THE SECOND ATLAS OF

# Breeding Birds *in* Ohio

EDITED BY

Paul G. Rodewald, Matthew B. Shumar, Aaron T. Boone, David L. Slager, and Jim McCormac

THE PENNSYLVANIA STATE UNIVERSITY PRESS

UNIVERSITY PARK, PENNSYLVANIA

Over 900 individuals contributed to the second Atlas project. Volunteers who contributed data through the second Atlas website reported over 70,000 hours of personal time and nearly 400,000 miles driven, demonstrating their strong commitment to the project while also contributing significantly to Ohio's economy. More than 1 million bird records were generated by the project, with records from all 4,437 blocks. Overall, there were 205 species with some evidence of breeding, including 194 confirmed breeding species and 11 species with either possible or probable breeding status. There were 5 species newly confirmed as breeding for Ohio and 5 species that had not been reported breeding for 50–100 years. Surveys of the 764 priority blocks revealed 44–119 species per block, with an average of 76 species per block.

The extensive survey efforts of volunteers and paid staff generated an unprecedented data set on the breeding birds of Ohio, one that has rarely been duplicated in other states. This new information will be invaluable given concerns about the impacts of climate and land-cover change on birds and should be central to the development of effective conservation planning and management of bird populations in Ohio. The ultimate value of the time and resources devoted to developing the second Atlas data set will be especially apparent once the state initiates work on the third Ohio Breeding Bird Atlas in approximately 2030.

## 1.4 About This Book

### REFERENCES

*The Second Atlas of Breeding Birds in Ohio* draws upon a diverse body of ornithological literature to discuss the historical status, distribution, and natural history of birds that breed within Ohio and the broader region. This includes peer-reviewed journal articles, especially those covering North American ornithology (e.g., *The Auk: Ornithological Advances*, *The Condor: Ornithological Applications*, *Journal of Field Ornithology*, *Wilson Journal of Ornithology*), and a series of National Audubon Society publications that summarized bird occurrence and distribution over many decades (*Bird-Lore*, *Audubon Field Notes*, *American Birds*, *Field Notes*, and *North American Birds*). State bird journals were often referenced for both bird records and articles, including the *Ohio Cardinal*, *Cleveland Bird Calendar*, and the *Bobolink*.

Of special importance in writing this volume were several books detailing the status and distribution of birds in Ohio, and those works cited most often are listed in table 1.4.1. Although the history of ornithologists working within Ohio stretches back over 200 years and includes visits to the state by John James Audubon and Alexander Wilson during the early 1800s (Peterjohn 2001), Jared Kirtland did not publish the first summary of all the birds of Ohio until 1838. Other important early reports on the state's birds include those by John Maynard Wheaton (1882), William L. Dawson (1903), and Lynds Jones (1903). However, it was not until the 1930s that Lawrence E. Hicks published the first report on the statewide distributions of breeding birds, which included the species reported to nest within each of Ohio's 88 counties (Hicks 1935a). After the mid-1930s, most of the important works on birds in Ohio have been either regional in focus (e.g., Trautman 1940; Campbell 1940, 1968; Williams 1950; Anderson et al. 2002; Trautman and Trautman 2006) or annotated checklists of species documented within the state (e.g., Borror 1950; Trautman and Trautman 1968; Peterjohn et al. 1987).

Following the work of Hicks during the mid-1930s, the next statewide assessment of breeding avifauna was the first Atlas book (Peterjohn and Rice 1991), the first comprehensive assessment of the distribution of breeding birds in Ohio. This work was so heavily used in compiling the second Atlas book, that in referencing results from the first Atlas, authors do not cite Peterjohn and Rice (1991), a rather typical practice for second Atlas books given space limitations within species accounts. However, Peterjohn and Rice (1991) are cited when a second Atlas account draws upon the authors' interpretation of results from the first Atlas. Finally, the most recent book by Bruce Peterjohn (2001) presents excellent and exhaustive coverage on the status and distribution of Ohio's birds; understandably, this work is heavily cited throughout the second Atlas.

### ABBREVIATIONS

Given space limitations in this book, especially for species accounts, numerous abbreviations and acronyms are used (table 1.4.2). Measurements are presented using the metric system, with English units in parentheses.

### COMMONLY REFERENCED SITE NAMES

A large number of sites are mentioned in the book to describe bird distributions. County names are provided for infrequently mentioned locations; but to save space, commonly mentioned locations often do not provide the county name. Table 1.4.3 provides location information for these sites, which are shown in figure 1.4.1.

### AVAILABILITY OF SECOND ATLAS DATA

The second Atlas was supported through public funding, and data collected by the project will be made available upon request to the Ohio Division of Wildlife.

TABLE 1.4.1 Books on Ohio ornithology frequently cited in the second Atlas

| Author | Year | Title |
|---|---|---|
| Jared P. Kirtland | 1838 | *Report on the Zoology of Ohio* |
| John Maynard Wheaton | 1882 | *Report on the Birds of Ohio* |
| Lynds Jones | 1903 | *The Birds of Ohio; a Revised Catalogue* |
| Lawrence E. Hicks | 1935 | *Distribution of the Breeding Birds of Ohio* |
| Milton B. Trautman | 1940 | *The Birds of Buckeye Lake, Ohio* |
| Louis W. Campbell | 1968 | *Birds of the Toledo Area* |
| Bruce G. Peterjohn and Daniel L. Rice | 1991 | *Ohio Breeding Bird Atlas* |
| Bruce G. Peterjohn | 2001 | *The Birds of Ohio* |

emphasis was placed on surveying priority blocks. Atlasers were instructed to put at least 25 hours of survey effort into priority blocks and strive to document at least 90 percent of the species total observed during the first Atlas. For nonpriority blocks, the suggested target was to document at least 75 percent of the species total recorded during the first Atlas in the priority block associated with that USGS topographic quad. Effort was continually assessed during field collection in order to achieve effort within priority blocks comparable to that recorded by the first Atlas; given issues associated with effort (e.g., missing data, random effects associated with observer and season), these data were not used post hoc to adjust for detection probability.

## 3.7 Analysis and Mapping of Block Data

Second Atlas distribution maps were generated for each species by mapping the breeding category (possible, probable, confirmed) containing the highest reported breeding evidence code (table 3.2.1) for each block. This information was collapsed to presence/absence in order to calculate the change in priority block occupancy between atlas periods. The significance of these changes was assessed for each species by comparing priority block totals from each atlas period using a z-test for differences in proportions; z-tests were computed using "quantmod," a free statistical package written in the R language (Ryan 2013). Results of this analysis are discussed in individual species accounts and presented in appendix B.

### BLOCK TURNOVER

Larger changes in the number of occupied blocks between atlas periods can suggest changes in a species' distribution at the state scale, or even within a physiographic region, but this metric alone does not take into account changes in the occupancy of individual blocks, the spatial clustering of occupied blocks, or changes in any distribution boundaries. Species utilizing ephemeral habitats (e.g., early-successional forest) may exhibit high rates of turnover, even if there is no perceived change in the total number of blocks occupied (Wilson et al. 2012). As detailed in Wilson et al. (2012), we calculated a relative block turnover metric to assess block fidelity between atlas periods using the following formula:

$$\textit{Relative Block Turnover} = \left[1 - \left(\frac{n_{both}}{n_{either}}\right)\right] - \left[\frac{|n_{1st} - n_{2nd}|}{max(n_{1st}, n_{2nd})}\right]$$

where $n_{both}$ is the number of priority blocks in which a species was recorded during both atlas periods, $n_{either}$ is the total number of priority blocks occupied during either atlas period, $n_{1st}$ is the number of priority blocks occupied during the first Atlas, and $n_{2nd}$ is the number of priority blocks occupied during the second Atlas. The first term calculates relative turnover, which ranges from 0 (no turnover; same blocks occupied) to 1 (complete turnover; present in completely different blocks). The second term calculates the relative change in the number of blocks occupied and ranges from 0 (no change) to 1 (colonization or extirpation).

Relative block turnover therefore represents the difference between the change in the number of occupied blocks and the relative proportional turnover. The resulting values representing this metric range from 0 (no change, or either complete extirpation or colonization) to 1 (complete turnover; no individual priority block was occupied during both atlas periods). Rare species (e.g., Pine Siskin) are more likely to have high turnover values, although values for these species are still informative, as low rates of turnover could indicate high site fidelity and/or high habitat quality.

Relative block turnover does not, however, account for changes in effort or detectability between atlas periods. Although we attempted to keep effort consistent during data collection, changes in detectability may have resulted in artificially increased rates of turnover. For example, changes in land cover and/or land use between atlas periods may have resulted in some woodlots becoming isolated or inaccessible. Forest-obligate species (e.g., Wood Thrush) present in these patches may go undetected if volunteers cannot access the appropriate habitat. Results from this turnover analysis are presented along with block summary results in appendix B. Additional details may be provided within species accounts where detectability may have confounded rates of occupancy or block turnover.

It is possible that substantial distribution shifts may occur while the overall number of occupied blocks remains relatively constant. Contrasting statewide and regional values for relative block turnover may indicate shifts in a species' distribution within the state. These shifts may result from changes in land cover, land use, or possibly climate.

### LATITUDINAL SHIFTS

Given concern over the effects of climate change on wildlife, we quantified poleward changes in species distributions. Of species observed during both atlas periods, distribution changes of 30 species were analyzed. Species were primarily selected based on the presence of a distribution boundary within Ohio and sample size (number of occupied blocks during each atlas period; see Batdorf 2012); rare species (those that occupied less than 10 blocks during the two atlas periods combined) and ubiquitous species (those that occupied more than 90% of blocks during the two atlas periods combined) were not included in the analysis. Similar to previous studies (e.g., Thomas and Lennon 1999; Zuckerberg et al. 2009; Wilson et al. 2012), we quantified the change in a species distribution boundary by measuring the difference in median latitude between the northernmost (or southernmost for northern species) blocks from each atlas period. To avoid issues with extreme outliers, irregularly shaped state boundaries, and occupancy associated with specific physiographic regions, we defined the distribution boundary for a species by selecting all blocks along the leading edge (for southerly-breeding species) or trailing edge (for northerly-breeding species). The

# RED-TAILED HAWK *Buteo jamaicensis*

PHOTOS: ROBIN ARNOLD / BRUCE LEONHARDT

Often seen perched on roadside utility poles, soaring in clear skies overhead, or hunting in open environments, the Red-tailed Hawk is one of North America's most recognizable raptors. Despite their namesake, Red-tailed Hawks do not obtain their characteristic rufous tail feathers until the definitive basic molt after their second summer (Pyle et al. 2008). Additionally, one of the 12 recognized subspecies (Harlan's Hawk; *B. j. harlani*) never acquires the bright rufous tail (Preston and Beane 2009). Within Ohio, breeding individuals are the widespread eastern subspecies (*B. j. borealis*; Peterjohn 2001).

Generally an open-country species, Red-tailed Hawks in Ohio occupy a mosaic of habitats that typically include agricultural fields and woodlots, with scattered trees, fencerows, or other locations for perching; they often occupy both suburban and urban areas as well. Nests are typically constructed near the edges of woodlots and are often reused for multiple years (Preston and Beane 2009), though Great Horned Owls will occasionally preempt a Red-tailed Hawk nest for their own use (Bent 1937).

**DISTRIBUTION** Red-tailed Hawks breed throughout North America, from Alaska to Nova Scotia and south throughout the United States to Panama. The eastern subspecies breeds as far west as the Great Plains and Manitoba. Although northern breeders are migratory, most Ohio birds are likely permanent residents (Peterjohn 2001; Preston and Beane 2009).

Though they are a common sight today, Red-tailed Hawks were not always ubiquitous in Ohio. Persecution and habitat degradation in the early 1900s decimated populations, with the species reaching lowest numbers in the state during the 1920s and 1930s (Peterjohn 2001). At that time, Red-tailed Hawks were uncommon in southeastern Ohio but rare to absent in the rest of the state (Hicks 1935a; Hicks 1937). Populations increased through the latter half of the century (Sauer et al. 2014), and the species was common and widespread during the first Atlas. Priority block occupancy was high during both the first and second Atlases (95% and 98%, respectively); the number of breeding confirmations in priority blocks increased by 28 percent. Second Atlas observers reported nests with young by 24 March and recently fledged young through August.

The slightly lower occurrence in some regions may be related to the availability of habitats for both nesting and hunting. For example, the larger expanses of mature forest in the Ohio Hills presumably provide ample locations for nesting, but the paucity of open habitats in many areas may not provide enough opportunities for foraging. Similar issues may explain lower block occupancy in western parts of the Prairie Peninsula, where vast open spaces provide habitat for hunting but fewer nesting opportunities. Small mammals associated with forest habitats, including squirrels, make up a portion of the Red-tailed Hawk diet, but they are consumed infrequently compared to field-dwelling voles and mice (Preston and Beane 2009).

**ABUNDANCE AND POPULATION STATUS** Second Atlas abundance data yielded a statewide population estimate of 38,000 individuals, with the highest concentrations in the northern Prairie Peninsula and Upper Great Lakes Plain. Breeding Bird Survey data showed a strong statewide increase of 3.5 percent per year since the mid-1960s (Sauer et al. 2014), which would put the Ohio population at approximately 16,700 individuals during the first Atlas.

Populations increased by 1.7 percent survey-wide, including within open expanses of the Midwest and in the heavily forested Appalachian Mountains (Sauer et al. 2014). Red-tailed Hawks can adapt to a variety of habitats and may be able to utilize openings created through timber harvests. However, breeding productivity has been shown to be higher at nest sites surrounded by fallow fields than at nests with either more adjacent forest cover or row crops and pasture (Howell et al. 1978), presumably because of differences in the availability of food sources.

**CONSERVATION AND MANAGEMENT** The diversity of habitats used within Ohio and across its expansive breeding range and the species' population recovery during the 20th century are testaments to the adaptability of the Red-tailed Hawk. Nonetheless, intensification of agricultural practices in western Ohio could reduce habitat availability and cause localized declines. With long-term population increases, the outlook for the Red-tailed Hawk in Ohio is positive, but given the species' close association with agricultural and other human-dominated systems, population monitoring of this species and other raptors is warranted.

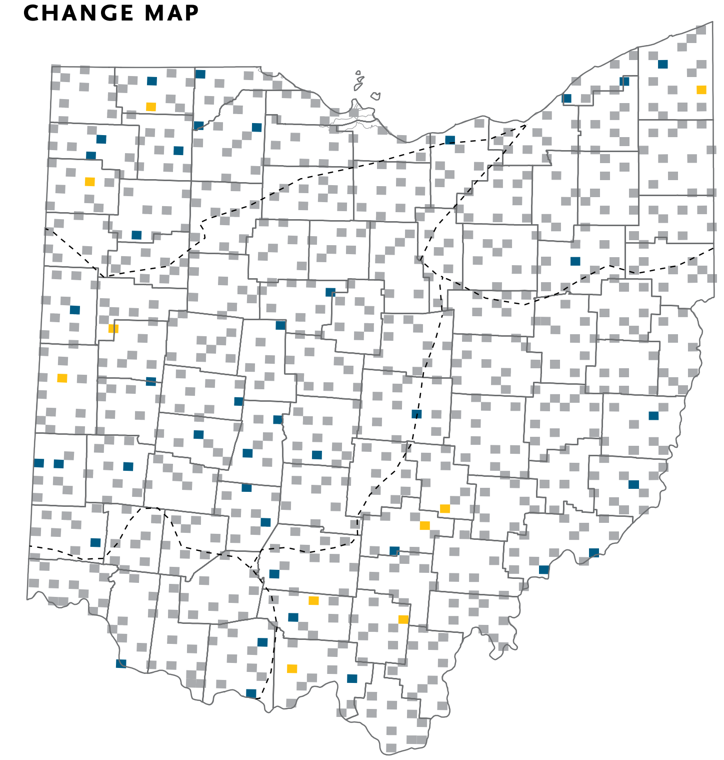
MATTHEW B. SHUMAR
*Sponsored by Allan Claybon*



## BREEDING EVIDENCE

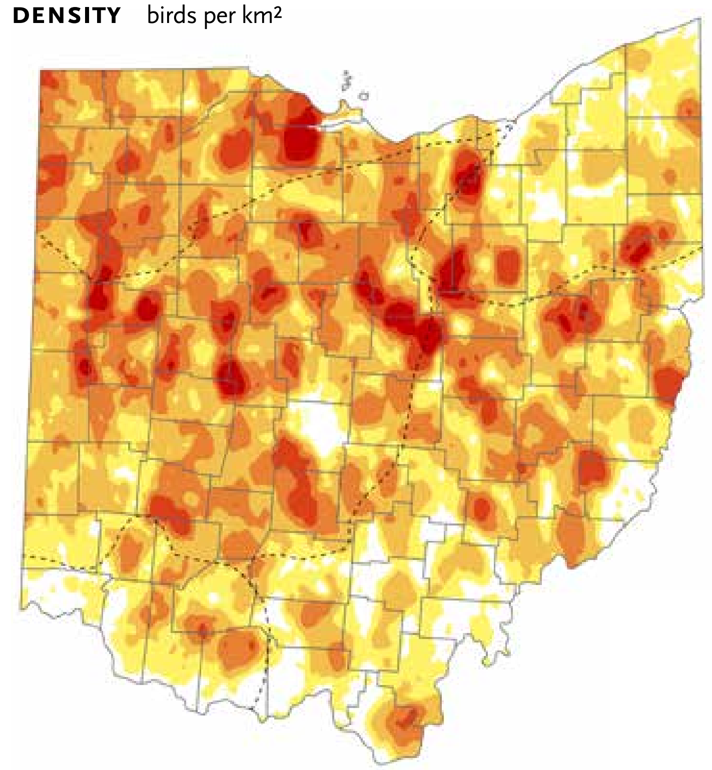
Not Reported
Possible
Probable
Confirmed

## CHANGE MAP



Not Reported
1982–87 Atlas Only
2006–11 Atlas Only
Both Atlases

## DENSITY birds per km²



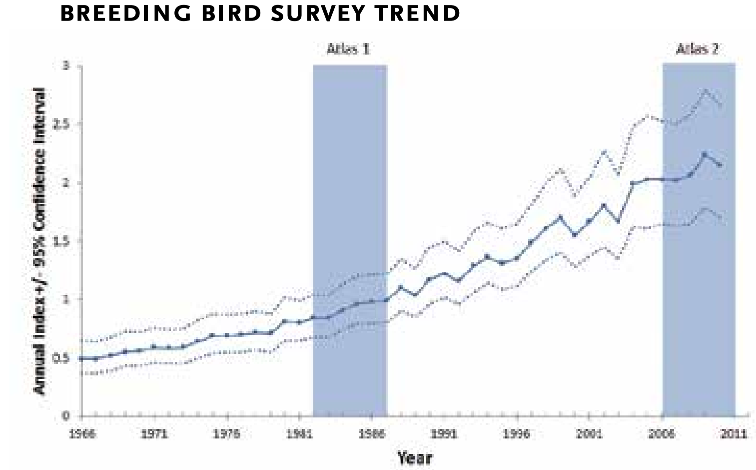
< 0.1
0.1–0.2
0.3–0.4
0.5–0.7
0.8–1.0
> 1.0

## NUMBER OF BLOCKS DETECTED

| | 2006–11 | | | | 1982–87 | |
|---|---|---|---|---|---|---|
| | All Blocks | | Priority Blocks | | Priority Blocks | |
| | No. | % | No. | % | No. | % |
| Possible | 1672 | 37.7% | 258 | 33.8% | 210 | 27.5% |
| Probable | 720 | 16.2% | 191 | 25.0% | 276 | 36.1% |
| Confirmed | 1157 | 26.1% | 303 | 39.7% | 236 | 30.9% |
| Total | 3549 | 80.0% | 752 | 98.4% | 722 | 94.5% |

Population estimate, birds (95% CI)
38,000 (34,000–42,000)

## BREEDING BIRD SURVEY TREND



PHOTOS: LINNEA ROWSE / SAM D. FITTON

# BARN SWALLOW *Hirundo rustica*

The sleek and graceful Barn Swallow is often seen flying over open areas and water in search of aerial insects (Brown and Brown 1999). The flight style of this swallow is fast and direct but also agile and maneuverable when needed, owing to its long, forked tail (Norberg 1994). When not feeding, Barn Swallows frequently rest on wires or take shelter on barn rafters. Loquacious, they deliver diverse vocalizations that include chirping and whistled calls and a long, rapid song containing warbles, twitters, and chatters (Brown and Brown 1999).

Both sexes construct the nest using mud pellets, but nest shape depends on the structure supporting it: a semicircular half cup may be affixed to a vertical surface, or a full cup may be built atop a bottom support (Brown and Brown 1999). Females lay 3–7 eggs per clutch (Brown and Brown 1999). Barn Swallows now use anthropogenic nest sites almost exclusively, though they originally nested in caves (Speich et al. 1986; Brown and Brown 1999). They likely began the transition to artificial nest sites prior to European settlement, as the species was observed nesting on Native American structures during the early 1800s (Macoun and Macoun 1909).

**DISTRIBUTION** In the Western Hemisphere, Barn Swallows breed from Alaska to Newfoundland south through much of the conterminous United States to central Mexico (Brown and Brown 1999); small numbers have also recently bred in Argentina during the austral summer (Martinez 1983). The species overwinters from central Mexico to southern South America (Brown and Brown 1999). Barn Swallows also nest widely across Eurasia and Mediterranean Africa and overwinter throughout the Old World tropics (AOU 1998).

In Ohio, Barn Swallows likely exploded in population during the 18th and 19th centuries as forest clearing and building construction rapidly created nesting habitat (Peterjohn 2001). The species was already an abundant summer resident statewide by the late 1800s (Wheaton 1882), and its distribution has not changed appreciably since then. No change in block distribution was noted between atlas periods, with Barn Swallows observed in 99.6 percent and 98.7 percent of priority blocks, respectively.

Barn Swallows in Ohio typically raise 2 broods annually (Brown and Brown 1999; Peterjohn 2001). The second Atlas reported most nests with eggs from late May to late June. This likely reflects a concentration of nest-searching effort early in the summer, because Barn Swallow nests with eggs are known from mid-May through mid-August in Ohio (Peterjohn 2001). However, a very unusual late nesting was reported in Holmes County in 2009 when recently fledged young were found on 7 November, with the last young leaving the nest on 11 November (Schlabach 2009). Of further interest were second Atlas reports of Barn Swallows nesting on natural substrates. On both West Sister Island and Gibraltar Island in Lake Erie, several pairs had built nests under rock overhangs near the water. This behavior is rarely reported but was also noted on West Sister Island in 1959 (Campbell 1968).

**ABUNDANCE AND POPULATION STATUS** Second Atlas abundance data yielded a statewide population estimate of 1,110,000 Barn Swallows. Breeding Bird Survey trends indicated that Ohio's Barn Swallow population has remained stable since 1966 (Sauer et al. 2014). Although Barn Swallows are common throughout Ohio, they are most abundant in agricultural areas and are typically scarce in both urban and heavily forested landscapes (Peterjohn 2001; Peterjohn and Rice 1991). Spatial models using second Atlas data revealed the highest breeding densities in the Upper Great Lakes Plain and the lowest densities in the Ohio Hills region. Some of the highest local densities were in the vicinity of Wayne County, where large numbers of small farms may provide ideal breeding habitat.

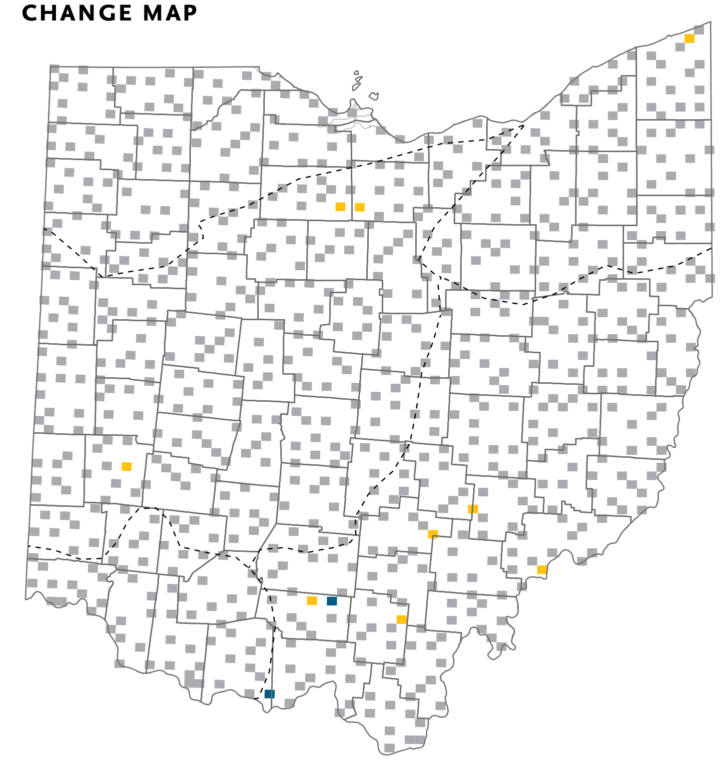
**CONSERVATION AND MANAGEMENT** The Barn Swallow is many times more abundant in Ohio today than it was prior to European settlement (Brown and Brown 1999). This swallow benefits from current land use and nesting opportunities associated with humans, and it should continue to flourish in Ohio. Most landowners seem to enjoy or at least tolerate Barn Swallows (Brown and Brown 1999), but if a particular nest becomes a nuisance it can often be relocated carefully and slowly to a nearby location without the parents abandoning it (Winkler and McCarty 1990).

DAVID L. SLAGER
*Sponsored by the Greater Columbus Council of Garden Clubs*

## BREEDING EVIDENCE

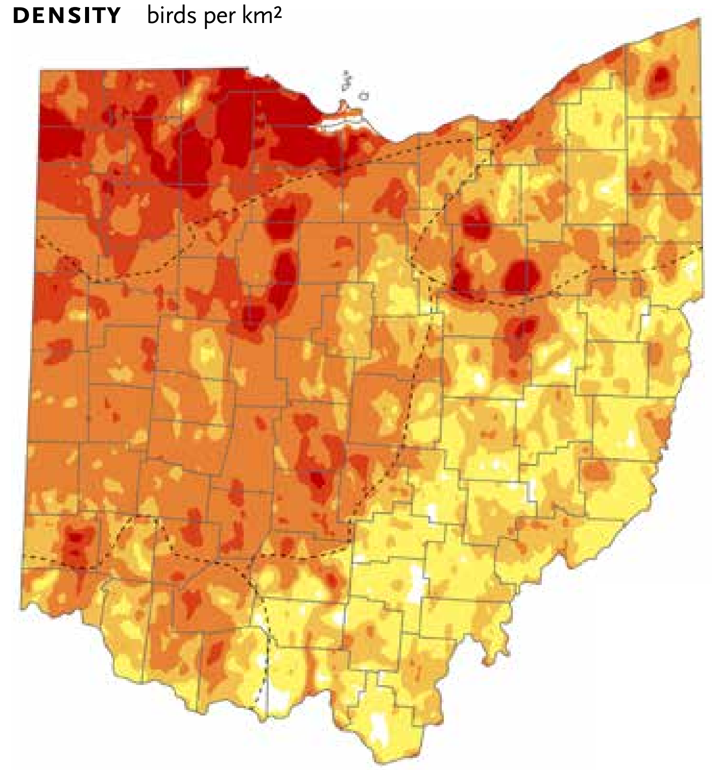
Not Reported
Possible
Probable
Confirmed

## CHANGE MAP



Not Reported
1982–87 Atlas Only
2006–11 Atlas Only
Both Atlases

## DENSITY birds per km²



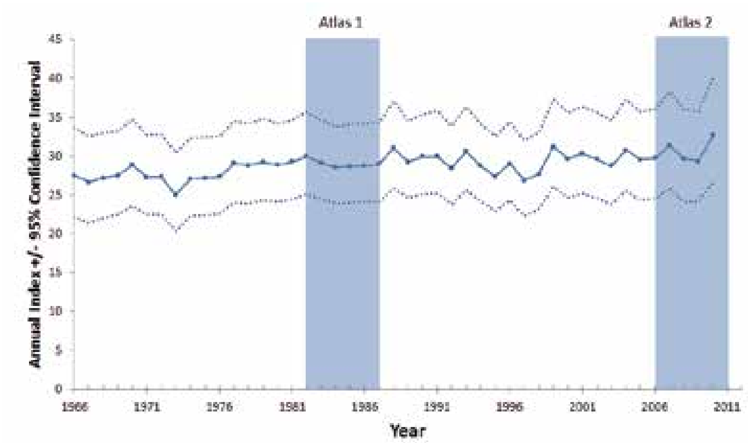
0.0–1.0
1.1–4.0
4.1–8.0
8.1–15.0
15.1–20.0
> 20.0

## NUMBER OF BLOCKS DETECTED

| | 2006–11 | | | | 1982–87 | |
|---|---|---|---|---|---|---|
| | All Blocks | | Priority Blocks | | Priority Blocks | |
| | No. | % | No. | % | No. | % |
| Possible | 1256 | 28.3% | 116 | 15.2% | 34 | 4.5% |
| Probable | 1037 | 23.4% | 207 | 27.1% | 165 | 21.6% |
| Confirmed | 1624 | 36.6% | 431 | 56.4% | 562 | 73.6% |
| Total | 3917 | 88.3% | 754 | 98.7% | 761 | 99.6% |

Population estimate, singing males (95% CI)
1,110,000 (1,090,000–1,130,000)

## BREEDING BIRD SURVEY TREND



**APPENDIX B**

# Species Results by Physiographic Region

State and regional totals of priority blocks (n=764) and all blocks (n=4,437) occupied during the first Atlas (1st) and second Atlas (2nd), along with the percent change between atlas periods, the statistical significance of change, and rates of relative block turnover. Block totals include possible, probable, and confirmed breeding records, but only confirmed records are used for the Mute Swan and colonial nesting species (marked †): Double-crested Cormorant, Great Blue Heron, Great Egret, Snowy Egret, Little Blue Heron, Cattle Egret, Black-crowned Night-Heron, Yellow-crowned Night-Heron, Ring-billed Gull, Herring Gull, Common Tern, and Black Tern.

Significance of percent change is calculated using a z-test: * p < 0.05, ** p < 0.01, *** p < 0.001, ns = not significant. Relative block turnover ranges from 0 (no change, or either complete extirpation or colonization) to 1 (complete turnover; no individual priority block was occupied during both atlas periods). See chapter 3 for details on analytical methods.

| | | Ohio | Allegheny Plateau | Interior Low Plateaus | Ohio Hills | Prairie Peninsula | Upper Great Lakes Plain |
|---|---|---|---|---|---|---|---|
| Canada Goose | Priority blocks—1st | 351 | 78 | 14 | 51 | 144 | 64 |
| | Priority blocks—2nd | 627 | 102 | 52 | 156 | 230 | 87 |
| | All blocks—2nd | 2707 | 534 | 219 | 571 | 994 | 389 |
| | % change | 79 | 31 | 271 | 206 | 60 | 36 |
| | Change significance | *** | *** | *** | *** | *** | *** |
| | Relative block turnover | 0.07 | 0.03 | 0.05 | 0.06 | 0.09 | 0.08 |
| Mute Swan† | Priority blocks—1st | 0 | 0 | 0 | 0 | 0 | 0 |
| | Priority blocks—2nd | 14 | 3 | 1 | 0 | 4 | 6 |
| | All blocks—2nd | 59 | 18 | 4 | 5 | 8 | 24 |
| | % change | ∞ | ∞ | ∞ | 0 | ∞ | ∞ |
| | Change significance | n/a | n/a | n/a | n/a | n/a | n/a |
| | Relative block turnover | 0.00 | 0.00 | 0.00 | n/a | 0.00 | 0.00 |
| Trumpeter Swan | Priority blocks—1st | 0 | 0 | 0 | 0 | 0 | 0 |
| | Priority blocks—2nd | 16 | 5 | 0 | 0 | 1 | 10 |
| | All blocks—2nd | 70 | 15 | 1 | 5 | 11 | 38 |
| | % change | ∞ | ∞ | 0 | 0 | ∞ | ∞ |
| | Change significance | n/a | n/a | n/a | n/a | n/a | n/a |
| | Relative block turnover | 0.00 | 0.00 | n/a | n/a | 0.00 | 0.00 |
| Wood Duck | Priority blocks—1st | 521 | 81 | 31 | 140 | 193 | 76 |
| | Priority blocks—2nd | 488 | 78 | 31 | 138 | 167 | 74 |
| | All blocks—2nd | 1704 | 329 | 122 | 397 | 584 | 272 |
| | % change | –6 | –4 | 0 | –1 | –13 | –3 |
| | Change significance | ns | ns | ns | ns | * | ns |
| | Relative block turnover | 0.31 | 0.31 | 0.49 | 0.40 | 0.24 | 0.25 |
| Gadwall | Priority blocks—1st | 6 | 0 | 0 | 0 | 0 | 6 |
| | Priority blocks—2nd | 1 | 0 | 0 | 0 | 0 | 1 |
| | All blocks—2nd | 12 | 2 | 0 | 0 | 0 | 10 |
| | % change | –83 | 0 | 0 | 0 | 0 | –83 |
| | Change significance | ns | n/a | n/a | n/a | n/a | ns |
| | Relative block turnover | 0.00 | n/a | n/a | n/a | n/a | 0.00 |
| American Wigeon | Priority blocks—1st | 0 | 0 | 0 | 0 | 0 | 0 |
| | Priority blocks—2nd | 2 | 0 | 0 | 0 | 1 | 1 |
| | All blocks—2nd | 9 | 0 | 0 | 0 | 2 | 7 |
| | % change | ∞ | 0 | 0 | 0 | ∞ | ∞ |
| | Change significance | n/a | n/a | n/a | n/a | n/a | n/a |
| | Relative block turnover | 0.00 | n/a | n/a | n/a | 0.00 | 0.00 |

Date: ____________ Point ID: ____________ Access Difficulty: ____________ Secondary Species: ____________

Observer: ____________ Azimuth: ____________

*Put an "s" if the bird was seen, "1" if the bird was heard, and "1s" if the bird was seen and heard*

| | | | | | Responded During | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time (military) | Sky | Wind (Beaufort) | Background Noise | Species | Pass 0–1 | Pass 1–2 | Pass 2–3 | Pass 3–4 | Pass 4–5 | Least Bittern (LEBI) | Sora (SORA) | Virginia Rail (VIRA) | King Rail (KIRA) | Pied-billed Grebe (PBGR) | American Bittern (AMBI) | Least Bittern (LEBI) | Outside Survey | Call Type(s) | Distance (m) | Direction | Comments |
| | | | | | | | | | | | | | | | | | | | | ○ | |
| | | | | | | | | | | | | | | | | | | | | ○ | |
| | | | | | | | | | | | | | | | | | | | | ○ | |
| | | | | | | | | | | | | | | | | | | | | ○ | |
| | | | | | | | | | | | | | | | | | | | | ○ | |
| | | | | | | | | | | | | | | | | | | | | ○ | |
| | | | | | | | | | | | | | | | | | | | | ○ | |
| | | | | | | | | | | | | | | | | | | | | ○ | |
| | | | | | | | | | | | | | | | | | | | | ○ | |
| | | | | | | | | | | | | | | | | | | | | ○ | |
| | | | | | | | | | | | | | | | | | | | | ○ | |
| | | | | | | | | | | | | | | | | | | | | ○ | |
| | | | | | | | | | | | | | | | | | | | | ○ | |
| | | | | | | | | | | | | | | | | | | | | ○ | |
| | | | | | | | | | | | | | | | | | | | | ○ | |
| | | | | | | | | | | | | | | | | | | | | ○ | |

**Background Noise:** 0) no noise; 1) faint noise; 2) moderate noise, probably can't hear some birds >100 m; 3) loud noise, probably can't hear some birds >50 m; 4) intense noise, probably can't hear some birds >25 m

**Beaufort Scale:** 0) smoke rises vertically; 1) wind direction shown by smoke drift; 2) wind felt on face, leaves rustle; 3) leaves, small twigs in constant motion; 4) raises dust and loose paper, small branches are moved; 5) small trees with leaves swayed, crested wavelets on inland waters

**Sky:** 0) clear or a few clouds; 1) partly cloudy or variable sky; 2) cloudy or overcast; 4) fog or smoke; 5) drizzle; 6) snow; 8) showers

**Call Types:** **AMBI:** pump-er-lunk; **LEBI:** coo coo, kak-kak; **BLRA:** kicky-doo, churt, grr, tch; **VIRA:** grunt, tick-it, kicker, sqwk; **SORA:** whinny, keep, per-weep; **KIRA:** kek, kek-hurrah, kek-burr; **AMCO:** burr-up, hic-up; **COMO:** wipeout, giddy-up, beep; **PBGR:** hyena, owwhoop

**Access Difficulty:** 1) not difficult at all; 2) somewhat difficult; 3) moderately difficult; 4) very difficult to access; 5) extremely difficult to access