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### TEN YEAR SUMMARY OF THE KANSAS BREEDING-BIRD SURVEY: TRENDS

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Previously I had described the first ten years' records for the Fish and Wildlife Service's Breeding-bird Survey in Kansas, locating the starting points and listing the participants, as well as giving a broad overview of the distribution and relative densities of some of the breeding species in the state (Zimmerman, 1978). This paper provides a brief analysis of the stability and changes in Kansas breeding bird populations during the period, 1967-1976.

Although a total of 175 species have been recorded on these June surveys in Kansas during this decade, only 83 species have been analyzed for population trends. Of the remaining 92 species, many were late migrants and not breeding species in the state (e.g.—Sandhill Crane, White-rumped Sandpiper, Least Flycatcher, Rusty Blackbird, Savannah Sparrow, Fox Sparrow). Others are breeding species, but so infrequent on the census as to prevent any indication of a trend (e.g.—Least Bittern, Wood Duck, Sharp-shinned Hawk, Turkey, Ruby-throated Hummingbird, Acadian Flycatcher, Wood Thrush, White-eyed Vireo, Parula Warbler, Summer Tanager, Chipping Sparrow). Still others breed in the state and have been regularly recorded, but only on one census route (e.g.—Black-crowned Night Heron, Gadwall, Redhead, Snowy Plover, American Avocet, Forster's Tern). I eliminated these species from the analysis since they were too localized and hence not indicative of state-wide patterns. Additionally, all the owl species, the more crepuscular goatsuckers, and the lekking Greater Prairie Chicken are not considered since the census methodology is not designed to adequately measure the population levels of these species.

In order to recognize any pattern in the changes in species populations over the 10 year period, the average number of birds per route for the routes on which the species has been recorded were subjected to analysis by the theory of runs (Dixon and Massey, 1957: 287-289). In this test the median value is determined, and each year's average birds per route is scored as above (+) or below (-) this median. Any sequence of one or more years carrying the same sign (+ or -) is considered a run. Probability values are available to evaluate whether the observed number of runs is either higher or lower than might be expected from just random variation in the size of the species' population from year to year. A higher than expected number of runs is indicative of a stable, closely regulated population. A lower than expected number of runs reflects a general trend, either an increase or a decrease in population size. If the probability for such a low number of runs was less than 0.05, the species was considered to be definitely increasing (or decreasing as the case might be). If the probability was greater than 0.05 but less than 0.20, then the apparent trend was considered as "possibly increasing" or "possibly decreasing".

Eight species appear to be maintaining stable populations in Kansas (Table 1). They fall into two categories, a group of four species that are quite closely

TABLE 1. Species With Stable Populations in Kansas

Closely Regulated	Broadly Regulated
Red-tailed Hawk	Green Heron
Black-billed Cuckoo	Black-billed Magpie
Belted Kingfisher	Common Grackle
Lark Bunting	Brown-headed Cowbird

regulated from year to year and four more species that are broadly regulated over what appears to be a five year cycle. There is no characteristic common to all these species. They represent a wide spectrum of ecological communities and are adapted to often quite dissimilar ecological niches. Two are abundant and widely distributed (Common Grackle and Brown-headed Cowbird). The Lark Bunting is also abundant, but restricted in its range, having occurred at least once on only 58% of the Kansas routes. The Red-tailed Hawk, Black-billed Cuckoo, Belted Kingfisher, and Green Heron are not as abundant but are still fairly wide in their distribution across the state (58- 97% of the routes), while the Black-billed Magpie similarly has a low density but a much more restricted range in the state (39% of the routes). The indication from these data that the Lark Bunting is a highly stable species is surprising, since others' experiences with this species suggest that its population size varies widely and sometimes erratically (Baumgarten in Bent, 1978; Wilson, 1976). Whereas the Black-billed Cuckoo appears stable in Kansas, the species has been recently added to the National Audubon Society's Blue List of declining species (Arbib, 1978).

Three species are definitely decreasing in density in the state, while seven more are possibly decreasing (Table 2). Only the three raptors, the Eastern Bluebird, and the Dickcissel are included on the current Blue List (Arbib, 1978). The decrease in the Carolina Wren population is certainly a reflection of the recent severe winters, and this trend and its relationship to the weather have been noted elsewhere in its range. While the Kansas population of the Eastern Wood Pewee, Scissor-tailed Flycatcher, and Blue Grosbeak are at the periphery of their continental ranges (A.O.U., 1957) and thus might be expected to be less stable, the Orchard Oriole is not. The actual reasons for the declines in these species is not known.

**TABLE 2. Species With Decreasing Population Levels in Kansas**

<b>Definitely Decreasing</b>	<b>Possibly Decreasing</b>
Eastern Wood Pewee	Swainson's Hawk
Carolina Wren	Marsh Hawk
Orchard Oriole	American Kestrel
	Scissor-tailed Flycatcher
	Eastern Bluebird
	Blue Grosbeak
	Dickcissel

Three species are definitely increasing, while six more probably have been also increasing in population size during this decade (Table 3). All of these except the Great Blue Heron and White-breasted Nuthatch are species that have adapted to cultural changes in the environment brought about by man's agricultural practices and spreading urbanization. But again, the specific proximate cause for the current upward trends in these species is not known.

**TABLE 3. Species With Increasing Population Levels in Kansas**

<b>Definitely Increasing</b>	<b>Possibly Increasing</b>
Killdeer	Great Blue Heron
Barn Swallow	Cliff Swallow
American Robin	White-breasted Nuthatch
	House Wren
	Gray Catbird
	Blue Jay

As should be expected, the vast majority of species analyzed show changes in their populations that are indistinguishable from variations to be expected from chance alone. Thus these species are neither especially stable or undergoing a clearly defined change in density within the state. These species are listed in Table 4.

Dolbeer and Stehn (1979) have completed a much more sophisticated statistical analysis of the trends in Starling, Red-winged Blackbird, Common Grackle and

**TABLE 4. Species Showing Random Changes in Population Levels in Kansas**

Mallard	Great Crested	Warbling Vireo
Blue-winged Teal	Flycatcher	Yellow Warbler
Turkey Vulture	Eastern Phoebe	Yellowthroat
Mississippi Kite	Say's Phoebe	Yellow-breasted Chat
Bobwhite	Horned Lark	House Sparrow
Ring-necked Pheasant	Bank Swallow	Eastern Meadowlark
Upland Sandpiper	Rough-winged Swallow	Western Meadowlark
Rock Dove	Purple Martin	Yellow-headed Blackbird
Mourning Dove	Common Crow	Red-winged Blackbird
Yellow-billed Cuckoo	Black-capped Chickadee	Northern (Baltimore)
Common Nighthawk	Carolina Chickadee	Oriole
Chimney Swift	Tufted Titmouse	Cardinal
Common (Yellow-shafted)	Bewick's Wren	Rose-breasted Grosbeak
Flicker	Northern Mockingbird	Indigo Bunting
Red-bellied Woodpecker	Brown Thrasher	American Goldfinch
Red-headed Woodpecker	Blue-gray Gnatcatcher	Grasshopper Sparrow
Hairy Woodpecker	Loggerhead Shrike	Lark Sparrow
Downy Woodpecker	Starling	Cassin's Sparrow
Eastern Kingbird	Bell's Vireo	Field Sparrow
Western Kingbird	Red-eyed Vireo	

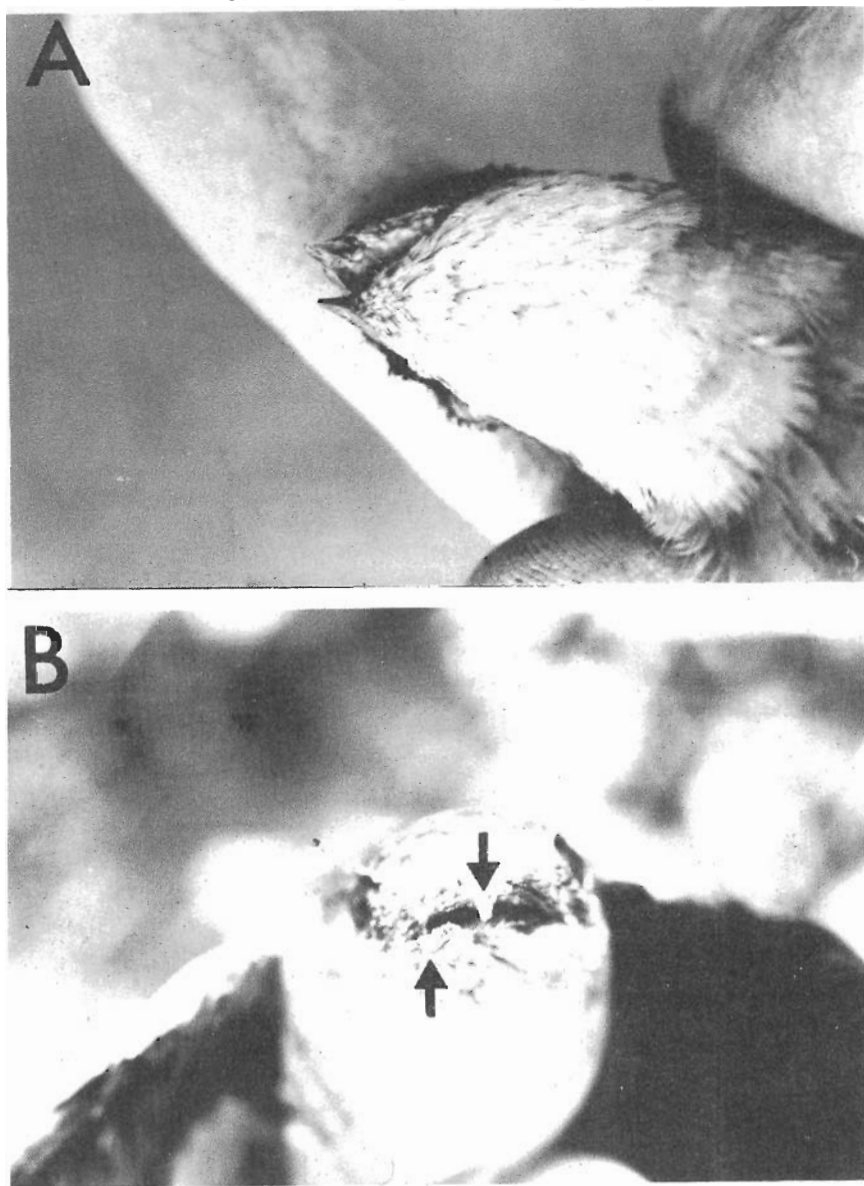
Brown-headed Cowbird populations in North America based on the Breeding-bird Survey data from the eleven year period, 1966-1977. Although they report a significant increase in the mean number of Starlings and Red-winged Blackbirds per route for Kansas when the three years, 1974-1976, are compared to the years, 1966-1968, there are no significant trends in the year to year Kansas populations for any of these four species. Their data suggest, however, that the Red-winged Blackbird population in the state perhaps should be added to the possibly increasing category, since there was a positive slope for this species that was significantly different from zero at a probability of between 0.05 and 0.10.

It is clear to me that the Breeding-bird Survey is an effective method to assess population changes in the birds of the state. Hopefully as these data accumulate, it will be possible to relate trends in species densities with changes in environmental factors that affect their specific successes, whether the change results from short-term perturbations like altered patterns of land use or from long-term shifts in, for example, the climate.

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**Chimney Swift with Laterally Displaced Mandibles.**—In the course of banding a fall roost of Chimney Swifts (*Chaetura pelagica*) on the morning of 24 September 1978 at the Baldwin City Junior High School, Douglas County, Kansas, we discovered a swift with mandibles that did not close together. The mandibles themselves were apparently in no way deformed but were so laterally displaced that no part of one mandible touched the other (Fig. 1A). This deformity was confined to the bill only, with no damage noted to the gape (Fig. 1B).



**FIGURE 1.** Lateral displacement of mandibles in a Chimney Swift. A. Ventral view of head showing the position of the mandibles. B. Frontal view showing that the shape of the gape has not been altered. Tips of the mandibles indicated with arrows. (Photographs from color slides).

Bill deformities in most species of birds result in poorer foraging abilities and are reflected in poor health and low body weight. However, the swift was in good health and weighed 22.1 grams, only slightly lower than the mean weight for the population sampled ( $\bar{x}$ =23.0 gms, range=19.1 to 26.9 gms,  $n$ =100). Since the gape is the most important part of the foraging apparatus for a swift, and not the bill, the deformity seemingly had little effect on food gathering. Pomeroy (1962. *British Birds* 44: 49-72) notes that ectoparasitism can be quite severe in birds with bill deformities because of their inability to remove parasites. Our specimen's bill would certainly be of little use in preening, but we noted no parasitism of this specimen, nor on any of the swifts banded. The outer primaries, several retrices and tail coverts were in molt and there was little body molt except on the head. This was a common pattern observed in many of the banded swifts. Since molt is an energy demanding process, this provides additional evidence that the swift with the deformed mandibles had no trouble in foraging.

This type of bill deformity was probably the result of a genetic defect or an injury suffered in development. Other usual causes of bill deformities such as incorrect feeding, disease, or lack of wear seem highly unlikely. We can find no similar report of bill deformities in Chimney Swifts, including the review by Pomeroy (*op. cit.*). The frequency of bill deformities is generally well below 0.5 percent in most species of birds. Our figure for Chimney Swifts is 0.03 percent but is based on a relatively small sample of 298 swifts banded over the past two years. Although bill deformities are noted with some regularity in birds, Gochfield (1972. *American Birds* 26: 705) observes that records of the frequency of their occurrence and their distribution can be important in documenting changes over time, perhaps reflecting changes in the environment.

Our thanks to John Vaughn, Denise Chubb, and Peter Lowther's contingent of graduate students from the KU Museum of Natural History for their assistance in the banding operation and to Bill Horn for permission to use the Junior High School chimney for our studies of swifts.

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**October Hatch of Bobwhite in Northeast Kansas.**—On the afternoon of 2 October 1978, I flushed a pair of Bobwhite (*Colinus virginianus*) in a grazed woods with brushy understory near Spring Creek Lake, about 2 miles southeast of Baldwin City, Douglas County, Kansas. The female attempted to lead me away with a broken wing ruse, dragging her wings and flopping on the ground, while the male called excitedly as he circled around me, alternately flying and running on the ground. The object of their distraction efforts was a small brood of chicks which scattered rapidly through the sparse grass cover. Surprisingly all the chicks (estimated brood size of eight) were downy and the one I was able to run down and capture still had an egg tooth. The egg tooth is normally shed during the first two days of life (Stoddard, H. L., 1931. *The Bobwhite Quail: Its Habits, Preservation and Increase*, Charles Scribners Sons, N.Y.) and this indicated that the brood probably hatched that morning or the day before. The captured chick weighed only 6.1 grams and additional measurements of tarsus, bill and hallux (13 mm, 6 mm, and 10 mm respectively) all lend additional support to the view that the brood had just hatched.

I returned the chick to the area in which it was captured. Its separation calls and those of the other chicks (plus calls given by the hen) suggested that the brood was reunited with the parents. Several return visits to this area in subsequent weeks revealed no evidence of the brood so their fate is unknown. Although survival for such young chicks must be more difficult this late in the season, Bobwhite chicks do grow very rapidly (Rosene, W., 1969. *The Bobwhite Quail: Its Life and Management*, Rutgers Univ. Press, New Brunswick, N.J.). Weather conditions

throughout October remained fairly mild and would have allowed time for development of insulating plumage and flight feathers.

An October hatch is probably a rare event for Bobwhite in Kansas, and may represent a renesting effort. Klimstra and Roseberry (1975. Wildl. Monogr. 41: 1-37) note that 75 percent of the hatch in Illinois, at approximately the same latitude as Kansas, occurred before the middle of August. Although Johnston (1964. The breeding birds of Kansas, Univ. Kansas Publ. Mus. Nat. Hist. 12:575-655) indicates a range of breeding from 1 May to 20 September, the early autumn dates are probably based on few records. Of the 21 Kansas Breeding Bird Survey cards on file at the University of Kansas Museum of Natural History, only two are fall records. A brood of 16 chicks "out of the nest" and "attended by the parents" was observed near Welda, Anderson County, Kansas on 6 September 1959 by William R. Brecheisen. The latest date appears to be a clutch of 15 eggs found in a roadside ditch on 27 September 1969, 5 miles east of Richmond, Franklin County, Kansas by Charles S. Edwards. The nest was discovered after it had been accidentally mowed over (killing the incubating adult) and 13 unbroken eggs were later incubated under a Bantam hen. The hen broke 3 of the eggs but 10 eggs hatched on 4 October 1960. Survivorship of the chicks is not noted.

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