

# DISTRIBUTION AND CHRONOLOGY OF MALLARDS HARVESTED IN MINNESOTA

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The proportion of band recoveries from Mallards (*Anas platyrhynchos*) reared in Minnesota that are also recovered in the state is normally quite high, about 70% for those banded as flightless young (Lee et al., 1964). Approximately 55 to 65% of the first-year mortality of locally reared mallards can be allocated to hunting losses (Jessen, 1970). Contribution of these locally-reared mallards has been judged to account for one-fourth of the total number of mallards bagged in Minnesota during the years 1964-67 (Jessen, 1970) and a slightly higher proportion when related to the years 1966-1968 (Geis, 1971). With the larger take of mallards originating from outside the state, it is important to understand the source and nature of this contribution to aid future waterfowl management decisions.

This paper details the chronology and distribution of harvest in Minnesota of mallards originating from Alberta, Manitoba, Saskatchewan, South Dakota, and North Dakota. These breeding grounds contribute three-fourths (72%) of Minnesota's harvest from out-of-state sources (Geis, 1971). Regions of recovery within Minnesota are also related to sources of birds.

## METHODS

Band recoveries from mallards shot in Minnesota during the 1963 through 1967 hunting seasons provided the basis for this investigation. Only hunting season recoveries from mallards banded on the breeding grounds of Saskatchewan, Alberta, Manitoba, South Dakota, and North Dakota were used. A total of 321 such recoveries was available for this analysis.

Because the ratio of mallards banded to the total number of mallards present varied among the states and provinces, band recoveries were weighted for purposes of comparison. These "rough" weights were derived by using the formula: population index divided by the number of birds banded, times the number of recoveries (Geis and Taber, 1963). Thus with weighting, each band represents a portion of the total mallard population originating from a specified location.

Population indices calculated here to indicate abundance were derived from the mean numbers of mallards recorded by aerial surveys on the breeding grounds during the same time period used for recoveries, 1963 through 1967 (Crissey, 1964; Martinson, 1965, 1968; Martinson and Henny, 1966). An average of total numbers of mallards banded during the years 1963 through 1967 in Manitoba, Saskatchewan, Alberta, North Dakota, and South Dakota was used as the number banded in the equation described. A weakness in this approach that may have influenced our findings is that the banding effort was not representative of the reference region. It is known that banding sites were not distributed evenly through-

out the states and provinces. In addition, total number of recoveries available for analysis was low.

Based on a previous calculation that in Minnesota 51% of the band recoveries reported in any week occur on the weekend (Geis and Carney, 1961), band recoveries were tabulated by seven-day intervals to avoid this bias. Six-week intervals, or 42 days, in chronological order were used for reference in tabulation of recoveries. This time period was considered adequate as season lengths ranged from 35 to 45 days during the years examined. Opening dates for the five hunting seasons ranged from 3 to 9 October. Differences in opening dates presumably did not influence the chronology of harvest; consequently, each opening day was treated as day one of the first seven-day time interval.

In addition to time intervals, Minnesota was divided into three geographic regions based on latitudinal divisions: the region south of latitude 45 degrees was designated southern, that between 45 and 47 degrees as central, and that north of 47 degrees as northern. This division of the state places the central region within the area bounded by the Twin Cities to Duluth on the east and to Montevideo to Detroit Lakes on the west, with the other regions lying to the north or south.

#### RESULTS AND DISCUSSIONS

Mean weighted recoveries from mallards banded within reference breeding areas to the west and north of Minnesota, when related to seven-day intervals throughout the fall, revealed that one-third (32%) were taken during the first seven-day interval of the hunting season (Fig. 1). The mean proportion over the five years examined reveals that one-half of the birds (51%) were reported by the end of the second time interval. The mean proportion over six time intervals declined throughout the season with the exception of a slight increase in the third interval. This is similar to the harvest pattern of local ducks. Jessen (1970) reported that 61% of the total recoveries of mallards banded as flightless young in Minnesota were taken by 15 October, and after this date the recovery rate progressed at about one percent per day. Others, such as Bellrose (1944), have reported that daily harvests and individual hunter harvests were highest in the early portion of the hunting season in northern states. Mean recoveries for the five years examined followed a pattern similar to that of hunter activity as reported for the 1960 hunting season in Minnesota (Atwood and Wells, 1961).

Lee and Tester (1955) reported mallard densities in Minnesota to be highest about 15 October in the northern part of the state, with peak numbers in the south not being reached until 15 November. Such seasonal patterns of abundance should be reflected in the chronology of recoveries, provided the number of mallards bagged is related to numerical abundance. In Wisconsin, Jahn and Hunt (1964) calculated that one-fifth to one-half of the seasonal harvest of all ducks was attained during the first seven days of the hunting season even though peak densities of ducks were reached later (10 October to 10 November).

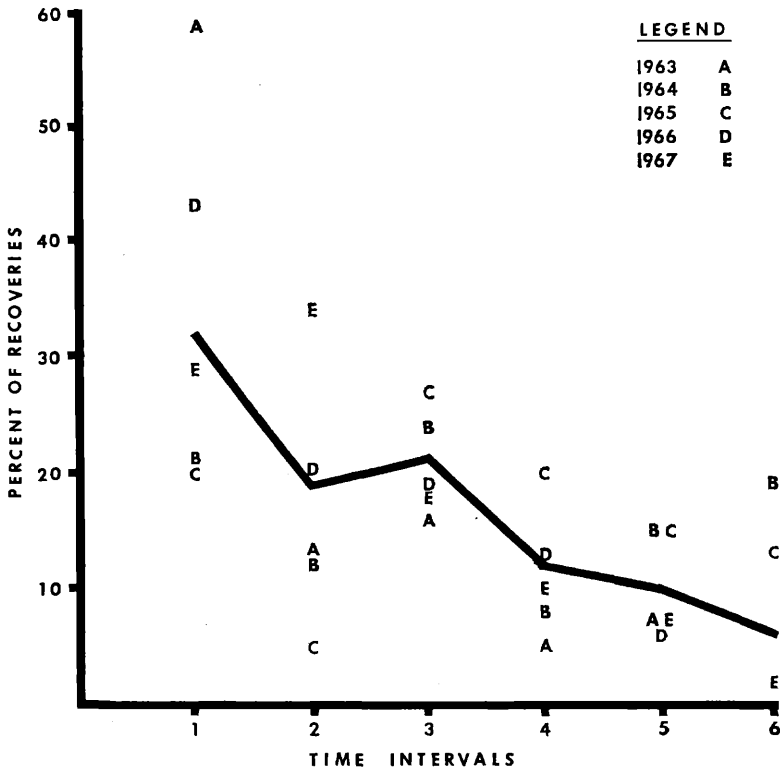


FIGURE 1. Percentage of recoveries due to hunter harvest as recorded during hunting seasons, 1963 through 1967.

Mallard recoveries within the three regions of Minnesota reflect similar patterns of recovery even though regions varied as to total percentage taken (Fig. 2). Each region reflected a high recovery rate within the first time interval with lower proportions occurring in the latter intervals. A minor exception is shown in the southern region for the third time interval. Recoveries in the northern region are proportionately low, 10% of the total. The central region accounted for 44% of the recoveries and the southern zone 46%.

Of the northern recoveries 91% occurred during the first 21 days of the season (Table 1). This compares with 75% in the central and 65% in the southern zones for the same time period. These differences probably reflected reduced availability of birds in the more northern latitudes due to earlier freezing conditions of shallow waters. Hunter responses to late fall weather conditions would also be involved.

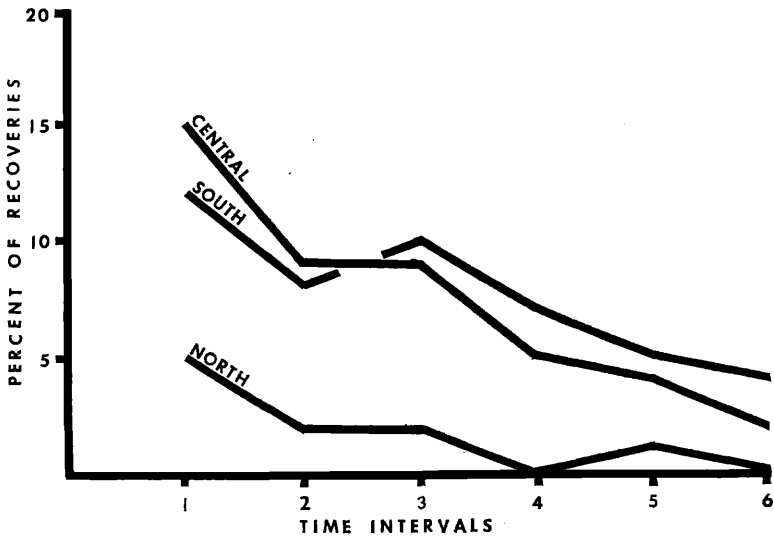


FIGURE 2. Percent of recoveries occurring within three geographical regions of Minnesota during six time intervals over the hunting season.

Proportional contribution of mallards to the Minnesota harvest from the out-of-state sites examined was estimated at 10% from Alberta, 36% from Saskatchewan, 27% from Manitoba, 10% from North Dakota, and 17% from South Dakota (Table 2).

Relating the origins of mallards within the three regions of Minnesota reveals additional differences (Table 2). In the northern region 80% of the birds taken originated from Manitoba and Saskatchewan. A lesser amount, about 20% of the total, was derived collectively from Alberta and South Dakota. Central region recoveries were dominated by Manitoba birds, slightly over one-third, with the remainder divided among the other sources. The southern region received over one-half of its birds from Saskatchewan.

TABLE 1.  
Cumulative percent of recoveries for time intervals as occurring in the three regions of Minnesota

Region of Recovery	Time intervals					
	1	2	3	4	5	6
North	48	71	91	91	100	—
Central	35	55	75	86	95	100
South	26	44	65	80	90	100
Totals <sup>1</sup>	32	51	72	84	94	100

<sup>1</sup>Row entries obtained from raw data totals

TABLE 2.  
Percent of total recoveries for banding reference locations as occurring in three regions of Minnesota

Region of recovery	Banding location				
	Alberta	Saskatchewan	Manitoba	North Dakota	South Dakota
North	1(10) <sup>1</sup>	4(40)	4(40)	0	1(10)
Central	4( 9)	9(21)	16(37)	6(14)	8(19)
South	4( 9)	24(53)	6(13)	4( 9)	7(16)
Total <sup>2</sup>	10	36	27	10	17

<sup>1</sup>Percentage of total recoveries within each region of recovery

<sup>2</sup>Difference in summation due to rounding to nearest whole number after data calculations

Total recoveries when proportioned by banding location within the north, central, and south regions of Minnesota reveal interesting harvest patterns (Fig. 3). Moderately large proportional harvests

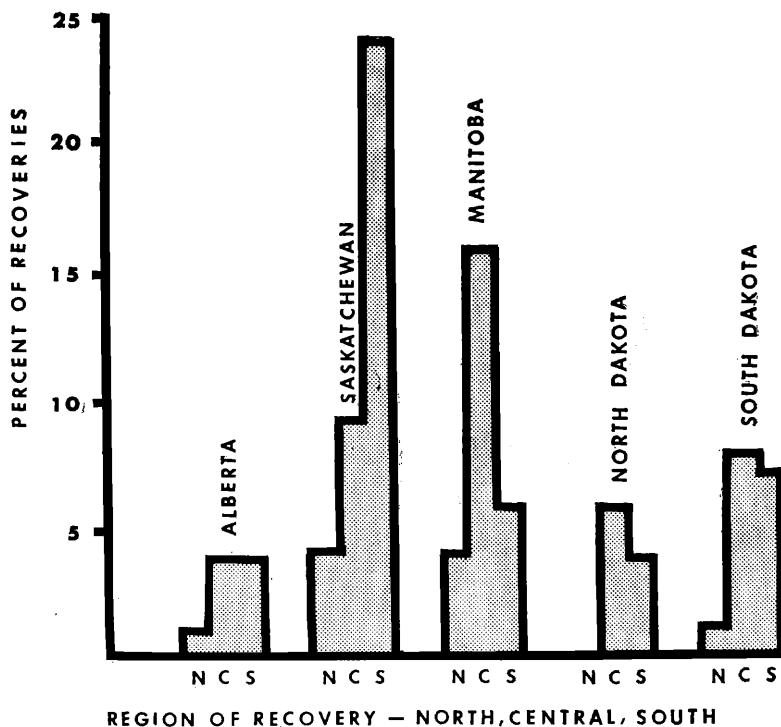


FIGURE 3. Percent of total recoveries occurring within three geographical regions of Minnesota as arranged by contributing out-of-state sources.

of mallards occur in the southern region (24%) which originated from Saskatchewan and in the central region (16%) with an origin in Manitoba. Total recoveries ranging between 9 and 6% in the central region originated from Saskatchewan, North Dakota, and South Dakota. Manitoba and South Dakota provide 6 and 7% respectively of the mallard harvest in the southern region.

#### SUMMARY

Chronology of mallards harvested in Minnesota averaged over the period 1963 to 1967 from out-of-state breeding grounds to the west and north is apparently related to hunter activity during the season. Little evidence was found of increased harvest due to late season "northern flights." The first week of the combined five hunting seasons accounted for 32% of the birds taken. This is the same period having the highest hunter activity. The proportion of birds taken declined as the season progressed. The central region of Minnesota received 44% of the total weighted recoveries, whereas the southern region received 46% and the northern region 10%. After three time-periods of the season (21 days), recoveries from the northern region were nearly complete. This likely reflects the onset of freezing weather and a corresponding reduction in both mallard abundance and hunting activity. Mean recoveries from the central and southern regions are also greatest during the first week of the hunting season, progressively declining thereafter.

The calculated contribution of mallards to Minnesota's overall harvest is greatest from Saskatchewan and Manitoba, accounting for about 62% of the birds from the five areas examined. South Dakota contributed an additional one-sixth of the birds with the remainder coming from Alberta and North Dakota.

The northern region of Minnesota received its greatest contribution of mallards from Manitoba and Saskatchewan with few birds from the other locations. The central region receives most of its harvest from Manitoba followed by substantial numbers from Saskatchewan and South Dakota. The southern region receives a large proportion of its harvest from Saskatchewan with lesser proportions from the other reference areas.

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