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MIGRATION AND SEASONAL DISTRIBUTION OF COMMON GRACKLES Banded IN NORTH AND SOUTH DAKOTA

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In the half century from 1920 through August 1970, the Bird Banding Laboratory processed 1,489 recoveries of Common Grackles (*Quiscalus quiscula*) banded in North and South Dakota. On the basis of range (American Ornithologists' Union, 1957), these birds are assumed to be of the subspecies *versicolor* (formerly *aeneus*), referred to as the Bronzed Grackle prior to the 1957 edition of the A.O.U. check-list. Wanda W. Brentzel, Robert and Ann Gammell, J. F. Brenckle, and biologists of the Denver Wildlife Research Center obtained 632, or over 42 per cent, of all recoveries. Sixty-five other banders obtained the rest.

Neff (1949), Huntington (1952), Fankhauser (1968), and Meanley (1971) have used some of these records in various analyses but have not reported them separately or in any detail. We found 87 recoveries of Dakota-banded grackles specifically identified in the following references: Lincoln (1927), Anonymous (1941), Cooke (1942), Stevens (1944), Preston (1945), Gray (1948), Irwin (1957), Holden (1961), Elliott (1965), and De Grazio et al. (1969). Gill (1946) referred to a grackle banded in South Dakota on 17 August 1924 and recovered in Minnesota in October 1940, but current records include no such recovery. However, there is a record of grackle 3386003 banded at Aberdeen, South Dakota, on 17 August 1934 and recovered in Minnesota in October 1940. The 1924 banding date was probably in error.

This paper presents information on geographical and seasonal distribution of band recoveries, based on data in our banding files, analysis of duplicate band recovery records from the Bird Banding Laboratory, a literature review, and correspondence with other banders.

BAND RECOVERY DISTRIBUTION

A total of 745 grackles was recovered in the same 10-minute latitude-longitude block (approximately 12 x 8 miles) where they were banded; 186 of these were obtained by retrapping. If retrapped and released by the original bander, they probably should have been reported as Returns, not Recoveries. Another 170 grackles were recovered at short distances, no farther than two 10-minute blocks in any direction from the banding station. These 915 local

recoveries (including 35 across state lines) account for 61 per cent of the records and are not mapped in this paper.

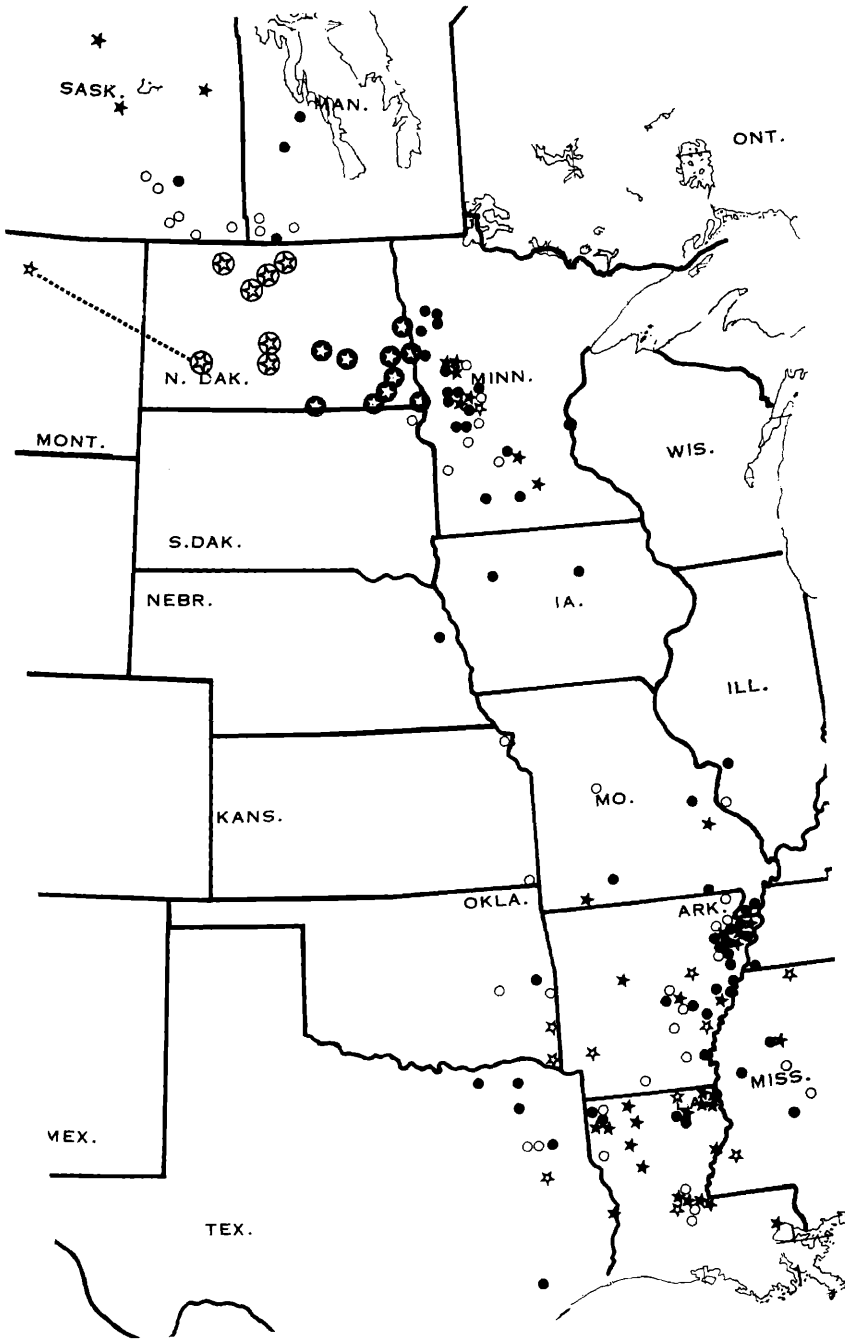
Of the remaining 574 distant recoveries, 442 occurred outside of the banding state. Out-of-state recoveries have been mapped (Figs. 1 and 2), except for a few with inexact recovery location data. A recovery is direct if there is a strong probability that the bird experienced only one migration between banding and recovery. This would include most grackles banded from 1 May through 14 December and recovered through the following February, and most of those banded from 15 December through 30 April and recovered through the following August. Figure 3 shows 123 of the 132 in-state recoveries over two ten-minute blocks from their banding locations.

BREEDING RANGE

Band recoveries indicate that North Dakota-banded grackles occupy a summer range in North Dakota, eastern Montana, southwestern Manitoba, southern Saskatchewan, and southern Alberta (Figs. 1 and 3). Most recoveries in Canada were from the grassland life zone, but some were from the aspen parkland. Some grackles banded in extreme eastern North Dakota were recovered in Canada from about the latitude of Regina, Saskatchewan, and northward. They evidently belonged to the same summer population as those reported by Houston (1968). Most of those banded in north-central to northwestern North Dakota were recovered in that area and in southern Canada southeast of Regina, but two reached far western Saskatchewan and Alberta. Those banded in south-central and southwestern North Dakota were recovered in the same regions where they were banded, except for one recovered in Montana.

South Dakota-banded grackles occupied a summer range in South Dakota, North Dakota, and eastern Montana (Figs. 2 and 3). Few birds were recovered in western North Dakota and eastern Montana, and none were recovered in Canada. Grackles banded in central and western South Dakota were recovered in the same regions where they were banded, except for one recovered in Montana. Those banded in northeastern South Dakota were recovered mainly in the same region and the adjoining southeastern and south-central area of North Dakota. No grackles banded in southeastern South Dakota (Brookings, Madison, and Alexandria southward) have been recovered in North Dakota, but this might be because banding in that area was mainly in late spring after northern migrants had passed.

FIGURE 1. Common Grackles banded in North Dakota and recovered out-of-state. Banding locations east and west of 100° longitude and their recoveries are shown by solid and hollow symbols, respectively. Stars denote direct recoveries; circles denote indirect recoveries; stars within circles denote banding locations. Three indirect recoveries are not mapped: Sask. 521-1094 and Alta. 522-1131, from western N. Dak. banding; Alta. 510-1132, from eastern N. Dak. banding.



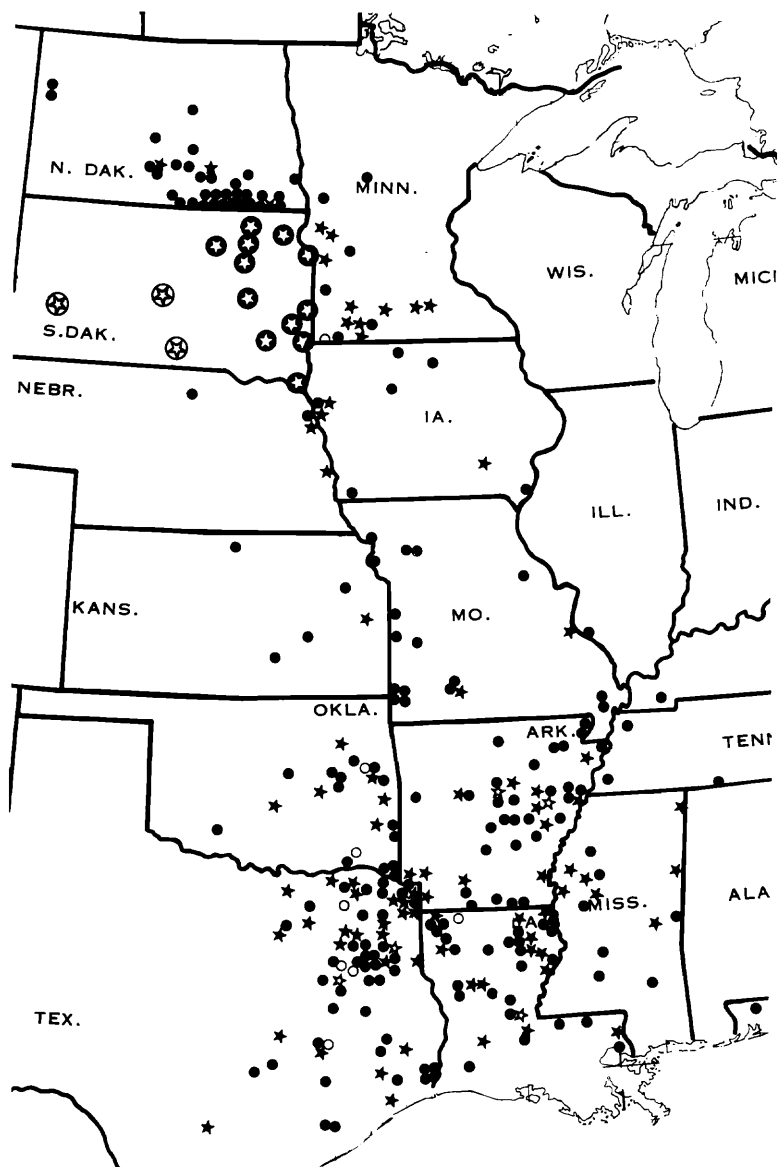


FIGURE 2. Common Grackles banded in South Dakota and recovered out-of-state. Symbols as in Figure 1. Five indirect recoveries are not mapped: Mich. 430-0834, Ohio 413-0824, Mont. 484-1070, and Colo. 402-1050, from eastern S. Dak. banding; Mont. 454-1083, from western S. Dak. banding.

One grackle, banded in south-central North Dakota (Wilton), reached southern Saskatchewan. This and other indirect recoveries (such as an odd displacement from northeastern to southwestern North Dakota in Figure 3E and the single recoveries in Colorado, Ohio, and Michigan) could represent birds that changed summer ranges from one year to another, or there might be undiscernible errors in some recovery records.

WINTER RANGE

The winter range of Dakota-banded grackles, as indicated by band recovery patterns (Figs. 1 and 2) and periods (Table 1), spans an area about 700 miles east-west and 500 miles north-south. It extends from western Florida and central Tennessee west to the eastern edge of the grassland and mesquite-grassland life zones in eastern Oklahoma and eastern Texas, and from the Gulf coast and San Antonio, Texas, to the latitude of the Arkansas-Missouri state line. However, about 90 per cent of the recoveries were in Arkansas, Louisiana, Oklahoma, and Texas, and only 10 per cent were east of the Mississippi River in Tennessee, Mississippi, and Florida. This is the same recovery ratio between the southwestern and the south-central states reported for grackles banded in Minnesota, Iowa, Missouri, Kansas, and the states and provinces north and west of them (Huntington, 1952).

Grackles banded in North versus South Dakota and in the eastern versus the western half of each state present different recovery patterns within the overall winter range. Winter recoveries of grackles banded in eastern North Dakota are most numerous near the Mississippi River from northeastern Arkansas to southern Louisiana with some occurring westward into eastern Texas. Grackles banded in Saskatchewan (Houston, 1968) occupy about the same range as those banded in eastern North Dakota. Perkins (1932) describes the winter range of Indiana-banded grackles as similarly narrow and close to, but mainly east of, the Mississippi River.

Winter recoveries of grackles banded in western North Dakota have much the same distribution as those from eastern North Dakota, except that fewer are near the Mississippi River and proportionately more are in eastern Oklahoma and Texas.

Grackles banded in South Dakota account for the greatest east-west limits of the overall winter range (Fig. 2). Many recoveries of grackles banded in eastern South Dakota were in eastern Arkansas and northeastern Louisiana, and some were east of the Mississippi River, but the densest pattern occurs in northeastern Texas. Over 47 per cent of those banded in South Dakota were recovered in Oklahoma and Texas, in contrast to only about 17 per cent of those banded in North Dakota. No grackles banded in western South Dakota were recovered east of the Mississippi River.

Bailey (1927) stated that the Bronzed Grackle migrates "to the southeastern states except the coast districts." The much greater number of recoveries inland than near the coast, especially east of

Texas, shows this to be true. However, weather conditions might cause movement of exceptional numbers of grackles into coastal areas in some years. This occurred in January and February of 1940. McIlhenny (1940) reported that great numbers of grackles, both purple (*Q. q. stonei*) and bronzed, came to the last timber belt of the lower South in January 1940. Burleigh (1944) noted the

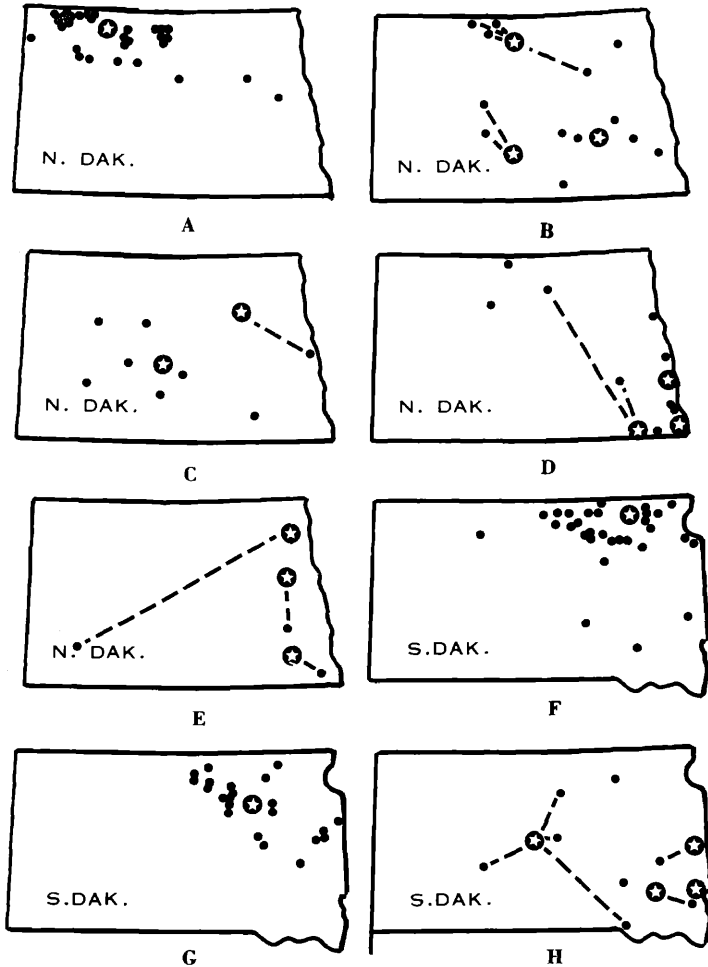


FIGURE 3. Common Grackles banded and recovered within North and South Dakota. Maps A-H show recovery patterns for different banding locations. Stars within circles denote banding locations. Broken lines connect some specific banding and recovery locations. In maps B, C, D, and H, all recoveries not connected by broken lines are associated with the banding locations from which no broken lines extend.

Bronzed Grackle on the Mississippi coast only during the winter of 1940, when freezing temperatures and deep snows prevailed over much of the Bronzed Grackle's normal winter range. Band recoveries in that winter had a more southern, but not primarily coastal, distribution. In January and February of 1940, nine Dakota grackles and two Saskatchewan grackles (Houston, 1968) were recovered: seven in Louisiana, three in southwestern Mississippi, and only one in Arkansas. Among grackles banded by Bartel (1953) in Illinois, the most southern recovery was on 13 February 1940 at Flomaton, Alabama (on the Florida line).

TABLE 1. Number of out-of-state recoveries of Dakota-banded Common Grackles by areas and months of recovery.

Recovery area	May- July	Aug.- Oct.	Nov.	Dec.- Feb.	March	April
Alta., Sask., Man.	19	0	0	0	0	0
Mont., N. Dak., S. Dak., Minn.	62	43	5	2	2	11
Nebr., Iowa, Kan., Mo., Ill., Ohio, Mich., Ky., Colo.	5	5	7	5	18	15
Okla., Ark., Tenn.	1	2	18	47	30	9
Texas, La., Miss., Fla.	3	0	8	117	36	6
Total	90	50	38	171	86	41

MIGRATION ROUTES

Cooke (1915b) believed the Bronzed Grackle was among the many species that migrate in spring north from the Gulf coast through Missouri and Minnesota, turn northwest across the southwest corner of Manitoba and through southern Saskatchewan, then continue north to the Mackenzie Valley. He concluded that the dry plains on the west act as a barrier northward through the Dakotas, but that migrants turn northwest upon reaching Manitoba where the plains become wetter and are interspersed with groves. The recovery pattern for grackles banded in Saskatchewan (Houston, 1968) fits exactly Cooke's map of this route.

Grackles banded in North Dakota and eastern South Dakota also appear to avoid extended migration through the central and southern plains (Figs. 1 and 2). In-state recovery patterns show a strong west-northwest to east-southeast axis (Fig. 3A, B, C, F and G). Nine grackles banded at Sand Lake National Wildlife Refuge, South Dakota in July-September were directly recovered 50 to 100 miles east-southeast in September-November. Although a great many groves and field windbreaks were established in eastern North and South Dakota in earlier years, especially under the Prairie

States Forestry Project of 1935-42 (Read, 1958), we cannot detect in band recovery patterns any influence this habitat change might have had on grackle migration routes within this area.

Along the Minnesota-Dakota state line, the recovery pattern is oriented more north and south (Figs. 1, 2, and 3D). The courses of the Minnesota, Mississippi, and Missouri rivers, the Red River of the North, and possibly the Des Moines, Big Sioux, and others, evidently strongly influence migratory pathways between the Dakotas and the winter range. As we interpret the recovery maps, North Dakota grackles favor the more eastern river routes and South Dakota birds, the Missouri. These routes are through the oak-savanna and eastern deciduous forest life zones. Cooke (1951b) believed that birds used the north-south route east of the plains due to food supplies in the river valleys.

The migration routes of grackles banded in southwestern North Dakota and western South Dakota are less discernible, but we have reviewed unpublished recovery data from banding in other states that indicate southeast-northwest migration through central Nebraska and Kansas. Birds that pass through western North and South Dakota en route to and from Montana must move over a great stretch of high, dry plains, largely unaided by convenient river courses.

Oddly, no grackles banded in southern North Dakota have been recovered in South Dakota; thus Figs. 1 and 2 are not reciprocal in that respect. We would expect larger-scale banding from Bismark to Oakes to lead to recoveries in northeastern South Dakota during migration.

FALL MIGRATION PERIOD

Reilly (1968) states that grackles move south from August to mid-December. For Dakota-banded grackles, the geographic and seasonal patterns of interstate recoveries (Table 1) appear to reflect this lengthy period of southward movement. In fact, the data indicate possible movement even in July from Canada into North Dakota. There are no recoveries in Canada after July, and three grackles banded in northwestern North Dakota in the 11-25 July period were recovered in later years in southern Canada. Cooke (1915a) reported that some species start migrating south in early July.

Fall migration through the Dakotas occurs mainly in September and October. Grackles from farther north move into and through Sand Lake National Wildlife Refuge, South Dakota in September and October. Only two banded there in July and August were recovered to the north in later years, whereas 25 banded in September and 5 in early October were later recovered to the north. The three grackles banded in eastern South Dakota and recovered in Montana and extreme western North Dakota were banded at Sand Lake from 22 September to 5 October; these banding dates might indicate that the most northwestern population of South Dakota-banded birds arrives at Sand Lake the latest.

Stevens (1950) records the average date of the last fall departure at Fargo, North Dakota as 7 October (earliest, 26 September; latest, 25 October), and Pettingill and Whitney (1965) observed grackles at Rapid City, South Dakota only through 14 September in 1955 and 29 September in 1956. Among recovery records, the latest Dakota banding dates are: Kenmare, North Dakota, 12 October; Oakes, North Dakota, 13 October; and Sioux Falls, South Dakota, 14 October. Larson (1925) gave the average late date of departure from Sioux Falls as 9 November. A few grackles were reported recovered in the Dakotas as late as 14 November to 2 December, but we must wonder if they were really very late migrants or if their late occurrence was instead a result of poor physical condition or delayed reporting.

Fankhauser (1968) reviewed band recovery records and found that migration into southern states occurs in the 1 November - 15 December period. Few Dakota-banded grackles arrived on the winter range until November. A bird banded in August at Jamestown, North Dakota and shot in Arkansas on 27 October of the same year represents the earliest recovery within the winter range. From Table 1, it is apparent that migration into the Gulf states continues into December.

SPRING MIGRATION PERIOD

The seasonal limits of northward migration are given as late January to early May (Reilly, 1968). Grackles have appeared in many northern states as early as mid- to late February. However, it may be inferred from the band recovery analyses of Neff (1949) and Fankhauser (1968) that the main wave of migration occurs in March. Table 1 shows that March-April is the main spring migration period for Dakota-banded grackles. The earliest reported spring arrival at Aberdeen, South Dakota is 4 March (Bent, 1958). The average date of the first arrival at Sioux Falls, South Dakota for 8 years was 25 March and the earliest was 19 March (Larson, 1925). At Fargo, North Dakota the first arrival ranged from 21 March to 13 April, and the average was 7 April (Stevens, 1950). The average arrival date at Fargo, only 240 miles north of Sioux Falls, is 13 days later; this indicates an unhurried rate of migration through eastern South Dakota.

Among recovery records, the earliest Dakota banding dates are: Northville, South Dakota, 16 March, and Oakes, North Dakota, 22 March. Earliest bandings in the western part of the Dakotas were 16 April (Winner, South Dakota), 20 April (Kenmare, North Dakota), and 22 April (Rapid City, South Dakota).

A grackle banded at or near Dickinson, North Dakota on 20 April was recovered 10 days later in the Malta, Montana area (Fig. 1). Records of two grackles banded in southeastern North Dakota on 29 April and 13 May and recovered in Saskatchewan in June the same year show some migration through North Dakota as late as May. Although Houston and Street (1959) report the earliest arrival on 14 April and the average first arrival on 19 April

at Nipawin, Saskatchewan (about 300 miles north of the North Dakota line), no North Dakota-banded grackles have been recovered in Canada before May.

Two direct South Dakota-to-North Dakota recoveries are for April-to-June displacement northwest from Sand Lake. The scarcity of direct recoveries in North Dakota is explained by a low banding effort in the spring in South Dakota. Only 8 of 41 grackles banded in South Dakota and recovered in North Dakota were banded earlier than June.

RECOMMENDATIONS FOR FUTURE BANDING

More grackles should be banded in the Dakotas in the spring to obtain more direct recoveries on the summer range. So that all population segments are represented in subsequent recovery data, spring banding should begin with the arrival of the earliest flocks and fall banding should end only when the last migrants have departed.

Many more grackles should be banded in northeastern, south-central, and southwestern North Dakota and in central and western South Dakota. Data for both resident and transient populations in these areas are very incomplete.

SUMMARY

Through August 1970, the Bird Banding Laboratory processed 1,489 recoveries of Common Grackles banded in North and South Dakota. Recoveries indicate that Dakota-banded grackles spend the summer primarily in the Dakotas and the southern part of the Canadian prairie provinces, and to a lesser extent in Montana. They spend the winter south of the Arkansas-Missouri state line, mainly from eastern Texas and Oklahoma to the Mississippi River, and to a lesser extent east of the Mississippi River to western Florida. Grackles banded in different parts of the Dakotas show different band recovery distributions within the overall summer and winter ranges.

Within the summer range, migration routes are largely directed east-southeast to west-northwest, but from the Minnesota-Iowa state line to the winter range they are east of the grasslands in a southeast-northwest to south-north direction and appear to coincide to a great extent with major river courses where there is a good food supply. Fall migration within the Dakotas occurs mainly in September and October and spring migration mainly in March and April.

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