

# A SURVEY OF WINTERING BALD EAGLES IN SOUTHEASTERN MONTANA

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## *Abstract*

About 78 Bald Eagles (*Haliaeetus leucocephalus*) wintered on 71,500 km<sup>2</sup> in southeastern Montana each winter during the winters of 1976-77, 1977-78, and 1978-79. Most (71%) wintered on major rivers, some (22%) were associated with upland/riparian areas, and a few (8%) wintered strictly on upland sites. Upland wintering by Bald Eagles appears to be more common in the central portion of their winter range on the Great Plains and less common at the northern and southern edges of that range, perhaps due to greater competition for riparian wintering areas in the central Great Plains where wintering Bald Eagles apparently occur at greater densities.

## *Introduction*

Bald Eagles winter in "fairly large numbers" on the dry plains and semidesert valleys of the western United States (Murphy 1977:60). Censuses of Bald Eagles in Colorado, Wyoming, and Utah show that substantial numbers winter on upland habitats (Enderson

et al. 1970, Wrakestraw 1973, Platt 1976, Spencer 1976, Woffinden and Murphy 1977). However, few data are available on the wintering Bald Eagles in southeastern Montana. Here we present data on the distribution and use of uplands by wintering Bald Eagles in southeastern Montana at the northern edge of the species' winter range on the Great Plains (Steenhof 1978).

### Study Area

The study area encompassed about 88,000 km<sup>2</sup> in southeastern Montana south of the Missouri River and east of the Musselshell and Bighorn Rivers excluding the Crow and Northern Cheyenne Indian Reservations (Fig. 1). It is dominated by big sagebrush (*Artemisia tridentata*) steppe, but some grass-dominated steppes, ponderosa pine (*Pinus ponderosa*) forests, and ponderosa pine savannas are present. Plains cottonwood (*Populus deltoides*) predominates along larger rivers and is scattered along most major creeks. The area lies almost entirely within the unglaciated sedimentary plains, except for a small glaciated area between the Yellowstone and Missouri Rivers near North Dakota. Topography varies from almost flat to rough "breaks" and high hills, but it is mostly rolling. Elevation varies from 600 to 1360 m. The climate is continental and semiarid, with hot

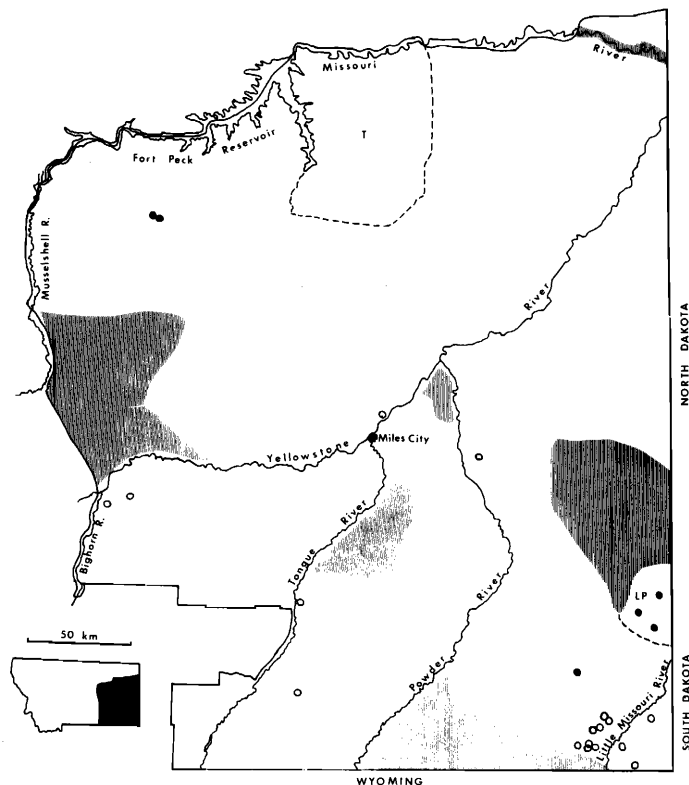


Figure 1. Map of the study area showing the distribution of Bald Eagles observed on the uplands closer than (open circles) or farther than (closed circles) 30 km from rivers. Shaded areas were not surveyed. Thompson's (1978) study area is identified by the "T" and the Long Pines Hills by the "LP". The map at the lower left shows the location of the study area in Montana.

**Table 1.** Wintering Bald Eagles observed in southeastern Montana during 1976-77, 1977-78 and 1978-79 in relation to rivers.

	Length of River Section (km)	Mean Annual Discharge (m <sup>3</sup> /sec)	Number of Bald Eagles Observed		
			Along Rivers	Within 30 km of River	Over 30 km from River
<i>Yellowstone River</i> mouth of Bighorn River to North Dakota	475.6	369.9	22(10-30) <sup>a</sup>	2 <sup>b</sup>	0
<i>Missouri River</i> <sup>c</sup> Ft. Peck Dam to the bridge at Wolf Point	109.6	303.3	2	0	0
<i>Bighorn River</i> Hardin to mouth	68.5	110.4	25(23-26) <sup>a</sup>	1	0
<i>Powder River</i> Wyoming to mouth	350.0	17.4	0	1	0
<i>Tongue River</i> Wyoming to mouth	326.5	12.1	5	2 <sup>d</sup>	0
<i>Musselshell River</i> Mosby to mouth	96.5	7.5	0	0	0
<i>Little Missouri River</i> Alzada to S. Dakota	75.6	3.7	0	11	4 <sup>e</sup>
<i>Ft. Peck Reservoir</i> mouth of the Musselshell River to Ft. Peck Dam	—	—	1	0	2
		TOTALS	55	17	6

<sup>a</sup> Mean (range) of counts during systematic flights in January 1977, 1978, 1979.

<sup>b</sup> Eagles wintering in prairie habitat unless otherwise noted

<sup>c</sup> From Thompson (1978)

<sup>d</sup> 1 in pine habitat

<sup>e</sup> 3 in pine habitat

summers, cold winters, and average annual precipitation between 300 and 400 mm. The major rivers of the study area, in decreasing order of mean annual discharge, are the Yellowstone, Missouri, Bighorn, Powder, Tongue, Musselshell, and Little Missouri (Table 1).

### Methods

During the winters of 1976-77, 1977-78, and 1978-79, we recorded Bald Eagle observations incidental to aerial surveys for deer (*Odocoileus hemionus* and *O. virginianus*). Most of the study area was surveyed intensively by following drainage patterns in 150 hp Piper Super Cub airplanes. Surveys were conducted mostly during clear skies and with snow cover. About one-third of the upland area was censused each winter and no upland areas were resurveyed. A portion of the study area was surveyed aerially following parallel transects 1.6 km apart in winter 1977-78 as part of a separate study (Fig. 1) (Thompson 1978). Observations from the Long Pines Hills (Fig. 1) were based on ground surveys. All of the surveys were conducted between late December and the first

week of March; almost all were made in January and February. This corresponds with the period of fewest Bald Eagles on the Yellowstone River (Hinz 1977); thus, the birds encountered would probably be overwintering and not migrating. Some immature Bald Eagles may have been confused with Golden Eagles (*Aquila chrysaetos*), especially on the uplands, but immatures comprise a small proportion of the Bald Eagles along the Yellowstone River (Hinz 1977), and probably the rest of southeastern Montana, in January and February.

Bald Eagles along the Yellowstone and Bighorn Rivers were counted in conjunction with aerial waterfowl surveys in January 1977, 1978 and 1979. Waterfowl were counted first and eagles were counted on the return flight. A Piper Super Cub was also used for these surveys. The Yellowstone River was flown in two sections: one above and one below Miles City. The river flights required three days of flying and were conducted over as short a timespan as possible. An average of the three winter counts on the Yellowstone and Bighorn Rivers was used to compare with the upland survey, because the upland survey required three winters to complete. The "total count", therefore, included all Bald Eagles observed during the upland surveys plus the three-year average of the river surveys. The "total count" approximates the average number of Bald Eagles present each winter during the study period.

The Bald Eagles were divided into three groups: those observed along a river, those observed on uplands but within 30 km of a river, and those observed on uplands farther than 30 km from a river. Bald Eagles observed on the uplands were separated because Bald Eagles observed within 30 km of a river may have been visiting the river regularly. Swisher (1964) reported that Bald Eagles in Utah commuted 29 km from their feeding area at the Bear River Marsh to their roosting area. Lish (1973) observed a daily movement of 21 km by a Bald Eagle wintering in Oklahoma, and Southern (1964) found that eagles wintering along the Mississippi River usually ranged over a 5–6.5 km area, but occasionally flew over 50 km in one day.

### *Results and Discussion*

A total of 71,500 km<sup>2</sup> was surveyed for Bald Eagles, including 1502 km of rivers. An average of 55 Bald Eagles (71% of the total for the study area) was observed along rivers, and a total of 23 (29%) was recorded on the uplands (Table 1), primarily near rivers (Fig. 1).

The Yellowstone and Bighorn Rivers comprised the most important wintering area; an average of 47 Bald Eagles (60% of the total for the study area) wintered there (Table 1). On the Yellowstone River, Bald Eagles were more concentrated in the upstream portion of the river because of more open water and waterfowl there (Hinz 1977). Bald Eagles were more concentrated on the Bighorn River, compared with the Yellowstone (Table 1), probably because it does not freeze completely in winter due to the warm water released from Yellowstone Reservoir. On 21 February 1978, when much of the Yellowstone River in the study area was frozen, 44 Bald Eagles were observed on the portion of the Bighorn River within the study area.

Seventeen eagles (22% of the total) were observed on uplands within 30 km of a river, ranging from 0.8 to 15.3 km and averaging 7.2 km (Table 1, Fig. 1). Hinz (1977) observed that Bald Eagles wintering on the Yellowstone River on this study area occasionally hunted over sagebrush-grasslands near the river and roosted at night in streamside cottonwoods. Roosting areas are important for wintering Bald Eagles (Murphy 1978)

and stands of cottonwoods, which could be used for roosting, are common along the rivers in the study area. Eagles observed on the uplands within 30 km of rivers may have roosted along the rivers at night and foraged there at other times. This group, which comprised about three-fourths of the eagles observed on the uplands, may therefore have been associated with both terrestrial and aquatic ecosystems. Upland wintering appeared to be proportionately more common near the smaller rivers than the three largest rivers, where more open water would probably be available (Table 1). This suggests that the Bald Eagles along the smaller rivers utilized terrestrial food sources when the rivers were frozen.

The only important upland/riparian wintering area located during our surveys was in the Little Missouri River drainage where 11 Bald Eagles were observed on a 500 km<sup>2</sup> area (Fig. 1). The eagles were observed there between 31 January and 6 February during the severe winter of 1978–79, when the river was completely frozen. At least half of the eagles observed were on carcasses of pronghorn antelope (*Antilocapra americana*). High winter mortality of antelope occurred throughout the study area, so the concentration of Bald Eagles was not due to a concentration of antelope carcasses. Bald Eagles have been seen regularly in the Little Missouri area in other winters including the winter of 1948–49 (Thompson 1949), indicating that it is a traditional wintering area. On 16 February 1980, during an unusually mild winter, three Bald Eagles were observed during an aerial survey on a small portion of this area, one of which was on the Little Missouri River. The Little Missouri area also supported the most dense wintering Golden Eagle population encountered during our surveys: 71 were observed on 2,976 km<sup>2</sup> (23.0 per 1,000 km<sup>2</sup>). Platt (1976) indicated that Bald Eagles scavenged from Golden Eagles on an upland wintering area in Utah.

The most important upland wintering area farther than 30 km from a river was the Long Pines Hills in the southeastern portion of the study area (Fig. 1), where a few Bald Eagles winter each year (G. Dusek and J. Ramsey, pers. comm.). This 600 km<sup>2</sup> area was not surveyed aerially for eagles, but an estimated three adult Bald Eagles wintered there in 1976–77, based on ground surveys associated with a white-tailed deer research project (T. Komberec and G. Dusek, pers. comm.).

The remaining three Bald Eagles on upland areas farther than 30 km from rivers were found on creeks with cottonwoods present. One of these eagles was probably associated with the Little Missouri River wintering area (Fig. 1).

The results suggest that relatively few Bald Eagles winter in southeastern Montana. Most winter on the major rivers, some are associated with rivers and upland areas, and a very few winter strictly on upland sites (Table 1). Observations made during our other field activities support this conclusion. This situation is similar to that found in Oklahoma, near the southern limit of the winter range of the Bald Eagle on the Great Plains (Steenhof 1978). There, upland wintering was limited to a few localities, and eagles concentrated on the largest rivers and reservoirs (Lish and Lewis 1975). However, the findings from Montana and Oklahoma contrast with the situation in Wyoming, Colorado, and Utah (Table 2) where Bald Eagles are more common on the uplands. Data from our study cannot be considered a true census and are, therefore, not completely comparable with the other data presented in Table 2. However, differences between our area and the other areas are large enough that we conclude they are real. Bald Eagles at the northern and southern limits of their winter range on the Great Plains apparently do not utilize upland areas to the same extent as they do in the central portions. This is also

Table 2. Use of uplands by wintering Bald Eagles in several study areas in the western United States.

Area	Size of Survey Area (km <sup>2</sup> )	Density of Eagles on the Uplands (eagles/1,000 km <sup>2</sup> )	Percentage of Eagles Observed on the Uplands	Source
Utah	923	124.6	100	Woffinden & Murphy 1977
Wyoming 1972	202,000	1.8	86 <sup>a</sup>	Wrakestraw 1972
Wyoming 1973	202,000	2.7	89 <sup>a</sup>	Wrakestraw 1973
SE Colorado 1967	57,000	0.3-0.7 <sup>b</sup>	100	Enderson et al. 1970
SE Colorado 1968	57,000	0.8-1.6 <sup>b,c</sup>	100 <sup>f</sup>	Enderson et al. 1970
SE Montana	71,500	0.3	29	This study

<sup>a</sup>Calculated as the projected number of eagles on the uplands divided by the projected total number of eagles, which was the sum of the projected upland population plus the river counts. Upland transects did not cross the rivers (Wrakestraw 1972).

<sup>b</sup>The lower density represents the number seen from transect flights 1.6 km apart, the higher density is based on an assumption that the effective counting distance from the airplane was 0.4 km (Wrakestraw 1972). These are absolute minimum estimates, because only adult Bald Eagles were counted (Enderson et al. 1970).

<sup>c</sup>26 of 46 Bald Eagles observed were at a small stream, which was considered upland.

suggested by the observations that upland wintering was most common in the southern portions of our study area (Fig. 1) and the northern portions of Oklahoma (Lish and Lewis 1975). This may be related to the preference for Bald Eagles in the western United States to winter in areas with a normal weekly temperature of  $-4^{\circ}$  to  $-1^{\circ}\text{C}$  in late December with densities apparently declining progressively with warmer or colder average temperatures (Gerrard 1977). Perhaps greater competition for wintering areas along rivers has caused more Bald Eagles in the central Great Plains to winter on the uplands compared with farther north or south, where densities are apparently less (Table 2).

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## FERRUGINOUS HAWK USING ROCK IN NEST DEFENSE

by

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While studying Ferruginous Hawks (*Buteo regalis*) in Harding County, South Dakota during 1977 I observed a resident female Ferruginous Hawk use a rock in nest defense. The incident occurred on 17 June, during one of my twice-weekly, post hatching nest visits.

As I approached the nest, the female flew overhead and circled, calling repeatedly. She showed no other aggressive behavior at this time. Her mate, responding to the calls, flew to the area of the nest and on 4 occasions swooped to within 3 m of me from a height of approximately 20 m. He then joined the female, circling and calling overhead. This pattern of nest defense, involving an aggressive male and more passive female, was typical of Ferruginous Hawks during the study. After 3 minutes of circling the female flew off in a southwesterly direction and disappeared over a nearby hill. She returned approximately 2 minutes later, circled overhead a few times and swooped toward me, approaching to within 10 m. Upon turning up from her dive she released a 5x7x10 cm stone which she carried in her talons. The stone landed within 5 m of me. The female then rejoined her mate overhead, both birds circling and calling until I left the area of the nest.

This behavior was not repeated during any of my 5 subsequent visits to this particular nest, nor was it exhibited by any of the other 34 breeding pairs of Ferruginous Hawks studied over a 2 year period. Janes (*Condor* 78:409, 1976) reported on a pair Common Ravens (*Corvus corax*) apparently using rocks during nest defense. To my knowledge, no other example of a raptor using rocks in defense of its nest has been reported.

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