recorded within the 68 square mile area of Laurel Quadrangle, and ten others have been recorded in summer without evidence of nesting. Of the 80 original species in 1943, three species, all grassland birds, are now extirpated: Horned Lark, Vesper Sparrow, and Henslow's Sparrow.

Of the 46 additional breeding species found here since the original survey in 1943, 13 had responded to the construction of wetlands, five were introduced by man, two were attracted by nest boxes, one responded to aging of the deciduous forest, five were southern species expanding northward, six were species at the edge of their breeding range, eleven were species for which little suitable habitat was available, and three remain unassigned (Table 2).

Of the 19 species that were recorded in five or more additional quarterblocks in the second atlas (2002-05), seven showed significant statewide BBS increases during the same period, 1983-2004 (Table 3). One species, Hooded Merganser, was not recorded on a Maryland BBS route. All but two of the others had non-significant BBS increases. The two exceptions, Green Heron and Blue Grosbeak, had slight but non-significant BBS declines from small samples.

Of the 12 species that were found in at least four fewer quarterblocks in the second atlas (Table 4), five showed a significant statewide negative BBS trend for both the same period and for the entire BBS period of 1966-2005. Two others had a significant decline for the longer period, 1966-2005. Five of the species that are declining locally are stable statewide.

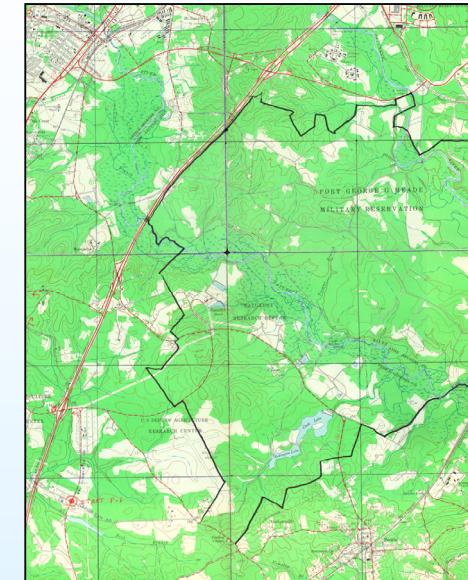


Figure 3. Laurel quadrangle with atlas blocks and quarterblocks

Table 1. Environmental events

1939	Dedication of Patuxent Research Refuge
1939-83	Construction of ponds and marshes
1946-50	DDT studies at Patuxent; DDT banned in 1972
1948	Nest boxes for bluebirds, House Wrens
1948	Resident Canada Geese released
1950-	Patuxent River flow controlled by Rocky Gorge Dam
1950-	Maryland raptors protected by law
1950-	Nest boxes erected for Wood Ducks
1965	Open fields sacrificed for Whooping Crane propagation
1976	Nest boxes erected for Purple Martins
1980-	Deer population went out of control
1984	Chesapeake Bay Critical Area Act of 1984
1991	Maryland Forest Conservation Act of 1991
1991	Acquisition of Fort Meade land
Ongoing	Regional conservation projects (TNC, county & local parks)



Photo by C.S. Robbins



Photo by C.S. Robbins

CONCLUSION

Atlas studies can be extremely valuable as conservation tools. They sample the entire avifauna, not just roadside habitats; and they detect changes at a more local scale than the BBS. Most of the eastern United States and the inhabited regions of Canada have already been covered by one or two five-year atlas studies. Everyone lives in an atlas block, so the changes detected relate to everybody's back yard or local park or favorite birding area.

The scale at which an atlas study is designed is generally 5x5 km or 10x10 km. The finer the grid, the easier it is to detect change. Many more trends were detected at the quarterblock (2.5 km) level than the 5x5 km. The catastrophic decline in Hooded Warblers, for example, was not detected at the 5 km level because there happened to be at least one pair remaining in each of the six atlas blocks.

ACKNOWLEDGMENTS

I thank Danny Bystrak for use of his unpublished 1996 data, and Jane Fallon for extracting his species totals. The following atlas participants contributed most of the records for the six Laurel blocks: Jay Sheppard, Marshall Howe, Robert Whitcomb, Dianne and Andy Aguilera, Delos C. Dupree, Jane and Fred Fallon, Deanna Dawson, Kathy Klimkiewicz, Carolyn Sturtevant, David Mozurkewich, Edward Clark, Stan Arnold, Barbara Dowell, Danny Bystrak, and Woody Martin. Thanks to Kinard Boone for constructing the poster.



Table 2. Chief reason additional species were recorded at PRR and vicinity.

Attracted by construction of wetlands	Species at edge of geographic range
Am. Black Duck	Least Flycatcher
Ring-necked Duck	Warbling Vireo
Hooded Merganser	Veery
Pied-billed Grebe	Cerulean Warbler
Least Bittern	Bachman's Sparrow
American Bittern	Northern Oriole
Great Blue Heron	Sparrow because of limited habitat locally
Yellow-crowned Night-Heron	Northern Harrier
Osprey	Barn Owl
Bald Eagle	Red-headed Woodpecker
Virginia Rail	Rough-winged Swallow
Common Moorhen	Bank Swallow
	Cliff Swallow
	Brown Creeper
	Sedge Wren
	Yellow Warbler
	Swamp Sparrow
	Pine Siskin

Other
American Kestrel
Eastern Screech-Owl
Common Grackle

Attracted by nest boxes	Attracted by maturing deciduous forest
Tree Swallow	White-breasted Nuthatch
Purple Martin	Chuck-will's-widow
	Fish Crow
	Yellow-throated Warbler
	Summer Tanager
	Blue Grosbeak

Table 3. Comparison of Atlas and Breeding Bird Survey (BBS) trends for increasing species. Atlas figures are number of quarterblocks. BBS trends are short-term and long-term. BBS changes significant at 0.05 are in boldface. Number of breeding pairs in 1943 and totals from Bystrak survey are shown at left.

Count	Point	Species	Atlas		Maryland BBS	
			1943	1996	1983-87	2002-05
0	30	Canada Goose	13	19	13.0	0.00
0	0	Hooded Merganser	2	9	---	---
0	0	Wild Turkey	0	12	24.4	0.00
3	0	Green Heron	11	18	-2.0	0.06
1	5	Black Vulture	4	10	3.6	0.52
7	1	Turkey Vulture	12	18	0.5	0.60
0	0	Bald Eagle	0	10	6.5	0.00
3	0	Cooper's Hawk	1	8	7.3	0.12
1	4	Red-tailed Hawk	11	16	2.4	0.17
11	2	Barred Owl	13	18	0.4	0.93
0	3	Fish Crow	9	14	1.2	0.33
0	3	Tree Swallow	4	17	9.8	0.00
0	0	Rough-wg Swallow	4	11	2.5	0.24
0	42	White-br. Nuthatch	14	24	7.7	0.00
2	2	Prothonotary Warbler	6	12	1.0	0.53
0	4	Summer Tanager	5	11	2.4	0.03
0	6	Blue Grosbeak	17	23	-0.6	0.10
5	45	Red-wing Blackbird	16	21	0.5	0.34
6	6	Orchard Oriole	7	18	0.6	0.19

Table 4. Comparison of Atlas and BBS trends for Decreasing Species

Count	Point	Species	Atlas		Maryland BBS	
			1943	1996	1983-87	2002-05
25	0	Northern Bobwhite	17	2	-8.4	0.00
12	0	Black-billed Cuckoo	4	0	0.5	0.93
0.5	0	Common Nighthawk	4	0	---	-6.7
0	5	Purple Martin	16	8	0.5	0.75
0	1	Yellow Warbler	6	1	0.3	0.78
45	1	Black-&-white Warbler	14	10	-6.5	0.07
275	40	American Redstart	13	9	0.8	0.72
188	4	Kentucky Warbler	18	9	-5.3	0.00
186	6	Hooded Warbler	21	11	---	0.3
91	0	Yellow-breasted Chat	19	12	-1.9	0.02
145	5	Field Sparrow	19	15	-3.2	0.00
3	0	Eastern Meadowlark	7	2	-5.2	0.00