



Banding of Asio Owls in south-central Saskatchewan

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Abstract.—During a long-term Great Horned Owl (*Bubo virginianus*) banding program, 1946-1996, there were opportunities to band 507 Long-eared Owls (*Asio otus*) and 246 Short-eared Owls (*Asio flammeus*). No less than 35.1 percent of the Long-eared Owls and 63.5 percent of the Short-eared Owls were banded in two unusual years, 1960 and 1969, after *Microtus* had proliferated under swaths of grain that lay unharvested beneath the snow. Such numbers are strong but not conclusive support for nomadism. Five Long-eared Owls were recovered (1 percent of bandings) but no Short-eared Owls, and there have been no recoveries from the last 280 Long-eared Owls banded since 1968.

METHODS

During a long-term banding program with visits to 3,105 successful nests of the Great Horned Owl (*Bubo virginianus*) in 486 different 10-minute blocks of latitude and longitude across Saskatchewan, and resulting from publicity and interest thereby generated, there were occasional, incidental opportunities to learn of nests of other owl species. I banded 501 nestlings of the Long-eared Owl (*Asio otus*) in 139 successful nests, plus two fledglings, and 244 nestlings of the Short-eared Owl (*Asio flammeus*) in 78 nests, plus one fledgling. In addition, I banded four adult female Long-eared Owls and one Short-eared Owl which remained on their nests to protect young. The Short-eared Owl nests were found on stubble during farm operations by farmers who knew of my interest in banding Great Horned Owls. The Long-eared Owl nests were found in roughly equal numbers by interested farmers and by birders. The banding visits kept me busy and I made no formal nest searches myself.

I used the 20 years, 1966-1985, of intensive data collection by members of the Saskatoon Nature Society (SNS) in the Saskatoon area, 51°30' to 52°30' N. and 106°00' to 107°30' W., as an additional, semi-independent test of numerical fluctuations. Rob Johanson analyzed computerized entries of 624 monthly sighting

cards of Short-eared Owls recorded by up to 50 observers 1966-1985. I analyzed, manually, the 154 SNS record cards for the Long-eared Owl, 1966-1985, and entered them into a database for the first time.

RESULTS

Years of Vole Abundance

At least one or two nests of the Long-eared Owl were visited each year in 34 different years, but nests of the Short-eared Owl were located in only 11 years (table 1). In both species, banding was concentrated in 2 years, 1960 and 1969, when rodents, chiefly *Microtus* and *Peromyscus*, proliferated beneath the snow under swaths of unharvested grain from the previous autumn. No numerical data are available for rodents, but in both 1960 and 1969 a number of farmers reported that they had never before seen so many in the fields, supporting my own field observations. About 63.5 percent of my lifetime Short-eared Owl and 35.1 percent of my Long-eared Owl banding took place during those 2 years. In 3 other years, 1964, 1966 and 1967, when rodents appeared unusually plentiful, Long-eared Owls were also common, as were Short-eared Owls in 1964 and 1967.

Two other Saskatoon banders took advantage of the surge in numbers of Long-eared Owls, centering on 1969. Each conducted nest searches of his own. R.E. Gehlert banded 12 Long-eared Owls in four nests in 1968 and 43 in nine nests in 1969, the year D.W.A. Whitfield banded 13 in two nests.

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Table 1.—Long-eared (LEOW) and Short-eared (SEOW) Owls banded by C.S. Houston in south-central Saskatchewan.

Year	LEOW	# nests	Yng/ nest	Adult Fledg	Recov	SEOW	# nests	Yng/ nest	Adult Fledg
1946	0			F					
1952	5	1	5.0			0			
1953	0					0			
1954	0					0			
1955	0					0			
1956	0					0			
1957	0					0			
1958	5	1	5.0			0			
1959	12	4	3.0			0			
1960	73	18	4.1	A	1	68	22	3.1	A
1961	0					0			
1962	0					0			
1963	0					0			
1964	28	7	4.0	A		16	7	2.3	
1965	0			A		0			
1966	65	20	3.3		2	0			
1967	34	10	3.4	A	2	15	4	3.8	
1968	16	4	4.0			0			
1969	103	28	3.7			87	26	3.3	
1970	0					0			F
1971	14	4	3.5			0			
1972	29	7	4.1			0			
1973	6	2	3.0			0			
1974	5	1	5.0			39	13	3.0	
1975	9	2	4.5			3	1	3.0	
1976	3	1	3.0			0			
1977	3	1	3.0			0			
1978	2	1	2.0			3	1	3.0	
1979	7	2	3.5			0			
1980	6	2	3.0			0			
1981	3	1	3.0			0			
1982	0					0			
1983	17	5	3.4			8	2	4.0	
1984	8	2	4.0			0			
1985	3	1	3.0			0			
1986	0					2	1	2.0	
1987	2	1	2.0			0			
1988	4	1	4.0			0			
1989	6	2	3.0			0			
1990	2	1	2.0			0			
1991	6	2	3.0	F		0			
1992	9	3	3.0			0			
1993	4	1	4.0			3	1	3.0	
1994	9	2	4.5			0			
1995	0					0			
1996	3	1	3.0			0			
Total	501	140	3.6	6	5	244	78	3.1	2
2best	176					155			
35.1% None from last 280 banded						63.5%			
Recoveries					1.0%	0.0%			



In all 4 years of abundance, Short-eared Owl nests were found in open stubble, as many as two nests per 65 ha, on farms where none had been seen in previous years. In most intervening years, Short-eared Owl sightings were largely restricted to spring and fall migration and our farmer nest-finders reported no nests. It is of interest that Northern Harriers (*Circus cyaneus*) were also more abundant in 1960 and 1969, with 177 of my 400 bandings (42 percent) of this 'mouse-driven' hawk (Hamerstrom 1986) restricted to those 2 years.

Food

Uneaten prey items in nests of both species have almost exclusively consisted of *Microtus* and *Peromyscus*. I know of no pellet analysis or other formal study of food items for either species in Saskatchewan.

Nest Sites

Short-eared Owl nests were found almost exclusively in swathed stubble from the previous year's grain crop (e.g., wheat, oats, barley); two were in *Symphoricarpos* cover. No nests were found in 'typical' sites in dry, grassy meadows, where, in contrast to stubble, there is enough vegetation to conceal the incubating female (Holt and Leasure 1993). Clark (1975) reported 63 nests, of which 35 were in grassland, nine in alfalfa hayland, four in low perennial vegetation, and only 15 (24 percent) in grain stubble. The absence of any recoveries from my banding raise the possibility that the young on stubble in the absence of appreciable cover were vulnerable to predation.

Long-eared Owls used stick nests of other species, usually the American Crow (*Corvus brachyrhynchos*), but on occasion a roofed or partially roofed nest of a Black-billed Magpie (*Pica pica*). In 1969, there were two instances where two nests and once, three nests, were present in adjacent aspen copses, 100 or 150 m from the first nest found.

Brood Size

Short-eared Owl brood size ($n=78$) at the banding visit averaged 3.1 young, but this number is not representative of initial clutch size because: the young at 12 to 18 days begin to disperse on foot in different directions up to 200 m from the nest, owlets are of different ages so that the oldest may leave the nest

before the youngest is large enough to band, predation of conspicuous ground nests is high, and some owlets die from starvation. In 1960, a peak vole year, the first six nests of the season contained 43 young, of which only 22 were of an appropriate size for banding. A striking example of possible parental cannibalism to achieve brood reduction within the competence of the surviving adult was seen near Theodore, Saskatchewan. One evening there were six healthy-looking young in the nest; by the next morning, 4 June 1960, one adult had been killed by flying into a high tension electricity transmission line, and the remaining parent was feeding the dismembered parts of the three smallest to the three oldest. The largest clutch included seven young and four eggs, in a nest in stubble at Greenan, Saskatchewan, 28 May 1966; this ties the North American record for the largest clutch ever reported (Holt and Leasure 1993).

Long-eared Owl brood size ($n=139$) at banding age averaged 3.6 young per nest, exclusive of five owlets unbanded because they were too small to band. In the first high vole year, 1960, the mean was 4.1 young per successful nest ($n=18$); that year, one nest had six young, four nests had five young each, nine pairs raised four young, three nests had three, and only one nest had two young. There was also one nest with six young in 1964 and again in 1966. The combined banding of Gehlert and Whitfield in 1968 and 1969 averaged 4.5 young per successful nest, Gehlert having two nests that produced seven young to banding age, and Whitfield one such nest. A Long-eared Owl nest with nine eggs on 25 May 1969 was the largest clutch I encountered; this nest subsequently failed.

SNS Record Cards

Short-eared Owl

Over-wintering occurred particularly in the high vole year of 1969. Prior to the concerted study there were retrospective SNS card entries for sightings throughout January and February in 1960, and during the intensive study, one sighting in early January 1972. There was one nest in 1964. There were two nests in 1966, one in 1967, 16 in 1969, and no nests between 1970 and 1985, inclusive. Most observations were during spring migration and a smaller number in fall migration; there were sightings throughout all months in 1968-1969 but only

seven observations in November and December of all other years combined. The number of Short-eared Owl observations is shown by year in figure 1.

Long-eared Owl

SNS record cards in 1966 recorded 32 visits to 20 Long-eared Owl nests or broods and only seven sightings away from a nest; in 1967, 17 visits to 11 nests, one found dead and one sighting away from a nest; in 1968, eight visits to four nests and one sighting; in 1969, 43 visits to 26 nests, two found dead and five sightings, including the latest fall date of 5 October. There were two nests in 1971, seven nests in 1972, two nests in 1973, with no

sightings away from a nest in these 3 years. One nest each in 1974, 1975, and 1980, a single sighting in 1977 representing the earliest spring arrival date of 24 March, two nests each in 1983 and 1984, and another six sightings away from known nests, commonly after the nesting period. While effort may have diminished somewhat in these later years, there were no Long-eared Owl sightings reported in 1976, 1979, 1981, and 1982.

Recoveries

The number of recoveries has been disappointing: five (1 percent) from 507 Long-eared Owls (none from the last 280 banded) and zero from the 246 Short-eared Owls banded. Long-eared

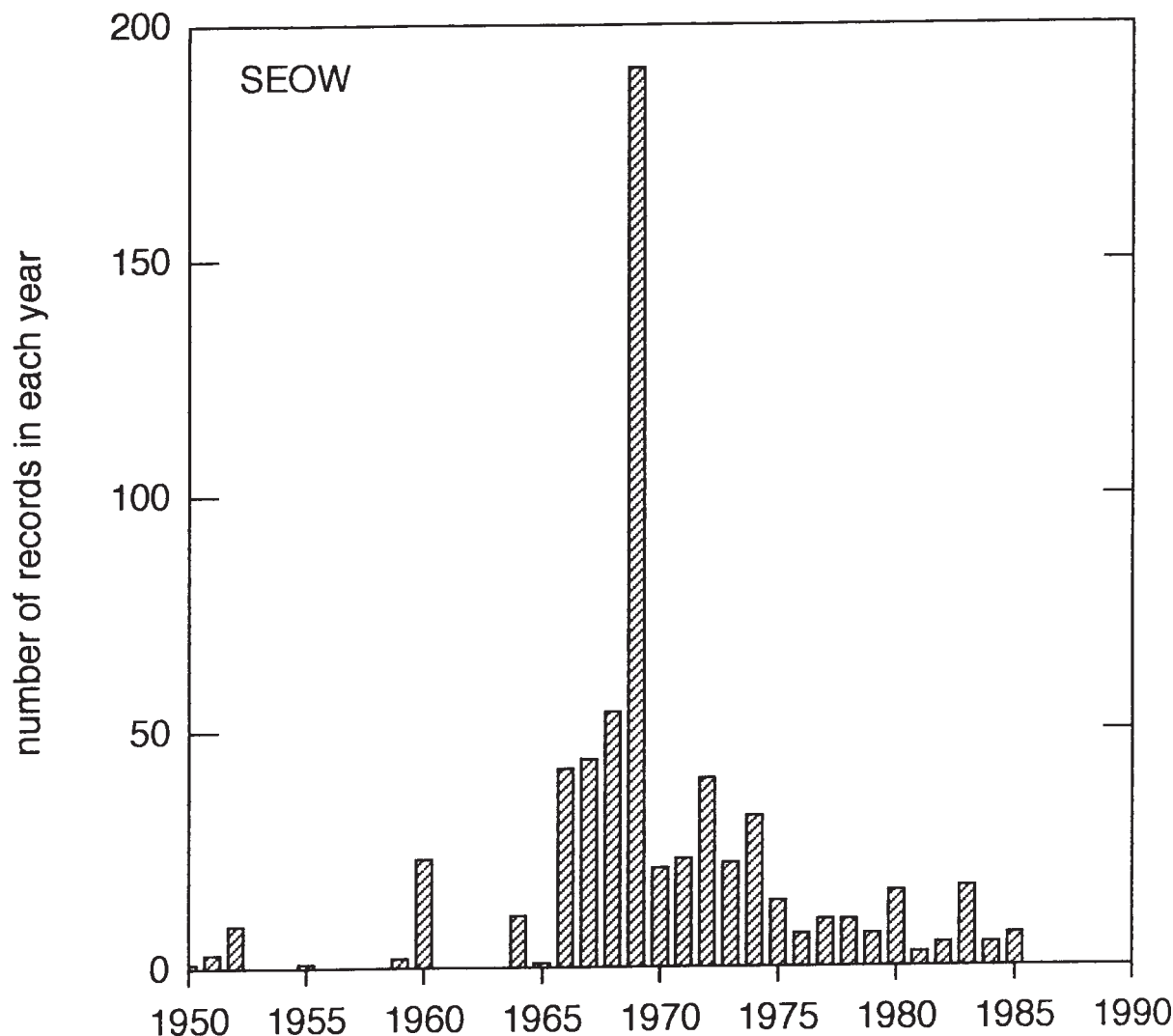


Figure 1.—Numbers of Short-eared Owl observation records, 1950-1990, from the *Saskatoon Nature Society* record cards.



Table 2.—Recoveries of Long-eared Owls banded in south-central Saskatchewan.

Banded	June	Lat.	Long.	Recovered			Age	Lat.	Long.	Distance	Direction	
											<i>km</i>	<i>Degrees</i>
Saltcoats	1960	510	1020	Found dead	Ejutla,Oaxaca	ca. 1960	0 yr	162	962	3890	170	
Grandora	1966	520	1070	Found dead	Billings, MT	Feb. 67	0 yr	454	1083	715	190	
Grandora	1966	520	1070	Found dead	Corwith, IA	Apr. 69	2 yr	425	935	1420	130	
Grandora	1967	520	1070	In trap	Russell, Man	June 69	2 yr	505	1005	445	104	
Saskatoon	1967	520	1064	Found dead	Clarksdale, MS	Dec. 72	5 yr	341	903	2370	140	

Owls have been recovered in Manitoba; Iowa; Montana; Mississippi; and Oaxaca, Mexico, at distances of 445 to 3,890 km from the banding site, from 0 to 5 years after banding, with no local recoveries (table 2).

DISCUSSION

It has long been known that populations and reproductive success of Short-eared Owls and Long-eared Owls are tied to the density of small mammals, often *Microtus* voles (Holt and Leasure 1993, Marks *et al.* 1994), and that the Long-eared Owl is nomadic, especially in Europe (Marks *et al.* 1994).

In contrast to the reasonably stable annual populations of the Long-eared Owl in western Montana and Idaho (e.g., Marks 1986), in most years both *Asio* species are rather thinly scattered breeders throughout south-central Saskatchewan. There have been years when groups of keen Saskatoon birders have not sighted a single Long-eared Owl. Thus it is a noteworthy surprise when, in rare, irregularly-spaced years, adult owls appear suddenly in numbers in response to a bonanza of small mammals or rodents. The obvious question is: Where do the owls come from? One can only speculate. In the case of the Short-eared Owl, migrant owls are seen every spring, some of which may be destined to nest on tundra 1,000 km or more farther north; one might speculate that in response to food abundance some of them stop in Saskatchewan to nest. Perhaps in both species some are year-old owls which would not have bred without abundant prey to stimulate the breeding impulse. Whatever the mechanism, my somewhat casual observations offer strong but indirect evidence that high *Microtus* populations do result in major increases in the breeding populations and productivity of both species of *Asio* owl and of the Northern Harrier. Indeed, from this informal

study one might conjecture that nomadism of both *Asio* owls is more pronounced in Saskatchewan than has been documented elsewhere in North America.

Although trends are difficult to quantify because of extreme cyclical variations, there has been a substantial decline in the sightings of Short-eared Owls in south-central Saskatchewan since the 1970s, perhaps part of the general decline in numbers and productivity of many species of grassland birds (Houston and Schmutz 1997). Long-eared Owl sightings and bandings have decreased since the late 1960s and early 1970s. The secretiveness of the Long-eared Owl is evident from the marked paucity of sightings away from active nests.

ACKNOWLEDGMENTS

I wish to thank Margaret Belcher, Denver Holt, Jeff Marks, and J. Frank Roy for constructive criticism, Rob Johanson for his computer graph of Short-eared Owl sightings, and Bob Gehlert and Doug Whitfield for use of their banding data on SNS cards.

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