Tree Swallow Banding Near Saskatoon, Saskatchewan

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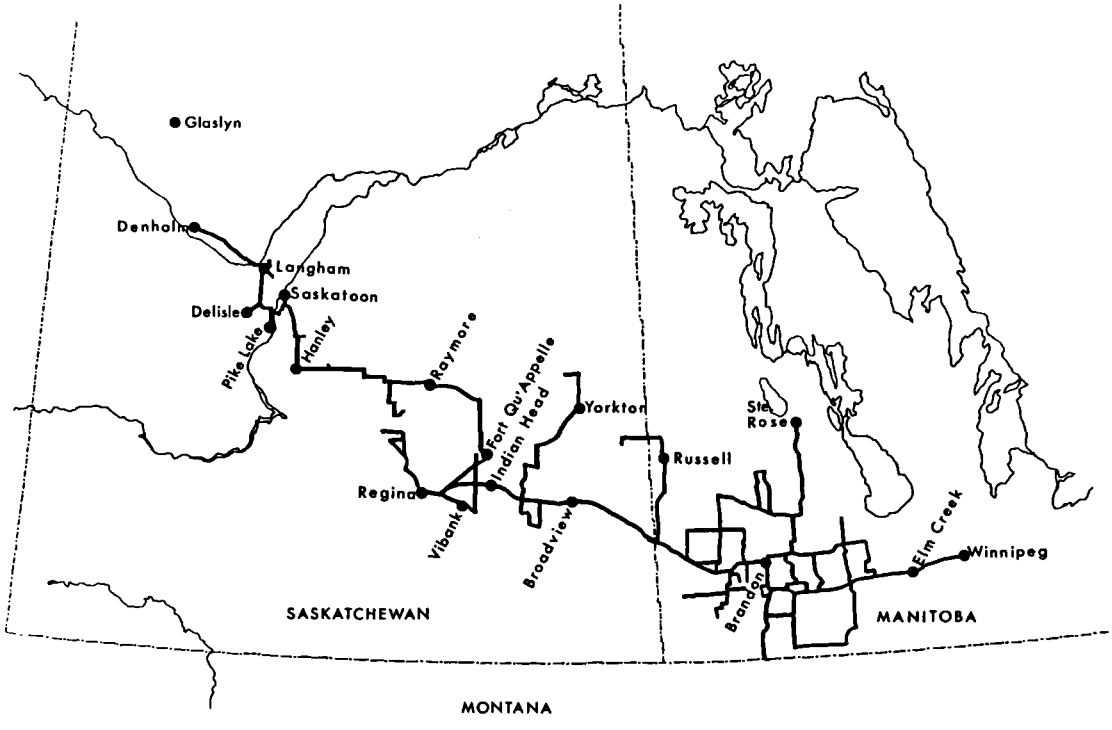
Before the settlement of the nearly treeless plains of southern Saskatchewan (Houston and Bechard 1983), cavity nesting birds such as the Mountain Bluebird (*Sialia currucoides*) and Tree Swallow (*Tachycineta bicolor*) were uncommon because of the lack of nest sites. They depended on decayed stumps and in the case of the bluebird, crevices in clay cliffs. Settlement brought telephone poles and fence posts with holes dug by Northern Flickers (*Colaptes auratus*), mail boxes, twine boxes on binders, and crevices in buildings. These made excellent nesting sites, resulting in increasing numbers of Mountain Bluebirds and Tree Swallows (Houston 1977).

Unfortunately, House Sparrows (*Passer domesticus*), followed in the 1940s by European Starlings (*Sturnus vulgaris*), also increased in number, and gradually usurped most of the sites suitable for Mountain Bluebirds. The lack of nest sites, and the resultant decrease in bluebird populations, motivated Dr. Jack Lane of Brandon, Manitoba, and his Junior Birders, to build and set out nest boxes, each with an entrance hole 1.5 inches in diameter, too small to admit a starling. Observing Lane's success, Lorne Scott of Indian Head, Saskatchewan, began building boxes and connected with Lane's trail in 1968. The Saskatoon Junior Natural History Society began a trail that met with Scott's in 1970 at Raymore, 120 miles southeast of Saskatoon (Scott 1970, Houston 1971). By 1975 there were about 2500 miles of connecting trails with the extremities (at Denholm, near North Battleford, Saskatchewan, and Winnipeg, Manitoba) about 600 miles apart (Figure 1).

For a few years we tried to monitor all boxes on the western portion of the trail, as far east as Raymore, but after 1973 we restricted regular visits to those 250 (on average) boxes between Delisle and Hanley. This regularly studied portion of the trail, from northwest to southeast, is 76 miles long, 36 miles on the west side of the South Saskatchewan river and 40 east of the river. All of these boxes are within 40 miles of Saskatoon, and the most distant extremities are 48 miles apart (as the bluebird flies).

Our boxes are placed on fence posts. To minimize their use by the House Sparrow and House Wren (*Troglodytes aedon*), they are positioned away from farm yards and preferably at a distance from trees or bushes. When the boxes are placed along busy roads, there is less temptation for vandals to stop and investigate. The boxes are

Figure 1. Map of Prairie Bluebird Trail from Denholm, Saskatchewan to Winnipeg, Manitoba.



checked and repaired in early spring, then visited again at least four times during the nesting season, to record numbers of eggs, look for banded adults and to band both adults and young. Although the objective — "to bring back the bluebirds" — has been achieved, the greatest beneficiary has been the Tree Swallow.

Late spring snowstorms or prolonged spells of cold rainy weather can seriously decrease the production of young, or delay the nesting period, or both. In 1982 a wet 6-inch snowfall on 28 May followed by a period of cold weather drastically reduced the food available. All but two clutches from the first nesting of Mountain Bluebirds were lost, and these were one and two weeks late. Some pairs renested, making bluebird banding four weeks later than usual, with fledging of only 132 young, compared to 335 one year earlier. Tree Swallows, which nest later than bluebirds, delayed egg laying by eight or nine days, but fledged a normal number of young (Houston 1982). In 1983, a heavy snowstorm on 9 May again delayed nesting of both species by 10-14 days. Bluebirds were even more seriously set back than the previous year and fledged only 100 young (Houston 1984). Although the Tree Swallows fledged a usual number of young in 1983, the adult females may have suffered unusual stress for only one of them was recaptured in subsequent years.

One of us (MIH) tries to check each nest box every ten days during the nesting season (it takes 4 full days each time). Those adults caught on the nest are banded or, if already banded, the bird number is recorded. Many variables affect the number of banded adults recaptured in a given year. In the first few years of the project when crews of junior naturalists, who move more quickly, were available to assist with banding, we caught more adults before they could fly from the box. Other variables include the weather — adults sit more closely on cold damp days; the stage of incubation — once the eggs are laid and incubation started, the female is more likely to stay on the nest; and frequently, early morning is better than later in the day. Once the young are a few days old, adults are often out foraging, and can be caught only when they return to the box with food. Only in 1970, 1973 and 1976 did we wait to catch, respectively, 2, 5 and 4 adult males as they brought food to the young. Not one of these males was recaptured later.

Table 1 gives the number of adult females and nestling Tree Swallows banded each year and the number of each age class recaught in a subsequent nesting season, from 1969 to 1985 inclusive. A much larger percentage of birds banded as adults return (12.8%) than those banded as nestlings (0.8%).

Birds found dead at or near a nest in subsequent years have been included. Five swallows, four banded as locals, included in the above calculations, were recaptured on other bird house trails — one in a nearby box of Doug Finlay's and two in Mel Moline's boxes, 19 and 31 miles further northwest. One banded in 1973 near Raymore where we joined with Lorne Scott's trail, moved another eight miles east to one of Lorne Scott's boxes. Another 11 swallows were encountered outside of our own boxes, including one bird killed on the highway, and four that moved into the city of Saskatoon, one of which was killed by a cat.

Table 1. Annual Tree Swallow banding and encounter rates, 1969-1985.

Year	Total Banded	Adults Banded	Adult Encounter	Locals Banded	Local Encounter
1969	193	17	4	176	2
1970	324	30	3	292	3
1971	662	76	6	586	5 +3
1972	664	80	13	584	7 +3
1973	495	99	8	391	6 +2
1974	446	67	18	379	2
1975	536	85	20	451	6
1976	574	67	13	503	4 +1
1977	663	52	13	611	4 +2
1978	684	65	12	619	3
1979	532	63	10	469	4
1980	586	58	6	528	6
1981	488	54	3	434	2
1982	525	59	6	466	3
1983	550	24	1	526	4
1984	486	53	8	433	3
1985	641	61	5	580	2
TOTAL*	9049	1010	149	8028	66 +11
			129 individuals		66 individuals
			12.8%		0.8%

* Excluding 11 males (see text)
+Locals which returned in later years, after first return as adults

In Table 1, the "+" numbers in the right column refer to swallows banded as nestlings that returned more than once as adults. These six individuals provided an additional 11 encounters beyond the first return. They are thus of special interest as different from the other 59 returns that were recaptured only once, not to mention the nearly 8000 other locals that were not encountered again. We believe the six warrant individual mention:

123-33540. Banded June 1971.
Returned in 1973, 13.4 miles northwest of where banded; in 1974, moved 1.7 miles south of its 1973 nest; in 1975, returned to use its 1973 nest, 1.7 miles north.

123-33537. Banded June 1971.
Returned in 1973, 20.9 miles northwest of where banded; in 1975, returned to use the 1973 nest.

124-30755. Banded in June 1972.
Returned in 1976, 5.9 miles northwest of where banded; in 1978, 1979 and 1980, used the same nest box as in 1976.

820-18791. Banded in June 1973.
Returned in 1975, 9.5 miles southeast of where banded; in 1978, moved 2.7 miles north and 0.7 miles west of the 1975 box; in 1979, moved 1.8 miles south and 0.4 miles east of the 1978 box.

850-92882. Banded in June 1976.
Returned in 1980, 19.5 miles northwest of where banded; in 1981, returned to use the 1980 nest.

880-31546. Banded in June 1977.
Returned in 1980, 2.4 miles northeast of where banded; in 1981, moved another 0.3 miles east; in 1982, moved a further 0.5 miles east.

For these six individuals, the average distance from the nest where they were raised to their first recapture site as nesting adults was 11.9 miles. However, for their 11 subsequent returns as adults, the average was only 0.8 miles.

Table 2 reports 149 recaptures of 129 female swallows banded as adults. Although our recapturing of swallows hasn't been consistent enough to justify use of sophisticated methods of annual mortality calculation, we have used a simple method to calculate a mean annual mortality of 53.9% from Table 2 (Hickey 1952). If one then constructs a life table based on individuals known to be alive, whether captured that year or not (e.g., a first return at 3 years allows one to include this individual in the 1-year and 2-year columns as well), one derives a somewhat higher mortality of 61.2% for the birds banded as adult females (Table 3). Similarly, Table 4 gives data for the first encounter of 66 swallows banded as nestlings, with a mean annual mortality of 53.0%, while Table 5 gives this in life table format, with a similar 50.2% annual mortality.

Table 2. Returns of all Tree Swallows banded as adult females.

		YEARS FOLLOWING BANDING					
YEAR	NUMBER BANDED	1	2	3	4	5	6
1969	17		2	1	1		
1970	30	1	2				
1971	76	4	1	1			
1972	80	10	1	1	1		
1973	99	4	1	3			
1974	67	10	4	2		2	
1975	85	12	3	3		1	1
1976	67	8	3	2			
1977	52	11	2				
1978	65	6	3	2	1		
1979	63	7	3				
1980	58	5	1				
1981	54	3					—
1982	59	2	2	1	1	—	
1983	24		1		—		
1984	53	4	4	—			
1985	61	5	—				
TOTALS	1010	92	33	16	4	3	1
CRUDE ANNUAL MORTALITY			64.1%	51.5%	75.0%	25.0%	
MEAN ANNUAL MORALITY			53.9%				

Table 3. Life table of all Tree Swallows banded as adult females.*

YEAR	NUMBER BANDED	YEARS FOLLOWING BANDING 1	2	3	4	5	6
1969	17	3	3	1	1		
1970	30	3	2				
1971	76	5	2	1			
1972	80	11	3	2	1		
1973	99	6	4	3			
1974	67	16	6	4	2	2	
1975	85	16	5	2	1	1	1
1976	67	12	5	2			
1977	52	11	2				
1978	65	10	4	2	1		
1979	63	8	3				
1980	58	6	1				
1981	54	3					—
1982	59	6	4	2	1	—	
1983	24	1	1		—		
1984	53	7	4	—			
1985	61	5	—				
TOTALS	1010	116	44	19	7	3	1
CRUDE ANNUAL MORTALITY			62.1%	56.8%	63.2%	57.2%	66.7%
MEAN ANNUAL MORALITY			61.2%				

*Known to be alive from later returns.

Table 4. First-time returns of Tree Swallows banded as locals.

YEAR	NUMBER BANDED	YEARS FOLLOWING BANDING 1	2	3	4	5
1969	176	1	1			
1970	292	2	1			
1971	586	3	2			
1972	584	4		2	1	
1973	391		4	1	1	
1974	379		1	1		
1975	451	3	1	2		
1976	503	1	2		1	
1977	611	2		1	1	
1978	619	1	1	1		
1979	469	1	1	2		
1980	528	3	1	1		1
1981	434	2			1	—
1982	466	2				
1983	526	1	2	1	—	
1984	433		3	—		
1985	580	2	—			
TOTALS	8028	28	20	12	5	1
CRUDE ANNUAL MORTALITY			29%	60%	58%	80%
MEAN ANNUAL MORALITY			53%			

Table 5. Life table of all Tree Swallows banded as locals.*

YEAR	NUMBER BANDED	YEARS FOLLOWING BANDING 1	2	3	4	5	6	7	8
1969	176	2	1						
1970	292	3	1						
1971	586	5	2	2	2				
1972	584	7	3	3	1	1	1	1	1
1973	391	6	6	3	2	1	1		
1974	379	2	2	1					
1975	451	6	3	2					
1976	503	4	3	1	1	1			
1977	611	4	2	2	2	1			
1978	619	3	2	1					
1979	469	4	3	2					—
1980	528	6	3	2	1	1		—	
1981	434	2					—		
1982	466	3	1	1	1	—			
1983	526	4	3	1	—				
1984	433	3	3	—					
1985	580	2	—						
TOTALS	8028	66	38	21	10	5	2	1	1
CRUDE ANNUAL MORTALITY			43%	45%	53%	50%	60%	50%	
MEAN ANNUAL MORALITY			50.2%						

*Known to be alive from later returns.

Table 6 summarizes the distance moved by each swallow between encounters in different years. Although adult females on 39 occasions (32 as first encounters and 7 in subsequent years) returned to the same box where they had nested previously, this was to our surprise more the exception than the rule. Another 53 adult females (47 as first encounters and 6 in subsequent years) nested between 0.1 and 1.0 miles from the previous nest. In striking contrast, only one nestling returned as an adult to the box in which it has been banded, while another returned to a box across the road. Another 3 locals returned to nest within one mile.

Within our study area, the maximum movement of an adult female was 23.5 miles and that of a nestling to its nesting box as an adult was 38.8 miles, close to the 48-mile distance between our most separated boxes. The average distance for adult females choosing a different box was 3.7 miles and for all adult females returning was 2.8 miles, while for those banded as nestlings it was 9.5 miles. (In 1972, when we banded as far east as Raymore, a swallow raised in a box west of Raymore flew the length of our trail and far beyond to nest at Glaslyn, at a distance of 208 miles. If included, this increases the average distance for all locals returning as adults to 12.5 miles.) The direction of dispersal was essentially random for both adult females and locals.

Finally, we have captured two swallows banded by Lorne Scott. One, banded as an adult female near Vibank in 1973 was recaptured in our box near Delisle in 1974, 168 miles northwest of where she had nested earlier. (This type of movement by adult females is probably more common than the limited sampling of 250 boxes over a 76-mile trail might suggest.) The second, banded as a nestling 7 miles southwest of Fort Qu'Appelle in 1975, was recaptured in 1978 in our box near Pike Lake, 158 miles to the northwest; this we suspect may be representative of the wide dispersal distances of many nestlings.

Three swallows were found dead on the highway near their nest box within six weeks of banding and have been eliminated from any calculations. Four others, all banded as locals, were recovered in August on their fall migration towards the southeast — three in North Dakota and one in Manitoba, having travelled remarkably similar distances in an almost identical direction (Table 7). Lorne Scott's two recoveries to date also were in the same direction, one in North Dakota and one in Minnesota.

Table 6. Distance moved between nests — by age at banding.

	AT FIRST RETURN				AT LATER RETURNS			
DISTANCE (miles)	LOCAL (number)	(%)	AD F (number)	(%)	LOCAL (number)	(%)	AD F (number)	(%)
0	2	3.0	32	24.8	5	45.6	7	35.0
0.1-1.0	3	4.6	47	36.4	2	18.1	6	30.0
1.1-5.0	18	27.3	27	20.9	4	36.3	5	25.0
5.1-10	18	27.3	13	10.1			2	10.0
11.1-20	16	24.2	6	4.6				
20.1-30	5	7.6	4	3.1				
31-40	3	4.6						
40+	1	1.5						
TOTALS	66	100.1	129	99.9	11	100.0	20	100.0

Table 7. Tree Swallow recoveries during migration (all banded as locals).

Band number	830-11930	830-17273	880-41966	2010-88364
Banding date	6/29/75	6/21/76	7/08/77	6/25/85
Location	515-1063 North of Dundurn, Sask.	515-1064 Pike Lake Sask.	515-1064 Pike Lake Sask.	515-1063 North of Dundurn, Sask.
Recovery date	8/30/75	8/12/76	8/??/77	8/26/85
How recovered	Injured	Injured	Struck power line	Found dead
Location	481-0991 7 mi N Minnewaukon, N.D.	485-0983 near Wales, N.D.	492-0983 4 mi E Somerset, Man.	474-0991 NW of New Rockford, N.D.
Distance (km)	664	669	640	702
(miles)	413	416	398	436
Direction Degrees southeast	125	127	112	128

Extensive Tree Swallow banding in Saskatchewan has provided no information about the wintering quarters of our birds nor about their migration route beyond North Dakota. Nestlings disperse so widely that few are recaptured in subsequent years. Even adult females show much less natal fidelity than might have been expected, and even less than our limited sampling process would at first glance suggest.

Acknowledgements

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Literature Cited

Hickey, J.J. 1952. Survival studies of banded birds. U.S. Fish & Wildlife Service Special Scientific Report: Wildlife No. 15. 177 pp.

Houston, C.S. 1977. The prairie bluebird trail. Nature Canada 6 (2): 3-9.

——. and M.J. Bechard. 1983. Trees and the Red-tailed Hawk in southern Saskatchewan. Blue Jay 41:99-109.

Houston, D.V. 1971. The prairie bluebird house trail. Inland Bird Banding Association News 43:58-61.

Houston, M.I. 1982. Effects of a late May snowstorm on Mountain Bluebird and Tree Swallow nesting. Blue Jay 40:206-207.

——. 1984. Mountain Bluebirds in Saskatchewan. Sialia 6:57-59.

Scott, R.L. 1970. Annual report of the Indian Head bluebird trail. Blue Jay 28:176-177.