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# Movements of Starlings banded in north-central Colorado, 1960-74

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## Introduction

Starlings, (*Sturnus vulgaris*) have become well established in Colorado in the last three decades. From 1950 to 1969 the state's Christmas Bird Counts averaged more than 11 Starlings per party-hour (Bock and Smith 1971) and the 1969 Breeding Bird Survey averaged 12 Starlings per route (Van Velzen and Robbins 1971).

Because of the problems caused by the feeding and roosting of large flocks of Starlings (Pearson et al. 1967; Besser et al. 1968), we and our co-workers banded 26,079 Starlings in north-central Colorado from December 1960 through July 1974 to learn more about their movements. Most birds were caught at cattle feedlots and roosts, mainly near Longmont, Brighton, and Platteville, but also at several other locations with a quadrilateral extending from Fort Collins to Greeley on the north and from eastern to western suburban Denver on the south. In Lakewood, 672 nestlings were banded in nest boxes. The approximate center of the banding area (hereinafter termed the banding site) was in Weld County, 39 km due north of the state capitol building in Denver, at the junction of Interstate 25 and Colorado Route 52.

Seventy-nine percent of all Starlings were banded from September through December, and about 40 percent were variously color-marked with plastic streamers attached by leg bands, as described by Guarino (1968a).

## Results

Through July 1975, 550 bands (2.1% of the number applied during the 14-year period) had been recovered (= encountered) and processed by the U.S. Fish and Wildlife Service Bird Banding Laboratory. Of these, 450 (82%) were recovered within 80 km of the banding site. This distance is within the reported limits of the daily dispersal from a Starling roost (summarized by Bray et al. 1975:799). The 100 recoveries at distances beyond 80 km included 44 to the north and 56 to the south (Figure 1), and extended over a span of about 2,200 km, from southern Manitoba to eastern Arizona. The

northern recoveries were made at an average longitude of 102°, or 3° east of the banding site, and the southern recoveries at an average longitude of 106°, or 1° west of the banding site.

Because of migration, the relative numbers of northern versus southern recoveries changed seasonally: March through September, 33 north and 15 south; and October through February, 11 north and 41 south.

Twenty-nine Starlings banded from July 22 through November 10 were recovered to the south in the first fall and winter (October through February). Only five of these recovered before January — three near Colorado Springs, Colorado, October 12 and 17 and November 28; one at Slaton, Texas, November 19; and one at Blanding, Utah, in December (day unknown).

Banding dates for the 44 Starlings recovered north of the banding site ranged from September 10 through March 19 and included all intervening months; thus a Starling banded in north-central Colorado at any time within this 191-day period might migrate north. Such a bird could be either a winter resident or a transient when banded.

The spring migration period and dispersal pattern are most accurately gauged by 10 distant direct encounters in the spring of birds banded from November 11 through March 19. These include only Starlings banded after the latest banding date that yielded direct fall recoveries to the south (November 10), and that were recovered through June 15. The two earliest direct spring recoveries were at Wadena, Minnesota, on March 15 (Figure 1) and near Aberdeen, South Dakota, on March 27. Three direct recoveries were made in Manitoba, two in North Dakota, and one each in Minnesota, South Dakota, Nebraska, Wyoming, and Colorado. The Colorado encounter indicated a reversal of the usual northward spring movement — the bird was banded March 19, 1963, north of Aurora and recovered about 105 km south at Colorado Springs on April 27 (date of letter in which the recovery was reported). Climatic data revealed no evidence of inclement weather (e.g. low temperature

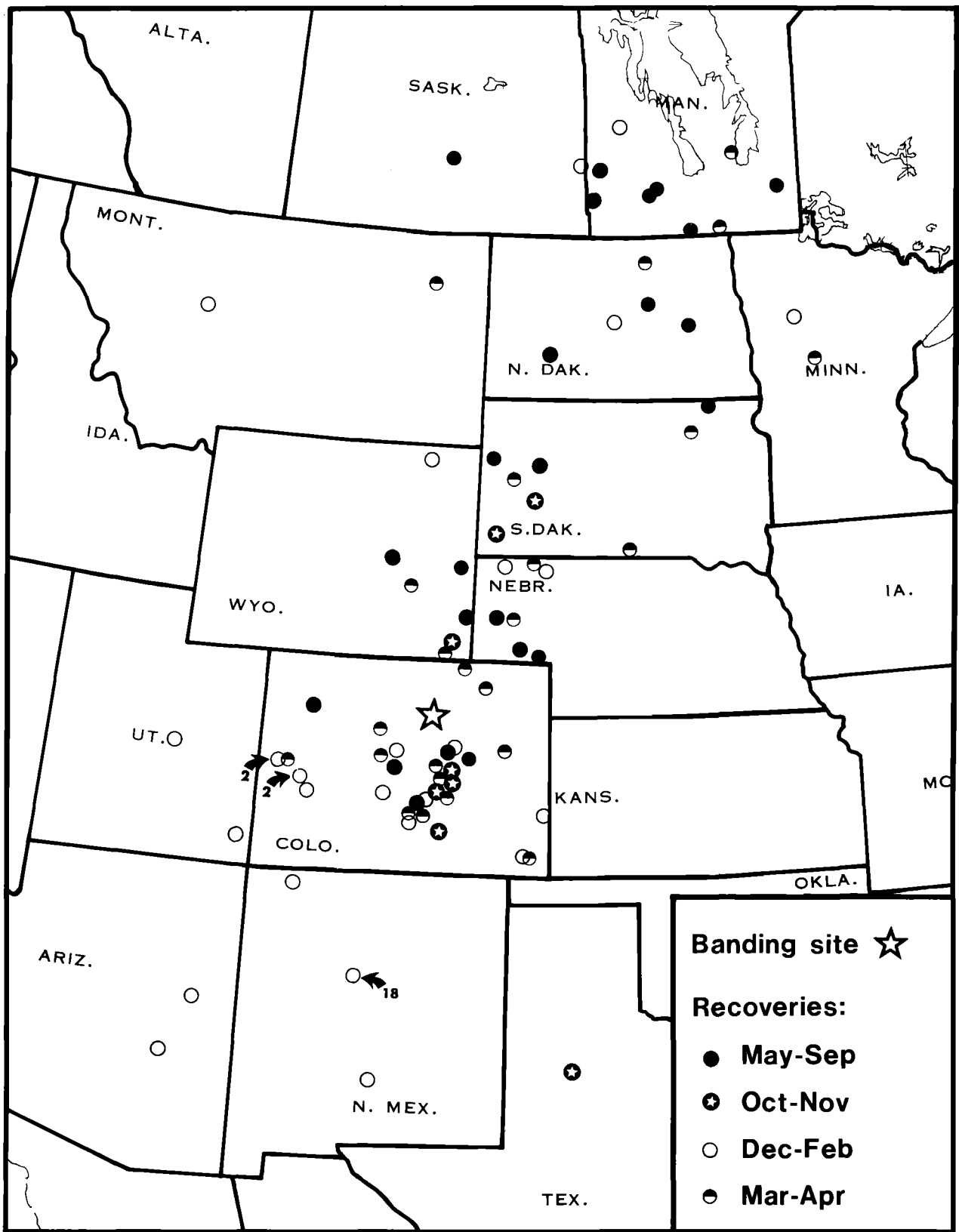


Fig. 1: Recovery localities for Starlings retaken more than 80 km from a banding site in north-central Colorado, 1960-74.

or heavy snowfall) that might cause such movement.

The banding of 672 nestlings resulted in 16 recoveries (2.4%); 15 were within 20 km of the Lakewood banding site and occurred in every month except February and December. One nestling banded in 1971 was found dead in western Nebraska in 1974.

## Discussion

Numerous studies of the baiting of Starlings with toxicants conducted by our co-workers and us, and control efforts by cattle feedlot operators, increased the numbers of both local and distant band recoveries. An estimated minimum of 326,000 Starlings were killed in north-central Colorado during the four winters, 1964-65 through 1967-68, the period during which 60% of the banding was done. Of 450 locally recovered birds, we and our co-workers recovered 134 (30%), of which 88 had been poisoned. Probably some of the 316 Starlings recovered locally by the public also died from lethal baits, because birds could disperse widely over their daily range before dying from the slow-acting toxicant, DRC-1339, that was in use (DeCino et al. 1966: West 1968). Use of a toxicant at Albuquerque, New Mexico, accounted for 16 recoveries on January 30-31, 1965, of which 15 were made by one person (W.D. Fitzwater).

To Bailey and Niedrach (1965:653), it seemed likely that the Starling breeding populations of Colorado moved south to winter, and were replaced by migrants from the north. Our recoveries, obtained largely in 1965-74, show a partly different pattern of migration. Recoveries of nestlings strongly indicate that Starlings raised in north-central Colorado are largely nonmigratory, as first suggested by Guarino (1968b). The five earliest-banded birds recovered to the south were banded as juveniles, July 22 - August 27; they were recovered as near as Colorado Springs and as far away as southern New Mexico. Although they may have been raised in the banding area, we considered it more likely that they were fledged farther north and migrated into Colorado. Paevskii (1974:67), in reference to movements of Starlings in Central Europe and the Soviet Union, stated "as early as the first month after the breeding season ends, Starlings travel over considerable distances in the direction of their wintering grounds, and then roam locally." He used the term "interim migration" for this summertime (June, July) movement.

Some migrants from farther north evidently winter in north-central Colorado, as Bailey and Niedrach

(1965) thought likely, but we believe other northern birds are transients that merely pass through Colorado. If, as we believe, Colorado-raised Starlings are largely nonmigratory, most of the 56 birds recovered to the south were transients when banded.

In our opinion, the modest yet clear tendency toward a NE-SW migrational axis is more likely inherited than due to topographical influences. The main band recovery axis only intermittently coincides with major river drainages and, as in California (Royall et al. 1972), high mountains are no formidable barrier to migrants. Eighteen distant recovery localities to the southwest lie beyond one or more mountain ranges — 13 of them west of the Continental Divide. The bird recovered in December at Blanding, Utah, and probably some of the other 10 recovered in the first winter and spring after banding, very likely migrated directly across the Rockies. Direct migration across mountain ranges is further indicated by an observation of three color-tagged Starlings at Salida, Colorado, in late December 1964 by J.W. De Grazio (pers. comm.). These birds had been marked at Longmont, Colorado, about 190 km northeast of Salida, the preceding fall. However, some of the birds recovered in western Colorado in late winter and spring might have migrated into New Mexico in the fall and then moved north in late winter on a different, more westward route. Such dispersal by first- and second-year Starlings, not yet attached to a breeding area, is apparently one of the means of westward range expansion of the species in North America (Kessel 1953:63).

In some bird populations such as those of the Starling, some individuals regularly migrate, whereas others migrate only in response to inclement fall weather; perhaps the two types of movement intergrade. The effects of weather are probably not constant but may vary with the internal state of the bird (Lack 1960). Blyumental (1974:130), citing Lack and others, stressed the unstable relationship between migration and weather.

Although our data have certain severe limitations — in 9 of the 14 years so few Starlings were banded from late July to early November that neither local nor distant winter recoveries were obtained, and in the other 5 years results were influenced by large differences in numbers banded and percentages color-tagged from one month or season to the next and the Starling control efforts already mentioned — we found some evidence of year-to-year differences in fall migration that appeared to be related to midcontinental weather. No direct

recoveries south of the banding area were obtained from 1,443 birds banded from August to early November in 1962 and 1963. Eighteen of these birds were recovered within the banding area in the first October through February after banding. In both years, autumn and early winter were unusually mild in the Northern Great Plains, Southern Great Plains, and Southwest regions (See Nero 1964, for example, among 12 regional reports in *Audubon Field Notes* issues of February and June, 1963 and 1964). We suspect that few of our banded birds migrated farther south in those mild autumns.

In contrast to the 1962-63 recoveries, 31 of the 109 first-winter recoveries from 11,309 Starlings banded (mainly in October) in the autumns of 1964 through 1966 were directly recovered farther south; record cold or unusually heavy snowfall occurred during parts of each autumn in one or more of the three above-named regions (Snider 1965; Williams 1966; Hatch 1966, 1967). In Denver the Weather Bureau recorded about 13 cm of snow and a  $-7^{\circ}\text{C}$  minimum temperature in mid-November 1964, 14-cm snowfalls in September and November 1965, and 21 cm of snow and a monthly low of  $-5.5^{\circ}\text{C}$  in mid-October 1966 (U.S. Weather Bureau 1965a, 1965b, 1966; U.S. Environmental Data Service 1966).

Four of the most distant southern recoveries — two in Arizona, one in northwestern New Mexico, and one in southern New Mexico — occurred in the winter of 1966-67. The first three were aligned as if they had followed a single narrow migratory route.

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### Summary

We and our co-workers banded 26,079 Starlings in north-central Colorado in 1960-74. Of 550 band recoveries (2.1%), 450 were within 80 kilometers of the banding locality; 100 were more distant, at points ranging north to Canada and south to southern New Mexico. The population that breeds in north-central Colorado appears to be largely nonmigratory, whereas some birds from more northern breeding populations are highly migratory. Some of the northern birds winter in north-central Colorado and others are transients. The

main axis of migration, slightly NE-SW, appears to be inherent. Abnormally heavy snowfall and low temperatures during the autumnal migratory period apparently cause Starlings to migrate farther south than they do in most winters.

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## Some Starling Notes

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Regarding returns, repeats and recoveries of Starlings, some banders report that Starlings "seldom return": Bell (*EBBA NEWS* 32(4):174) and Fisk (*EBBA NEWS* 17(5):5-6). My Starling figures from my Woodhaven Bird Banding Station are as follows: *Birds banded: 2747; Returns: 105; Recoveries: 67; Repeats: 56.* This is better than an 8% return-repeat-recovery showing on the above Starlings. Burt reported (*EBBA NEWS* 31(6):286) that only 12 Starlings out of 24,784 banded, returned, and had only 119 repeats from 8,736 birds banded.

Concerning repeats, I have had two Starlings that repeated four times each. Foreign retraps of Starlings were not plentiful, numbering 7. Detweiler reported (*EBBA NEWS* 18(4):52-53) that his foreign retraps were from north and east of his banding station at Salem, New Jersey, while his birds migrated clockwise to the west, northwest, and then north.

Three of my retraps of Starlings were from Dr. Fluck's banding station at Washington Crossing Park, which is north and slightly west from my Woodhaven station. One retrap was a Dickerson Starling from Spotswood, New Jersey, which is northeast of my station, and two were from Detweiler's Salem station, south and west from me. Thus three of my retrapped Starlings came from the northwest, one from the northeast, and three from the southwest.

Recoveries of Starlings banded by me show that my birds moved mostly northeast, to New York, Vermont, Maine and New Brunswick, Canada. While some near-local recoveries were northwest, only one long-flight recovery showed northwest movement into Wisconsin.

It has been suggested that Starlings follow rivers; my station, Dr. Fluck's station, and the Rev. Detweiler's station were all on, or very close to the Delaware River.

Connie Katholi reported (*EBBA NEWS* 29(4):173) on a cross-billed Starling. On 2 January 1958 we banded Starling No. 552-32288 which had a bill with each mandible curling into a different direction and extremely long. While the bird did not appear to be suffering from malnutrition, it ate with a sideways shoveling motion, scooping the food into the side of the bill rather than picking it up. After three more repeats in our trap, we took the bird and had its bill trimmed back to a more normal size, although this did not eliminate the curves. One month later the Starling repeated again and seemed in good condition. This made 4 repeats for this bird; having an eating problem, no doubt a well-filled trap would entice this special bird to repeat more than a normal bird.

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