

ORIGINS AND MIGRATORY MOVEMENTS OF BALD EAGLES WINTERING IN MISSOURI

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Within the 48 conterminous United States, the midwest is an important area for wintering Bald Eagles (*Haliaeetus leucocephalus*) (Sprunt, 1961, 1963; Sprunt and Ligas, 1963, 1966). Missouri hosted the largest number of wintering Bald Eagles in this region during the annual mid-winter Bald Eagle count (unpubl. data, U.S. Fish and Wildlife Service, Laurel, Md). Sprunt and Cummingham (1961) suggested that Bald Eagles might have three principal migration routes: the Mississippi Valley, the Great Plains, and the Great Basin. Band recoveries from eagles banded as nestlings in Michigan, Wisconsin, Minnesota, Ontario, and Saskatchewan showed considerable overlap in their wintering range (Gerrard et al., 1975). Sightings of color-marked individuals and band recoveries of Saskatchewan-hatched Bald Eagles indicated an autumnal movement through southern Saskatchewan to wintering areas extending from Montana to Missouri, Texas, and southern California (Gerrard et al., 1974, 1978). Band recoveries of Michigan-hatched Bald Eagles were reported from Florida, Arkansas, Tennessee, and Georgia (Postupalsky, 1976). Dunstan (1973) reported two recoveries of Minnesota-hatched Bald Eagles from Texas. Sightings of color-marked eagles released at the Skagit River, Washington, indicated that these birds might originate from breeding grounds in British Columbia (C. W. Servheen and W. English, Ms).

The purpose of this paper is to present information on origins and migratory movements of Bald Eagles wintering in the vicinity of Swan Lake National Wildlife Refuge in northcentral Missouri. Records for eagles wintering elsewhere in Missouri are included.

PROCEDURES

During the winters 1973 through 1978, observations of wintering Bald Eagles were made at Swan Lake NWR and adjacent areas. The Refuge is in Chariton County, 30 km SW of Brookfield, Missouri. A major concentration of Bald Eagles, approximating 100 eagles at peak periods, winters at the Refuge. More than 200,000 Canada Geese (*Bran-ta canadensis*) overwinter in the Swan Lake vicinity. Large numbers of Snow Geese (*Chen caerulescens*) and ducks, primarily Mallards (*Anas platyrhynchos*), are also in the area for part of the winter. The eagles are apparently attracted to the area by mild winter weather, the large number of waterfowl, and abundance of other food.

Data relating to the nesting grounds and migratory movements of Bald Eagles wintering in Missouri were obtained through sightings of color-marked eagles, radiotelemetry, retrapping of banded eagles, and band recoveries.

The colored wing markers seen were as described by Kochert (1973). Except those that had been tagged at Swan Lake NWR during this study and one rehabilitated Bald Eagle released at Duluth, Minnesota, all the color-marked eagles had been tagged as nestlings on the breeding grounds. Colors used on these nestlings were specific for each breeding location. It was sometimes difficult to determine whether different marked birds were sighted or whether the same birds were seen repeatedly, because some researchers color marked many individual eagles in the same manner. The problem was further complicated because some birds individually color tagged with multiple markers lost one or more of their markers, and sometimes the colors of the markers were not determined.

Eagles were trapped during the three field seasons of 1974–1975, 1975–1976, and 1977–1978. In 1974–1975, they were captured in cannon nets baited with Canada Goose carcasses. A live Bald Eagle with an amputated wing was used as a decoy at the trap site. During the other two winters, we captured eagles with specially designed leg traps, using Canada Goose carcasses as bait, and a live decoy Bald Eagle (Griffin, 1978).

All captured eagles were banded with U.S. Fish and Wildlife Service bands, lock-on type during 1974–1976 and rivet-type in 1977–1978. In 1974–1975, each of the six eagles captured was fitted with a back-mounted transmitter and a blue Herculite tail streamer, measuring 465×20 mm, attached to a rectrix. In 1975–1976, 6 of the 14 Bald Eagles captured were tagged with back-mounted transmitters. Seven eagles (including those with transmitters) were fitted with blue tail streamers. In 1977–1978, 15 Bald Eagles were captured. Twelve of the birds were equipped with back-mounted radio transmitters, and all 15 were tagged with two wing markers (white with a blue edge), one on each wing.

The transmitters operated in the 151 MHz band and each was identifiable by a distinct frequency and pulse rate (48 to 120 pulses per minute). They had an expected field life of 12 months. A 12-channel receiver was used with a four-element Yagi antenna. Transmitters and receivers were manufactured by AVM Instrument Company, Champaign, Illinois.

Band recovery records for Bald Eagles were supplied by the Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Laurel, Maryland, and by eagle banders.

RESULTS AND DISCUSSION

Sightings of Color-marked Eagles

During the five field seasons, 1973–1978, 38 sightings of color-marked Bald Eagles were made in or near Swan Lake NWR (Table 1). All color-marked birds were immatures except one subadult bird sighted in 1978. Six sightings were made of birds with green and/or red markers, showing that their nesting grounds were at Besnard Lake, Saskatchewan.

TABLE 1.

Color-marked immature Bald Eagles sighted in vicinity of Swan Lake NWR, 1973-1978, and their origins.

Marker (wing tag)	Dates	Observer	Origin
	<i>1973-1974</i>		
Orange ¹ (r) ²	26 Nov. 73	J. M. Southern	MN
Orange or red ? (r)	28 Feb. 74	J. R. Poppe	?
Red (r) green (l) ²	28 Mar. 74	J. M. Southern	Sask.
	<i>1974-1975</i>		
Orange or red ? (r)	8 Nov. 74	J. M. Southern	?
2 red (l) green (r)	22 Dec. 74	J. E. Rathert	Sask.
	<i>1975-1976</i>		
Red (r)	19, 23 Oct. 75	J. E. Rathert	Sask.
		L. T. Kecke	
Orange (r)	26, 27 Oct.; 3, 9, 13, 16, 19 Dec. 75	C. R. Griffin	MN
Red (l) green (r)	23 Dec. 75	D. A. Graber	Sask.
Orange (r)	10, 15 Jan.; 22, 23, 27, 29 Feb.; 9, 12 Mar. 76	C. R. Griffin	MN
Red (r) green (l)	12 Mar. 76	J. R. Acker	Sask.
	<i>1976-1977</i>		
Orange (r)	13, 20, 25 Nov. 76; 27 Feb. 77	C. R. Griffin	MN
	<i>1977-1978</i>		
Orange (l and r)	16, 19 Dec. 77; 12 Jan. 78	C. R. Griffin	MN
Orange (r)	12 Jan. 78	C. R. Griffin	MN
Orange (l and r)	16, 22 Jan. 78	C. R. Griffin	MN
Orange (r)	4, 8, 18 Feb.; 12 Mar. 78 ³	C. R. Griffin R. B. Kahl	MN

¹ Secondaries also painted orange.

² r = right wing tagged; l = left wing tagged.

³ Sub-adult bird, head and tail not completely white.

Thirty sightings were of birds with orange markers, indicating that they were from the Chippewa National Forest in northcentral Minnesota. Color of wing markers on two marked eagles sighted could not be precisely determined; thus, the location of their nesting grounds was not known.

Sightings of Radio-tagged Eagles

An immature eagle, radio-tagged at Swan Lake NWR on 22 January 1976, was sighted near Kenora, Ontario, on 1 April 1976 by Steven Fritts. This bird was probably a migrant, because no signals were re-

TABLE 2.

Missouri recoveries and retraps of eagles banded elsewhere and recoveries of eagles banded in Missouri.¹

Band no.	Banded			Recovered-retrapped/ sighted	
	Age ²	Date and location	Condition/ status	Date and location	Condition/ status
<i>Missouri Recoveries/Retraps</i>					
509-50820	?	6 Dec. 63, WI	Injured/treated, released	Jan. 65 SE MO	?
599-23441	L	28 May 75 OH	Normal/wild	17 Jan. 76 Swan Lake NWR (MO)	Trapped/ released
599-11229 629-00229	L	10 Jun. 75 WI	Normal/wild	16 Dec. 75 Swan Lake NWR (MO)	Trapped/ released
599-01911	L	22 Jun. 74 MN	Normal/wild	Apr. 76 N MO	Dead
629-00849	L	1 Jul. 76 MN	Normal/wild	13 Nov. 76 S MO	Dead
<i>Missouri Bandings</i>					
509-53768	SY	4 Jan. 66 NW MO	Injured/treated, released	21 May 67 Ont.	Dead
599-22564	AHY	14 Jan. 75 Swan Lake NWR (MO)	Normal/wild	24 Sept. 75 Man.	Dead

¹ Assembled from files at Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Laurel, Maryland.

² L = Nestling, SY = Second year, AHY = After hatching year.

ceived during subsequent searches in that area. The bird returned to Swan Lake NWR the following winter and was present from 28 November through 9 December 1976. Gerrard et al. (1978) also reported eagles visiting the same wintering areas in successive years.

Retrappings of Banded Eagles

In 1975–1976, two banded immature eagles were trapped in the Refuge (Table 2). The first, captured on 16 December, had been banded as a nestling the previous summer near Phelps, Wisconsin, by C. R. Sindelar. The second, captured on 17 January, was banded as a nestling near Mound City, Ohio, the previous year by J. B. Holt, Jr.

Band Recoveries

During this study, 1973–1978, five Missouri recoveries were of eagles banded outside of Missouri. Three of these band recoveries were made

during the winter of 1975–1976. One involved a bird banded as a nestling in northcentral Minnesota 22 June 1974. It was found dead in April 1976 in northern Missouri (Table 2). The other two eagles recovered in Missouri were from Ontario (details in Postupalsky et al., Ms). The other two band recoveries were reported in 1976–1977. One involved an immature bird banded as a nestling in northcentral Minnesota in 1976. It was found dead near West Plains, southern Missouri, on 13 November 1976 (Table 2). The second recovery was of a bird banded in Ontario (details in Postupalsky et al., Ms).

During the study period, only one recovery was made of an eagle banded in Missouri (Table 2). It was an immature eagle found dead on Matheson Island, Manitoba, on 24 September 1975. This bird was banded at Swan Lake NWR on 14 January 1975. It was not known whether Matheson Island was its natal ground or whether the bird was migrating through the area.

No band recoveries were reported for 1973–1975 or 1977–1978.

Other Missouri-related Records

Color-marked Bald Eagles from the Chippewa National Forest in Minnesota have been sighted in recent years at Mingo NWR in southeastern Missouri (unpubl. data on file at Mingo NWR, Puxico, Missouri) and in central Missouri. Minnesota birds and birds from Besnard Lake, Saskatchewan, have been reported at Squaw Creek NWR in northwestern Missouri (Gerrard et al., 1978; unpubl. data on file at Squaw Creek NWR, Mound City, Missouri) (Table 3).

Before this study, two Bald Eagle band recoveries had been reported in Missouri (Table 2). The first was of an eagle that had been injured, treated, and released in Wisconsin on 6 December 1963. It was found in southeast Missouri in January 1965. The age of this bird and its condition when found are not known. The second band recovery was of a bird banded in Michigan (details in Postupalsky et al., Ms).

Prior to this study, only one recovery was known of Bald Eagles banded in Missouri (Table 2). It was an injured eagle that was treated and then released at Squaw Creek NWR on 4 January 1966. This eagle was found dead in western Ontario on 21 May 1967.

SUMMARY

From 1973 through 1978, 38 sightings of color-marked Bald Eagles were made in the vicinity of Swan Lake NWR and two sightings of a radio-tagged eagle tagged at Swan Lake NWR. Additionally, from 1965 through 1978, seven Missouri recoveries were made of Bald Eagles banded elsewhere, as well as two band recoveries of eagles banded in Missouri and two retraps of eagles in Missouri. Some eagles that migrate through, or winter in, Missouri originate from breeding grounds in Ohio, Michigan, Wisconsin, Minnesota, Ontario, and Saskatchewan. Others at least migrate through Manitoba and Ontario.

TABLE 3.

Color-marked immature Bald Eagles sighted at Mingo and Squaw Creek National Wildlife Refuges, and other Missouri localities.¹

Marker (wing tag)	Dates	Location	Origin
	<i>1973-1974</i>		
Red (l) ² green (r) ²	12 Nov. 73	Squaw Creek	Sask.
Orange (l)	10 Jan. 74	Squaw Creek	MN
2 red (l)	8 Apr. 74	Squaw Creek	Sask.
	<i>1974-1975</i>		
2 red (r)	19 Oct. 74	Squaw Creek	Sask.
Red (l)	10, 12, 17 Nov. 74	Squaw Creek	Sask.
2 red (l) green (r)	18, 21 Nov. 74	Squaw Creek	Sask.
	<i>1975-1976</i>		
2 red (l) green (r)	21, 30 Nov. 75	Squaw Creek	Sask.
Orange (l)	25 Nov. 75	Mingo	MN
Yellow (r)	18 Dec. 75	Squaw Creek	Sask.
	<i>1976-1977</i>		
2 red (l) green (r)	5, 7, 27 Nov. 76	Squaw Creek	Sask.
Red (l)	8 Nov. 76	Squaw Creek	Sask.
Orange (l and r)	11 Nov. 76	Squaw Creek	MN
Orange (l)	11 Nov. 76 ³	Squaw Creek	MN
Orange (r)	2 Dec. 76 ³	C MO	MN
Orange (l)	5 Feb. 77 (2 eagles)	Mingo	MN

¹ Assembled from files at Mingo NWR, Puxico, MO; Squaw Creek NWR, Mound City, MO; Gerrard et al. 1978; and J. M. Gerrard (pers. comm.).

² r = right wing; l = left wing.

³ Adult.

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