

Summer Distribution and Population Trends of Gray Catbird, Brown Thrasher and Northern Mockingbird in Indiana

JOHN S. CASTRALE AND LESLIE DONALDSON
Indiana Division of Fish and Wildlife
Mitchell, Indiana 47446

Introduction

Few attempts have been made to analyze population trends and distributions of birds in Indiana. Keller et al. (9), Mumford and Keller (14), and Webster (17) compared recent records of abundance and regional occurrence with assessments made by Butler (2) in the late 1800s. Webster (16, 17) classified the distributions of bird species based on county nest records for 1930 to 1979. Results of Summer Bird Counts (8), May Day Bird Counts (7), and Christmas Bird Counts (13) are published annually in the *Indiana Audubon Quarterly*. Although these 3 surveys are on a large scale and are able to detect changes in distributions and numbers, they suffer from uneven statewide coverage and variable sampling effort among years and survey areas. They have been established nonrandomly and most are greatly affected by local weather conditions.

Of the various organized surveys, the federal Breeding Bird Survey (BBS) seems most suited for determining population trends and distributions. It was initiated in Indiana in 1966 and continues. Castrale (4) presented population trends of 17 species for the period 1966-1983 using BBS data. BBS records were also summarized for birds listed as endangered, threatened, and of special concern by the Indiana Division of Fish and Wildlife (5).

This study analyzes BBS data for the family Mimidae. The group was chosen because there are 3 species of this family common and widely distributed in Indiana. All are highly vocal and easily detected, and the ecotonal habitats they favor are well represented on BBS routes.

Methods

In 1966, 42 BBS routes were established in Indiana by the U.S. Fish and Wildlife Service (Figure 1). Three or 4 routes per 1° latitude/longitude block were originally located along 40 km of secondary roads using random starting points and directions. Volunteer cooperators survey routes once during the month of June. Surveys begin at the designated starting point 30 minutes before sunrise and the number of birds heard or seen within 0.4 km of each stop is recorded during a 3-minute period. Each route consists of 50 stops spaced at 0.8-km intervals, so 4.0-4.5 hours are required to complete a survey. In its initial year, 16 Indiana routes were surveyed and 13-36 surveys (mean = 19.2) have been conducted each year. Sixteen routes are considered long-term surveys because they have been conducted at least 16 of the 19 years. Beginning in 1981, the number of routes covered was increased substantially and only 4 of the 42 routes have never been surveyed. Four physiographic regions (Figure 1) are useful in analyzing BBS data in Indiana: Great Lakes Plain (sometimes referred to as northern Indiana in this paper), Tipton Till Plain (central), Highland Rim (south-central), and the Lexington Plain (southwest and southeast). References to southern Indiana utilize combined data from the Highland Rim and Lexington Plain. Additional information about Indiana BBS can be found in Castrale (4). Limitations of the BBS have been discussed by Bystrak (3).

Copies of BBS data were supplied by the U.S. Fish and Wildlife Service or obtained directly from BBS cooperators (1984 data). Annual population indices were

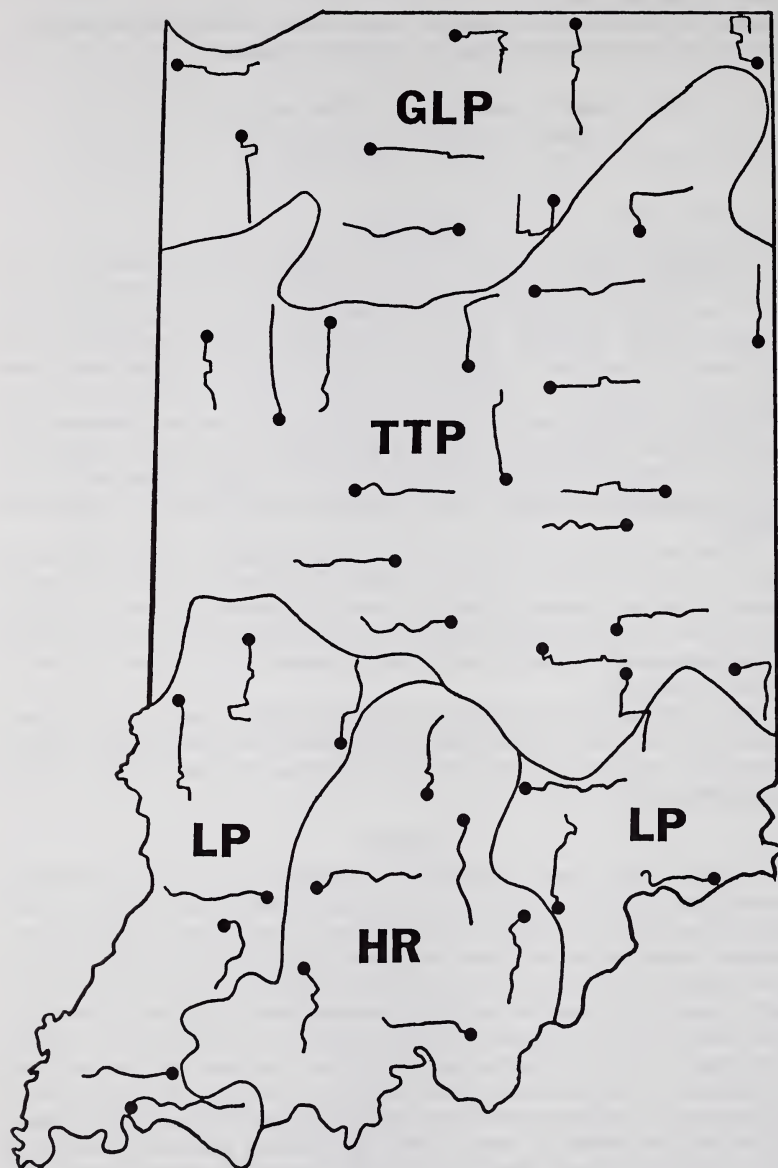


FIGURE 1. Locations of BBS routes in Indiana relative to physiographic regions: Great Lakes Plain (GLP), Tipton Till Plain (TTP), Highland Rim (HR), and Lexington Plain (LP).

calculated using changes in totals from comparable routes between each pair of successive years. Least squares regression was used to determine linear trends for the 19-year period. Mean numbers of birds per route were calculated for the first and last 5 years of survey data. Means for long-term routes were subjected to paired t-tests and sign

tests to determine statistical differences in abundance between these 2 periods. Calculated means for the 1980-1984 period were utilized to examine present species distribution. Regional differences were tested with Kruskal-Wallis tests followed by Mann-Whitney tests. Least squares regressions of route means with latitudes of starting points were conducted. Statistical significance of all tests was at the 95% level unless otherwise indicated.

Results

The Gray Catbird (*Dumetella carolinensis*) was the most common mimid species, being detected on 96% of the 365 surveys conducted in Indiana from 1966-1984 at a rate of 5.7 birds/survey. Brown Thrashers (*Toxostoma rufum*) were detected at a lesser rate (5.0 birds/survey) but on a similar frequency (97%) of surveys. Northern Mockingbirds (*Mimus polyglottos*) were also commonly noted (4.5 birds/survey) but were less often (67% of surveys) found.

Gray Catbird

Numbers of catbirds recorded on BBS were highest in south-central Indiana and lowest in the Tipton Till Plain (Figure 2a). Statistically, two similar regions are indicated. Numbers recorded on routes in the Highland Rim ($\bar{x} = 10.1$) and Great Lakes Plain ($\bar{x} = 8.7$) were similar, but differed from the Tipton Till Plain ($\bar{x} = 5.1$) and Lexington Plain ($\bar{x} = 6.3$) regions. Although catbird abundance differed by region (Kruskal-Wallis $T = 10.74$, $df = 3$, $P < 0.05$), there was no consistent latitudinal trend evident ($r = 0.02$, $df = 36$, $P > 0.05$).

During the 1966-1984 period, catbird numbers showed a statewide increase that approached statistical significance ($r = 0.43$, $df = 17$, $0.05 < P < 0.10$). Numbers detected on northern routes showed a significant upward trend ($r = 0.65$, $df = 17$, $P < 0.01$), while those in central Indiana increased at a rate that approached statistical significance ($r = 0.42$, $df = 17$, $0.05 < P < 0.01$). Catbirds in southern Indiana exhibited no consistent trends ($r = -0.04$, $df = 17$, $P > 0.05$). Long-term routes showed a significant increase ($t = 3.00$, $df = 15$, $P < 0.01$) between the periods 1966-1970 and 1980-1984. Fourteen routes showed increases, 1 declined, and 1 remained unchanged (sign test, $P < 0.001$).

Brown Thrasher

Thrasher numbers were also greatest in south-central Indiana ($\bar{x} = 6.6$) and lowest in central Indiana ($\bar{x} = 5.0$). However, regional differences were not significantly different (Kruskal-Wallis $T = 1.02$, $df = 3$, $P > 0.05$). Latitudinal trends in abundance were also lacking ($r = -0.10$, $df = 36$, $P > 0.05$).

Population trends for 1966-1984 were not evident on a statewide basis ($r = -0.09$, $df = 17$, $P > 0.05$), although a population decline in northern Indiana (Figure 2b) approached statistical significance ($r = -0.40$, $df = 17$, $0.05 < P < 0.10$). Regression lines for central Indiana exhibited a nonsignificant increase ($r = 0.23$, $df = 17$, $P > 0.05$), while those for southern Indiana declined somewhat ($r = -0.23$, $df = 17$, $P > 0.05$). The mean number of birds recorded on long-term routes during 1966-1970 was not statistically different from those recorded during 1980-1984 ($t = 0.40$, $df = 15$, $P > 0.05$). Nine routes increased and 7 declined (sign test, $P > 0.05$).

Northern Mockingbird

Mockingbirds were recorded in greatest numbers in the Lexington Plain ($\bar{x} = 9.2$) of southeastern and southwestern Indiana and lowest in northern and central Indiana ($\bar{x} = 1.2$). These regional differences were statistically significant (Kruskal-Wallis

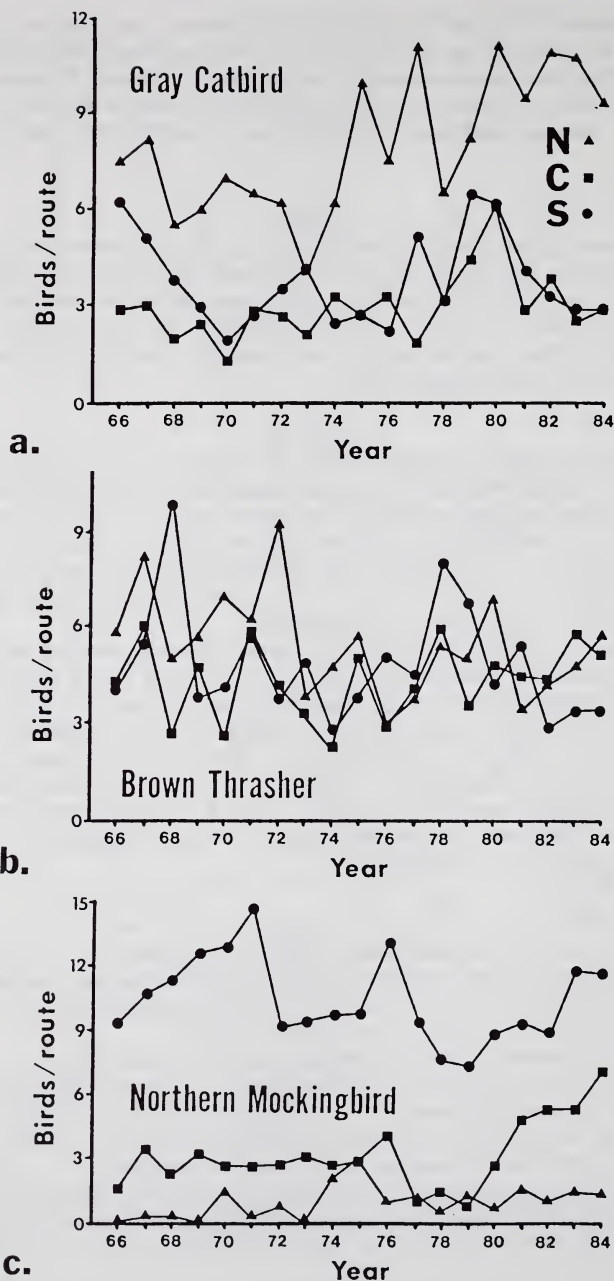


FIGURE 2. Regional population trends of the gray catbird (a), brown thrasher (b), and northern mockingbird (c) using Indiana BBS data, 1966-1984. Regions are designated by circles (south), squares (central), and triangles (north).

$T = 15.78$, $df = 3$, $P < 0.01$). Unlike catbirds and thrashers, this species exhibited a strong negative correlation with latitude ($r = -0.60$, $df = 36$, $P < 0.001$).

During the 1966-1984 period, population levels of mockingbirds declined ($r = -0.49$, $df = 17$, $P < 0.05$), although numbers recorded in northern ($r = 0.47$, $df = 17$, $P < 0.05$) and central ($r = 0.52$, $df = 17$, $P < 0.05$) Indiana increased significantly (Figure 2c). The statewide decline was primarily due to a statistically nonsignificant decline in southern populations ($r = -0.29$, $df = 17$, $P > 0.05$). Statewide, the mean number of mockingbirds on long-term routes did not differ significantly between 1966-1970 and 1980-1984 ($t = -1.84$, $df = 15$, $P > 0.05$). Ten routes declined, 4 increased, and 2 remained unchanged (Figure 3; sign test, $P > 0.05$).

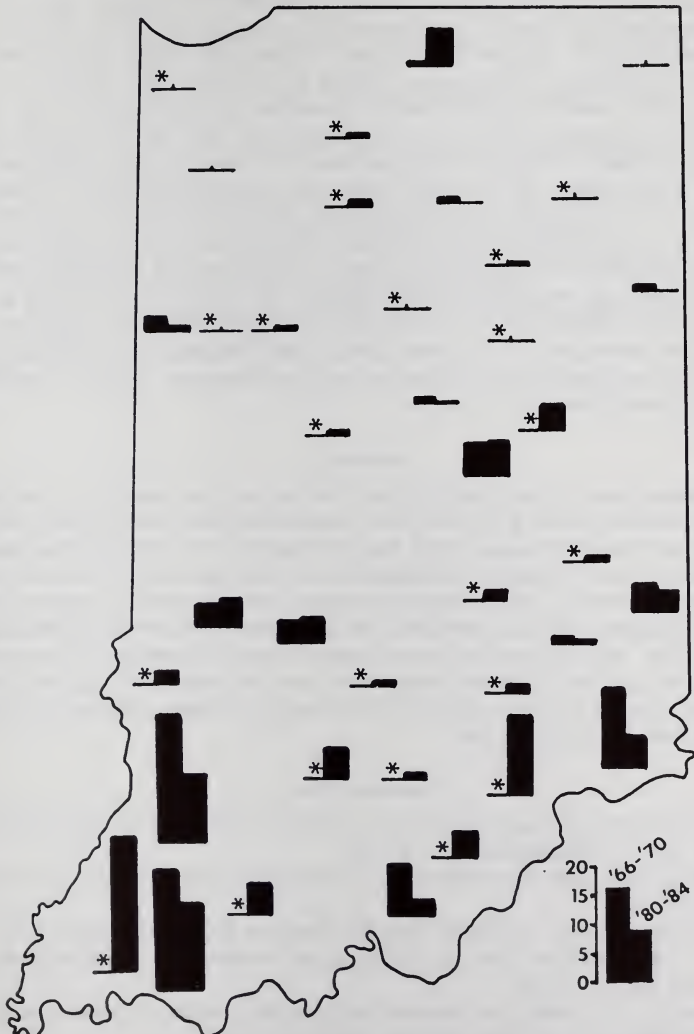


FIGURE 3. Mean number of northern mockingbirds detected on Indiana BBS routes for the periods 1966-1970 and 1980-1984. Asterisks indicate surveys were not conducted.

Discussion

Although catbirds, thrashers, and mockingbirds are widespread and common in Indiana and frequent similar habitats, they exhibit differences in regional abundance patterns and recent population trends. All are highly insectivorous in summer, but they switch to a diet of small fruits in winter and at other times when this item is available (6). Habitat differences are subtle; all 3 species inhabit ecotonal woodland/shrubland. Catbirds are most often found along woodland edges or in dense, brushy thickets. Thrashers and mockingbirds are typically found along fencerows, with the latter species more tolerant of open areas.

A major difference among these species is their degree of migratory movement. Mockingbirds are the least migratory, while few catbirds and thrashers winter in Indiana. Most catbirds winter in southeastern U.S. and Mexico; most thrashers in southeastern U.S. (1). The relative abundance of these species in the winter is reflected by results of Christmas Bird Counts in Indiana for the period 1981-1984 (10, 11, 12, 13). The ratio of mockingbirds to thrashers to catbirds was approximately 60:4:1, and the number of counts reporting these species was 54%, 20%, and 8%, respectively. Thus, mockingbirds, wintering in large numbers in Indiana, are most subject to impacts of winter weather. This is evident in Figure 2c, where population lows on southern and central Indiana routes occurred during the late 1970's when there were 3 consecutive years of exceptionally harsh weather. Thrashers and catbirds did not exhibit these patterns (Figure 2a, 2b). Winter weather in conjunction with habitat may restrict the distribution and abundance of mockingbirds in the state. Evidence for this is the expansion of the population of the mockingbird northward (Figure 2c). Range expansion by the mockingbird in the United States is well recognized, and has been correlated with the establishment of nonnative fruit-producing shrubs, especially multiflora rose (*Rosa multiflora*) (2, 14, 15, 16).

Summary

Nineteen years of data from Breeding Bird Surveys were analyzed for the three species of Mimidae found in Indiana. Gray Catbird populations were greatest in northern and south-central Indiana, while Brown Thrashers were uniformly distributed throughout the state. Northern Mockingbirds were most common in southeastern and southwestern Indiana. Catbirds increased in recent years, primarily in northern Indiana. Mockingbirds, the least common of the three species considered, decreased during 1966-1984. Regional analyses, however, showed increases in numbers of this species for northern and central Indiana. Population lows for mockingbird coincided with the series of severe winters in the late 1970's. Thrasher numbers displayed no consistent statewide or regional trends.

Literature Cited

1. American Ornithologists' Union. 1983. Check-list of North American Birds, 6th ed. A.O.U., Washington, D.C. 877pp.
2. Butler, A.W. 1898. Birds of Indiana. Indiana Dept. Geol. Nat. Res. Ann. Rept. 22:515-1187.
3. Bystrak, D. 1981. The North American Breeding Bird Survey. Pages 34-41 in C.J. Ralph and J.M. Scott, eds. Estimating the numbers of terrestrial birds. Stud. Avian Biol. 6. 630pp.
4. Castrale, J.S. 1985a. The Breeding Bird Survey in Indiana: eighteen years of overlooked data. Indiana Audubon Quart. 63:15-30.
5. Castrale, J.S. 1985b. Endangered and threatened birds of Indiana: population information from Breeding Bird Surveys. Indiana Audubon Quart. 63:134-147.

6. Graber, R.R., J.W. Graber, and E.L. Kirk. 1970. Illinois birds: Mimidae. Illinois Nat. Hist. Surv. Biol. Notes 68. 38pp.
7. Hopkins, E.M. 1984. Results of the 1984 Indiana Audubon Big May Day Bird Count. Indiana Audubon Quart. 62:120-135.
8. Jackson, S.F. 1985. Indiana Audubon Society 1984 Summer Bird Count. Indiana Audubon Quart. 63:64-85.
9. Keller, C.E., S.A. Keller, and T.C. Keller. 1979. Indiana birds and their haunts. Indiana Univ. Press, Bloomington. 214pp.
10. Mason, J., and A. Mason. 1982. The 1981 Christmas Bird Count. Indiana Audubon Quart. 60:34-48.
11. Mason, J., and A. Mason. 1983. The 1982 Christmas Bird Count. Indiana Audubon Quart. 61:46-62.
12. Mason, J., and A. Mason. 1984. The 1983 Christmas Bird Count. Indiana Audubon Quart. 62:76-94.
13. Mason, J., and A. Mason. 1985. The 1984 Christmas Bird Count. Indiana Audubon Quart. 63:95-110.
14. Mumford, R.E., and C.E. Keller. 1984. The birds of Indiana. Indiana Univ. Press, Bloomington. 376pp.
15. Stiles, E.W. 1982. Expansions of mockingbird and multiflora rose in the north-eastern United States and Canada. Amer. Birds 36:358-364.
16. Webster, J.D. 1966. The birds. Pages 452-473 in A.A. Lindsey, ed. Natural features of Indiana. Indiana Acad. Sci., Indianapolis. 600pp.
17. Webster, J.D. 1980. The distribution of Indiana's birds and birdwatchers. Proc. Indiana Acad. Sci. 89:68-81.

