

NORTH AMERICAN BREEDING BIRD SURVEY IN MISSISSIPPI

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Does it seem like you are hearing fewer Northern Bobwhite (*Colinus virginianus*) calls in recent years than you remember when you were younger? Conversely, have you also noticed hearing more “cooing” of Eurasian Collared-Doves (*Streptopelia decaocto*)? Do such experiences reflect changes in bird populations or are they false impressions? Well, fortunately for us, we have one of the most powerful wildlife data sets freely available, only a few mouse clicks away, for divining these answers. For most of our songbirds, their population trends are estimated from data gathered during the North American Breeding Bird Survey (BBS). And indeed, BBS population trends for the State of Mississippi support a decline in Northern Bobwhite and an increase in Eurasian Collared-Dove (Figure 1; Sauer et al. 2017a).

The BBS was initiated in 1966 as a multi-national field survey of North American breeding birds, conducted by volunteer observers, to provide data to estimate bird species population trends (Sauer et al. 2017b). The BBS design is a network of randomly-located, roadside survey routes spaced on a 1° latitude and longitude grid. Routes are typically located along less-traveled secondary roads and entirely within a single physiographic region. Each route has 50 stop locations, spaced at approximately half mile intervals, where birds are counted.

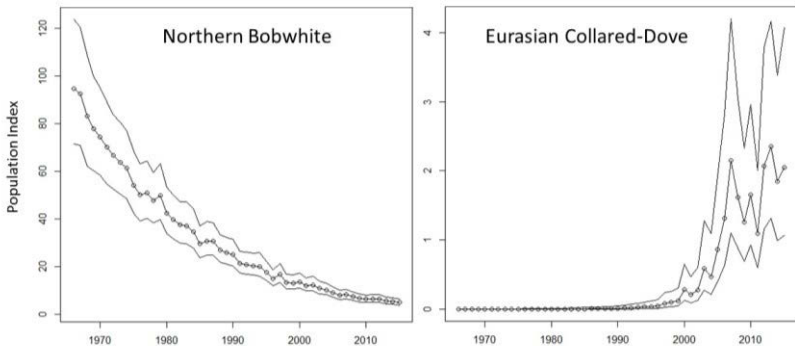


Figure 1. Trend in annual abundance indices, with lower (2.5%) and upper (97.5%) credible interval, as estimated using hierarchical model analysis (Sauer and Link 2011) of data from Breeding Bird Surveys in Mississippi (1966-2015) for Northern Bobwhite and Eurasian Collared-Dove. Graphs from <https://www.mbr-pwrc.usgs.gov/bbs/spec115.html>.

The BBS is an index survey, thus it is not intended to be a complete count of all birds along a route. Rather, the birds counted provide relative abundances of each species that are maintained in a publicly available database (Pardieck et al. 2017). The >2 million bird observations annually collected by BBS participants include count data on >700 species (including taxa groups), including >150 species in Mississippi (Appendix Table 1). Using these data, scientists have estimated and mapped relative abundances and population trends for >400 species nationally and 119 species for Mississippi (Sauer et al. 2017a), with future efforts anticipated to expand survey-wide results by >100 species (Sauer et al. 2017c).

The BBS provides support for landbird conservation in North America through the Avian Conservation Assessment Database (formerly Partners in Flight Species Assessment Database) which provides regional and statewide bird population

estimates for 274 landbird species (Rosenberg et al. 2017, Twedt 2015). BBS information is also widely used by managers and scientists to: inform regional conservation and land use planning through species distribution models, inform environmental assessments, evaluate causes of population change, evaluate effectiveness of management actions, motivate conservation action, and much more (Hudson et al. 2017).

One “secret” to the success of the BBS has been minimizing variation in methods over the decades. This was accomplished through counting guidelines on when, where, and how to sample a route (www.pwrc.usgs.gov/BBS/participate/). Uniform methods help ensure that changes in bird numbers are due to actual population changes, and not due to changes in how or when birds were counted. Each BBS route is surveyed once per year during the breeding season (15 May-30 June in Mississippi) beginning 30 min before local sunrise. During 3 min spent at each stop location, an observer, skilled in bird identification and standing near the vehicle, records the number of each bird species heard or seen within 0.25 mi (400 m). To account for variation in weather, temperature, sky condition, and wind speed are recorded at the start and completion of each BBS route.

To consistently assess bird populations, the same BBS routes and stop locations along these routes are surveyed every year. However, over 50 years, roads are re-routed, bridges washout, and safety concerns arise. As such, some stop locations are moved and eight Mississippi routes have been moved from their origins, with three of these moved twice. There are currently 62 BBS routes located within Mississippi: 49 routes are in the uplands of the Gulf Coastal Plain whereas 13 routes are in the “Delta” (Figure 2). These routes comprise ~2% of the >3,500 BBS routes located across the U.S., and provide critical avian population data for the state, as well as for regional and national species assessments.

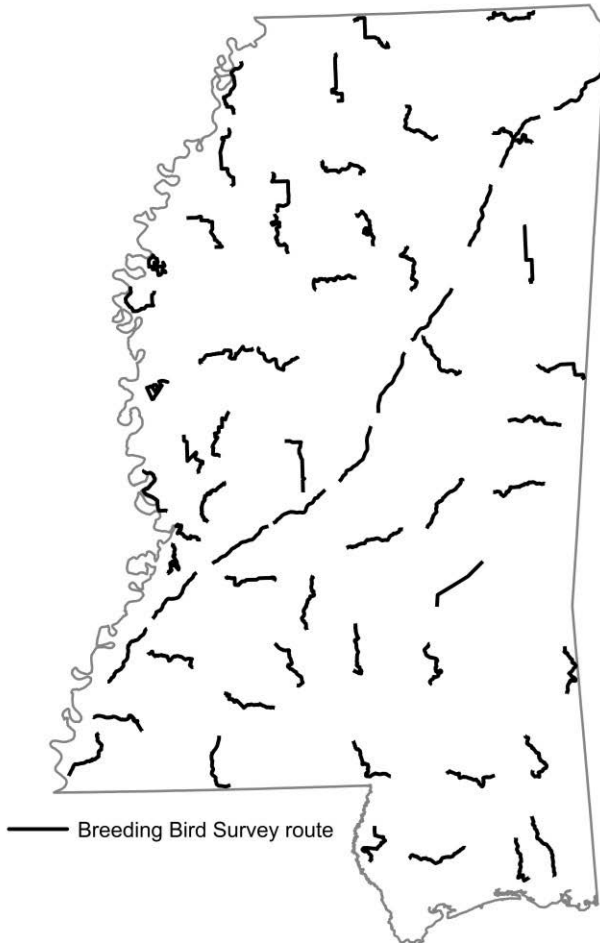


Figure 2. Locations of 62 active BBS routes in Mississippi intended to be surveyed during 2018. Routes in need of volunteer observers may be identified at <https://www.pwrc.usgs.gov/bbs/RouteMap/Map.cfm>.

Over the last 51 years, 138 Mississippi birders with the ability to identify birds by sight and sound have voluntarily awoke

before dawn and often traveled considerable distance to participate in the BBS. Thirty-two of these extraordinary birders have contributed their time and expertise to the BBS for over 10 years, while two individuals, Donald Lewis and Terence Schiefer, have each participated for over 30 years! During the past 10 years 60 total observers have surveyed an average 42 routes per year. As such, only 76% of the BBS routes in Mississippi are surveyed annually; meaning that each year there are vacant (i.e. unsampled) routes in Mississippi!

The most commonly detected birds on BBS routes during the past 50 years in Mississippi (Table 2) include: Northern Cardinal (*Cardinalis cardinalis*), Red-winged Blackbird (*Agelaius phoeniceus*), Mourning Dove (*Zenaida macroura*), American Crow (*Corvus brachyrhynchos*), and Northern Mockingbird (*Mimus polyglottos*). Notably some species that were very common during the first 2 decades of the BBS, from 1966-1985, have declined markedly. These declining species include Common Grackle (*Quiscalus quiscula*), Eastern Meadowlark (*Sturnella magna*), and Northern Bobwhite. Several exotic species, including House Sparrow (*Passer domesticus*), European Starling (*Sturnus vulgaris*), and Cattle Egret (*Bubulcus ibis*), were among the most commonly detected species during the early years of BBS, but have become less common over the decades. These declining species have been replaced on the list of most commonly detected species in recent decades by Eastern Towhee (*Pipilo erythrophthalmus*), Red-bellied Woodpecker (*Melanerpes carolinus*), Tufted Titmouse (*Baeolophus bicolor*), and White-eyed Vireo (*Vireo griseus*). On the other extreme, some species have rarely been detected on Mississippi BBS routes over the past 50 years including: Cerulean Warbler (*Setophaga cerulea*), Bald Eagle (*Haliaeetus leucocephalus*), and Inca Dove (*Columbina inca*; Appendix Table 1). The relative abundance and population trends for these and

Table 2. The relative rank (based on number of detections) of the twelve most common species on BBS routes in Mississippi during the past 50 years and changes among decades.

Species	1966- 1975	1976- 1985	1986- 1995	1996- 2005	2006- 2015
1 Northern Cardinal	4	2	2	1	1
2 Red-winged Blackbird	2	1	1	3	2
3 Mourning Dove	7	7	3	4	4
4 American Crow	10	9	4	2	3
5 Northern Mockingbird	5	5	5	5	7
6 Blue Jay	9	8	6	6	6
7 Common Grackle	1	3	8	13	22
8 Indigo Bunting	12	11	11	7	5
9 Yellow-breasted Chat	13	16	10	8	8
10 Northern Bobwhite	3	4	9	18	45
11 Eastern Meadowlark	6	6	7	15	37
12 Carolina Wren	16	18	13	11	10

other species detected on Mississippi's BBS routes can be found on the BBS website at www.pwrc.usgs.gov/bbs/results/.

It bears mentioning that, although the BBS is the longest running program that has monitored breeding bird populations in our state, there are several other survey programs that provide information on Mississippi's bird populations from other times of the year. For example, the Audubon Christmas Bird Count has for decades monitored bird populations during winter. And more recently, birders have been contributing to eBird (<http://ebird.org/content/ebird/>), the Cornell Lab of Ornithology's online checklist

program, thereby providing year-round information on Mississippi's birds.

As a reader of this note in *The Mississippi Kite*, which was enriched by edits from D. King and D. Ziolkowski, it may be that you are skilled at both visual and aural bird identification. If so, please consider participating as a volunteer observer for the Breeding Bird Survey by contacting the authors or visiting the BBS website: <https://www.pwrc.usgs.gov/bbs/>. A map of current route vacancies can be viewed at www.pwrc.usgs.gov/bbs/RouteMap/Map.cfm.

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APPENDIX

Appendix Table 1. Breeding bird species detected along BBS routes in Mississippi from 1966-2016.

Common name (or taxa group)	Scientific name	Years detected on at least one route
Black-bellied Whistling-Duck	<i>Dendrocygna autumnalis</i>	7
Canada Goose	<i>Branta canadensis</i>	27
Wood Duck	<i>Aix sponsa</i>	51
Blue-winged Teal	<i>Spatula discors</i>	2
Mallard	<i>Anas platyrhynchos</i>	33
Mottled Duck	<i>Anas fulvigula</i>	14
Hooded Merganser	<i>Lophodytes cucullatus</i>	3
Northern Bobwhite	<i>Colinus virginianus</i>	51
Wild Turkey	<i>Meleagris gallopavo</i>	43

Common name (or taxa group)	Scientific name	Years detected on at least one route
Pied-billed Grebe	<i>Podilymbus podiceps</i>	11
Rock Pigeon	<i>Columba livia</i>	51
Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	20
Inca Dove	<i>Columbina inca</i>	1
Common Ground-Dove	<i>Columbina passerina</i>	12
Mourning Dove	<i>Zenaida macroura</i>	51
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	51
Common Nighthawk	<i>Chordeiles minor</i>	51
Chuck-will's-widow	<i>Antrostomus carolinensis</i>	51
Eastern Whip-poor-will	<i>Antrostomus vociferus</i>	33
Chimney Swift	<i>Chaetura pelagica</i>	51
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	51
King Rail	<i>Rallus elegans</i>	6
Common Gallinule	<i>Gallinula galeata</i>	13
American Coot	<i>Fulica americana</i>	8
Sandhill Crane	<i>Antigone canadensis</i>	22
Black-necked Stilt	<i>Himantopus mexicanus</i>	8
Killdeer	<i>Charadrius vociferus</i>	51
American Woodcock	<i>Scolopax minor</i>	4
Least Tern	<i>Sternula antillarum</i>	11
Black Skimmer	<i>Rynchops niger</i>	5
Wood Stork	<i>Mycteria americana</i>	6
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	10
Anhinga	<i>Anhinga anhinga</i>	28
American Bittern	<i>Botaurus lentiginosus</i>	1

Common name (or taxa group)	Scientific name	Years detected on at least one route
Least Bittern	<i>Ixobrychus exilis</i>	4
Great Blue Heron	<i>Ardea herodias</i>	49
Great Egret	<i>Ardea alba</i>	48
Snowy Egret	<i>Egretta thula</i>	29
Little Blue Heron	<i>Egretta caerulea</i>	51
Tricolored Heron	<i>Egretta tricolor</i>	4
Cattle Egret	<i>Bubulcus ibis</i>	50
Green Heron	<i>Butorides virescens</i>	51
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	12
Yellow-crowned Night-Heron	<i>Nyctanassa violacea</i>	31
White Ibis	<i>Eudocimus albus</i>	32
Glossy Ibis / White-faced Ibis	<i>Plegadis falcinellus / chihi</i>	3
Roseate Spoonbill	<i>Platalea ajaja</i>	3
Black Vulture	<i>Coragyps atratus</i>	51
Turkey Vulture	<i>Cathartes aura</i>	51
Osprey	<i>Pandion haliaetus</i>	2
Swallow-tailed Kite	<i>Elanoides forficatus</i>	14
Mississippi Kite	<i>Ictinia mississippiensis</i>	48
Bald Eagle	<i>Haliaeetus leucocephalus</i>	5
Sharp-shinned Hawk	<i>Accipiter striatus</i>	12
Cooper's Hawk	<i>Accipiter cooperii</i>	30
Red-shouldered Hawk	<i>Buteo lineatus</i>	50
Broad-winged Hawk	<i>Buteo platypterus</i>	43
Red-tailed Hawk	<i>Buteo jamaicensis</i>	48

Common name (or taxa group)	Scientific name	Years detected on at least one route
Barn Owl	<i>Tyto alba</i>	1
Eastern Screech-Owl	<i>Megascops asio</i>	16
Great Horned Owl	<i>Bubo virginianus</i>	33
Barred Owl	<i>Strix varia</i>	49
Belted Kingfisher	<i>Megaceryle alcyon</i>	51
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	51
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	51
Downy Woodpecker	<i>Picoides pubescens</i>	51
Hairy Woodpecker	<i>Picoides villosus</i>	51
Red-cockaded Woodpecker	<i>Picoides borealis</i>	10
Northern Flicker	<i>Colaptes auratus auratus</i>	51
Pileated Woodpecker	<i>Dryocopus pileatus</i>	51
American Kestrel	<i>Falco sparverius</i>	33
Eastern Wood-Pewee	<i>Contopus virens</i>	51
Acadian Flycatcher	<i>Empidonax virescens</i>	51
Eastern Phoebe	<i>Sayornis phoebe</i>	43
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	51
Western Kingbird	<i>Tyrannus verticalis</i>	1
Eastern Kingbird	<i>Tyrannus tyrannus</i>	51
Scissor-tailed Flycatcher	<i>Tyrannus forficatus</i>	1
Loggerhead Shrike	<i>Lanius ludovicianus</i>	51
White-eyed Vireo	<i>Vireo griseus</i>	51
Yellow-throated Vireo	<i>Vireo flavifrons</i>	51
Warbling Vireo	<i>Vireo gilvus</i>	31
Red-eyed Vireo	<i>Vireo olivaceus</i>	51

Common name (or taxa group)	Scientific name	Years detected on at least one route
Blue Jay	<i>Cyanocitta cristata</i>	51
American Crow	<i>Corvus brachyrhynchos</i>	51
Fish Crow	<i>Corvus ossifragus</i>	51
Horned Lark	<i>Eremophila alpestris</i>	50
Purple Martin	<i>Progne subis</i>	51
Tree Swallow	<i>Tachycineta bicolor</i>	9
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	50
Bank Swallow	<i>Riparia riparia</i>	1
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	23
Barn Swallow	<i>Hirundo rustica</i>	51
Carolina Chickadee	<i>Poecile carolinensis</i>	51
Tufted Titmouse	<i>Baeolophus bicolor</i>	51
White-breasted Nuthatch	<i>Sitta carolinensis</i>	33
Brown-headed Nuthatch	<i>Sitta pusilla</i>	51
House Wren	<i>Troglodytes aedon</i>	1
Carolina Wren	<i>Thryothorus ludovicianus</i>	51
Bewick's Wren	<i>Thryomanes bewickii</i>	20
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	51
Eastern Bluebird	<i>Sialia sialis</i>	51
Wood Thrush	<i>Hylocichla mustelina</i>	51
American Robin	<i>Turdus migratorius</i>	51
Gray Catbird	<i>Dumetella carolinensis</i>	51
Brown Thrasher	<i>Toxostoma rufum</i>	51
Northern Mockingbird	<i>Mimus polyglottos</i>	51
European Starling	<i>Sturnus vulgaris</i>	51

Common name (or taxa group)	Scientific name	Years detected on at least one route
Cedar Waxwing	<i>Bombycilla cedrorum</i>	4
House Sparrow	<i>Passer domesticus</i>	51
House Finch	<i>Haemorhous mexicanus</i>	24
American Goldfinch	<i>Spinus tristis</i>	43
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	51
Bachman's Sparrow	<i>Peucaea aestivalis</i>	43
Chipping Sparrow	<i>Spizella passerina</i>	51
Field Sparrow	<i>Spizella pusilla</i>	51
Lark Sparrow	<i>Chondestes grammacus</i>	27
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	27
Song Sparrow	<i>Melospiza melodia</i>	7
Yellow-breasted Chat	<i>Icteria virens</i>	51
Eastern Meadowlark	<i>Sturnella magna</i>	51
Orchard Oriole	<i>Icterus spurius</i>	51
Baltimore Oriole	<i>Icterus galbula</i>	51
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	51
Brown-headed Cowbird	<i>Molothrus ater</i>	51
Common Grackle	<i>Quiscalus quiscula</i>	51
Boat-tailed Grackle	<i>Quiscalus major</i>	13
Ovenbird	<i>Seiurus aurocapilla</i>	11
Worm-eating Warbler	<i>Helmitheros vermivorum</i>	36
Louisiana Waterthrush	<i>Parkesia motacilla</i>	39
Blue-winged Warbler	<i>Vermivora cyanoptera</i>	3
Black-and-white Warbler	<i>Mniotilta varia</i>	48
Prothonotary Warbler	<i>Protonotaria citrea</i>	51
Swainson's Warbler	<i>Limnothlypis swainsonii</i>	38

Common name (or taxa group)	Scientific name	Years detected on at least one route
Kentucky Warbler	<i>Geothlypis formosa</i>	51
Common Yellowthroat	<i>Geothlypis trichas</i>	51
Hooded Warbler	<i>Setophaga citrina</i>	49
American Redstart	<i>Setophaga ruticilla</i>	47
Cerulean Warbler	<i>Setophaga cerulea</i>	4
Northern Parula	<i>Setophaga americana</i>	51
Yellow Warbler	<i>Setophaga petechia</i>	7
Pine Warbler	<i>Setophaga pinus</i>	51
Yellow-throated Warbler	<i>Setophaga dominica</i>	36
Prairie Warbler	<i>Setophaga discolor</i>	50
Summer Tanager	<i>Piranga rubra</i>	51
Scarlet Tanager	<i>Piranga olivacea</i>	24
Northern Cardinal	<i>Cardinalis cardinalis</i>	51
Blue Grosbeak	<i>Passerina caerulea</i>	51
Indigo Bunting	<i>Passerina cyanea</i>	51
Painted Bunting	<i>Passerina ciris</i>	51
Dickeissel	<i>Spiza americana</i>	51