

# Station Note

No. 31

February 1978

University of Idaho  
Wilderness Research Center

## A Preliminary Survey of Raptorial Birds in the Idaho Primitive Area

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The Idaho Primitive Area, a 7285 km<sup>2</sup> (2813 square mile) wilderness located in central Idaho, offers unique conditions for studying animal populations under pristine conditions. Little is known about raptor populations in an environment unaltered by man's activities. Consequently, this wilderness expanse was selected as an area for studying birds of prey. The purpose of this investigation was to determine the relative frequencies and densities of raptors that breed in representative natural habitat types found in the Idaho Primitive Area.

primitive area). Because of the pronounced topographic relief, vision was often obstructed by ridges or cliffs, but approximately 0.97 km (0.6 mile) on each side of the river was surveyed for breeding raptors. As time permitted, other sections of the primitive area were sampled to determine species present in those areas.

Vegetation within the Big Creek Drainage study area consisted of 58 percent coniferous forest, 40 percent grassland and 2 percent riparian habitat (Fig. 2). A more detailed description of the study area can be found in Hornocker (1970) and Seidensticker et al. (1973).

### STUDY AREA

The study area is located along 69.2 km (43 miles) of Big Creek, from its mouth on the Middle Fork of the Salmon River upstream to the Big Creek Ranger Station (Fig. 1). The land area encompassed by the study site was approximately 133.6 km<sup>2</sup> (51.6 square miles; 1.8% of the

### METHODOLOGY

The study area was surveyed throughout the summer (20 May to 3 August 1977) in a systematic manner involving approximately 1070 km of travel (665 miles; 440 miles on foot, 225 miles on horseback). The Big Creek Trail, which closely follows Big Creek, served as a convenient route for a census of the study area. Side trails were also used to survey the study area in more detail.

Nest sites were recorded when found, but the primary emphasis was on determining raptor nesting ranges and assessing densities of the various species inhabiting the study area. Binoculars were used when needed to confirm identifications. Sightings of paired and single raptors were plotted on 15-minute topographic maps. Even though

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Published as University of Idaho Forest, Wildlife and Range Experiment Station Contribution No. 105.  
ISSN: 0073-4594

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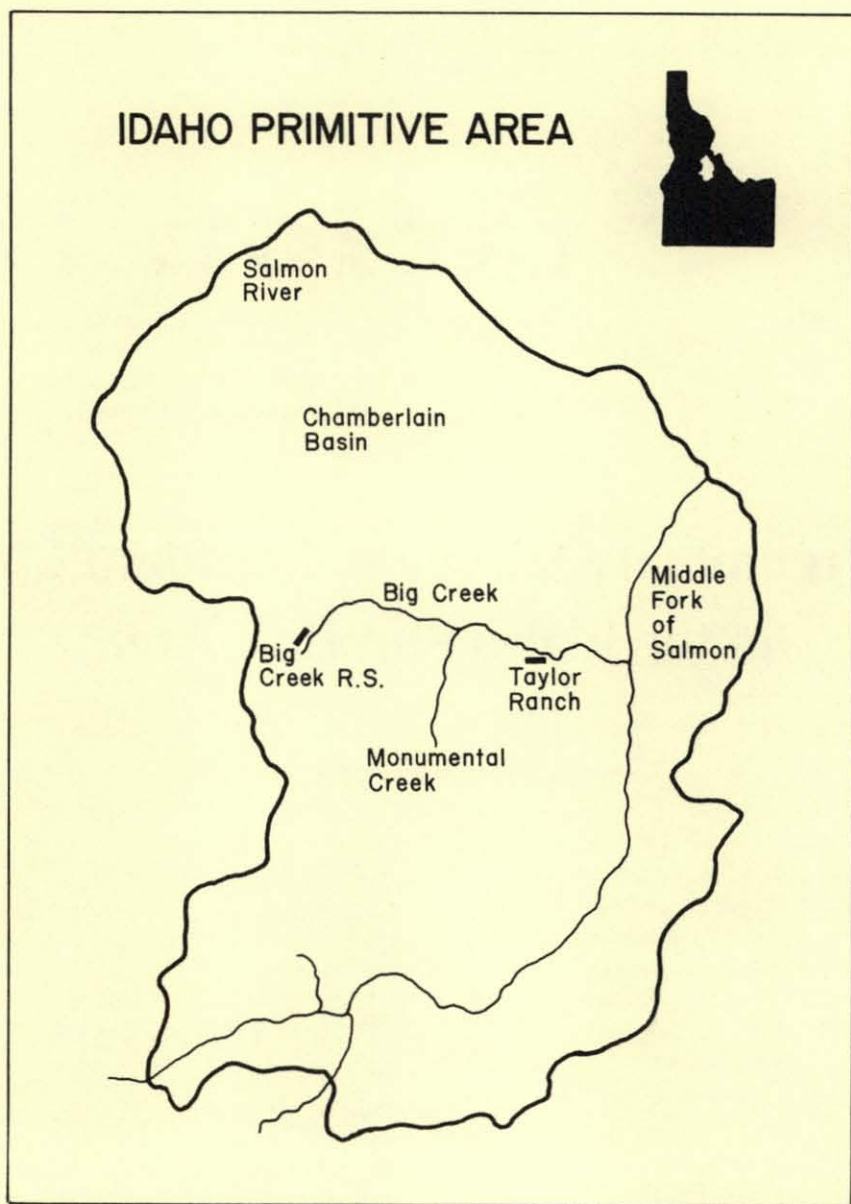


Fig. 1. Big Creek Drainage in relation to the Idaho Primitive Area.

a large number of observations ( $n > 50$ ) are not generally needed to define a range with reasonable accuracy (Craighead and Craighead 1956), the sizes of some nesting ranges in this study were not calculated because of insufficient sightings ( $n < 3$ ).

## RESULTS

Twelve species were recorded within the study area during this investigation: goshawk (*Accipiter gentilis*), Cooper's hawk (*Accipiter cooperii*), sharp-shinned hawk

(*Accipiter striatus*), marsh hawk (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), golden eagle (*Aquila chrysaetos*), kestrel (*Falco sparverius*), screech owl (*Otus asio*), great-horned owl (*Bubo virginianus*), long-eared owl (*Asio otus*), saw-whet owl (*Aegolius acadicus*), and pygmy owl (*Glaucidium gnoma*). In addition to these, the common raven (*Corvus corax*), which also has raptorial habits, was sighted frequently, and an osprey (*Pandion haliaetus*) has previously been reported (10 and 12 June 1976) in the Chamberlain Basin portion of the primitive area.

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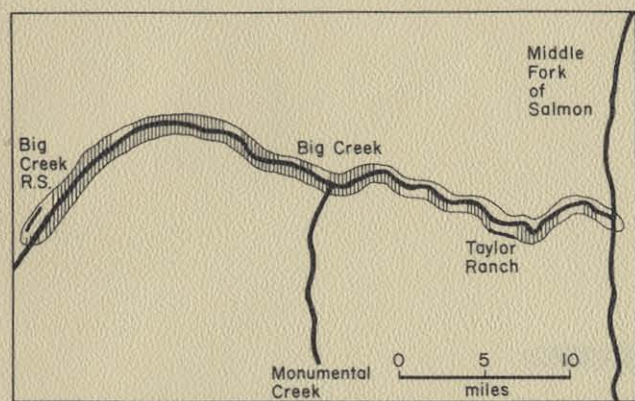


Fig. 2. General habitat distribution in the Big Creek study area. Forested habitat = Grassland habitat =

### Kestrel

Kestrels began nesting in the warmer and drier portion of the study area near the Middle Fork of the Salmon River prior to our arrival (first nest recorded 27 May). This species was the most abundant raptor in the study area and utilized the grasslands and open cliffs as hunting and nesting sites. Nesting chronology near the mouth of Big Creek was 2 to 3 weeks ahead of that 40.2 km (25 miles) upstream. In this segment of the drainage there is an elevation difference of 427 m (1400 ft). Young began to fledge in mid-June near the mouth of Big Creek, and the last pair fledged on 22 July near Monumental Creek (Fig. 1). Kestrel territories did not extend

much farther upstream. Beyond this point the vegetation on the south-facing slopes changes from grassland to coniferous forests of ponderosa pine (*Pinus ponderosa*), Douglas-fir (*Pseudotsuga menziesii*) and, at higher elevations, lodgepole pine (*Pinus contorta*). The chronology of plant development exhibited roughly the same time lag as the kestrel reproductive cycle between the sites at the mouth of Big Creek and at Monumental Creek.

Twenty-three pairs of kestrels had a nesting range which included at least part of the study area. Most of the land area covered by grasses or brush was used by at least one pair. The average size of the nesting range ( $n=23$ ) was 1.76 km<sup>2</sup> (0.68 square miles; Table 1).

Because Big Creek runs primarily west to east, the south and north slopes of the drainage support quite different types of vegetation. The north-facing slope was covered predominantly by Douglas-fir; south-facing slopes supported mainly bunchgrass (*Agropyron spicatum*) and balsamroot (*Balsamorhiza sagittata*). Since kestrels are adapted to the open country, the vegetation greatly influenced their utilization of the study area. Other factors which seemed to influence territory size and site selection were topography, location of favorite hunting perches, location of the nest site, and relative abundance of prey. Figure 3 illustrates the size and shape of some of the kestrel nesting ranges. These ranges appeared to be roughly rectangular.

### Sharp-shinned Hawk, Cooper's Hawk and Goshawk

The sharp-shinned hawk was the second most common hawk on the study area and was usually observed

Table 1. Nesting season ranges of raptors along Big Creek, Idaho, 1977.

Species and Sample Size	Parameter	Observed Area		Maximum Diameter		Observations per Nesting Range
		miles <sup>2</sup> (Acres x 640)	km <sup>2</sup> (Hectares x 100)	miles	km	
Kestrel n = 23	$\bar{x}$	0.68	1.76	1.17	1.88	25.4
	s	0.19	0.49	0.24	0.38	15.4
	Range	0.41-1.20	1.06-3.11	0.8-1.8	1.29-2.65	7-75
Sharp-shinned Hawk n = 7	$\bar{x}$	0.33	0.86	1.51	2.43	12.1
	s	0.09	0.23	0.26	0.42	11.5
	Range	0.22-0.47	0.57-1.22	0.95-1.70	1.53-2.74	4-34
Golden Eagle n = 2	$\bar{x}$	27.00	69.90	30.50	49.08	45.0
	s	4.24	10.99	2.12	3.42	14.1
	Range	24-30	62-78	29-32	47-51	35-55
Cooper's Hawk n = 1		0.76	1.97	1.70	2.74	3
Raven n = 1		3.20	8.29	2.60	4.18	30

in open riparian habitat or in park-like stands of coniferous forest. Since this type of habitat was often discontinuous in the study area, nesting sites frequently were isolated. The average nesting range ( $n=7$ ) was  $0.85 \text{ km}^2$  (0.33 square mile; Table 1) and the range was generally structured to follow a waterway. Consequently, several nesting ranges were long and narrow (Fig. 3). Cooper's hawks and goshawks were observed in more variable habitat than were sharp-shinned hawks.

#### Red-tailed Hawk and Marsh Hawk

Both red-tailed hawks and marsh hawks have been observed to nest within the study area in previous years, but neither species was recorded nesting in the drainage in 1977. Red-tailed hawks were found nesting in the higher meadows of Chamberlain Basin outside the study area, while breeding marsh hawks were completely absent from the study area and also from nest sites recorded in Chamberlain Basin the previous year. One female marsh hawk was observed in the Big Creek Drainage on 3 August 1977.

#### Golden Eagle

Four pairs of golden eagles included the study area as part of their nesting range; two of those pairs actually nested in the study area. Colonies of Columbian ground squirrels (*Spermophilus columbianus*) in burned areas and a colony of yellow-bellied marmots (*Marmota flaviventris*) in talus were hunted regularly by these eagles. Overlap of eagle nesting ranges occurred at the peripheries, especially near favored hunting areas; however, these areas of mutual use were not observed to be hunted by different pairs at the same time. The average area of golden eagle nesting ranges ( $n=2$ ) was  $69.9 \text{ km}^2$  (27 square miles; Table 1).

#### Raven

Nesting ranges of this species tended to be widely separated from each other. Only the area close to the nest was vigorously defended against other ravens or hawks. A nesting range of  $8.29 \text{ km}^2$  (3.2 square miles; Table 1) was determined for one regularly observed pair.

#### Owl

The owls were difficult to count because of their nocturnal habits. Nevertheless, representatives of the five species of owls previously recorded in the area were sighted throughout the summer. All of these were found in the Douglas-fir habitat which was the most abundant forest cover in the study area. The long-eared owl and great-horned owl were also found in lodgepole pine forests of the Chamberlain Basin. The screech owl and long-eared owl are additions to the bird checklist compiled for the Idaho Primitive Area by Seidensticker and Welch (1972). Additional studies, especially those utilizing prerecorded calls, should increase sightings of owls in the area.

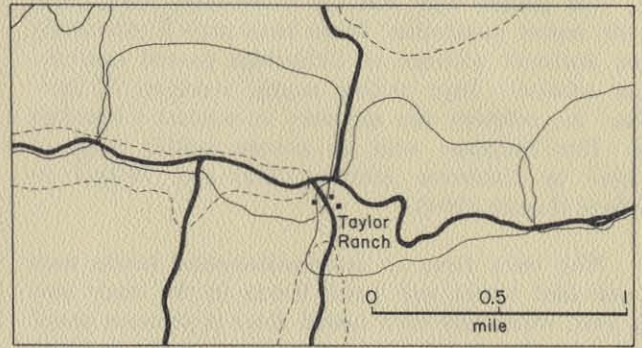


Fig. 3. Nesting ranges of the kestrel (solid-lined enclosures) and the sharp-shinned hawk (broken-lined enclosures) on a portion of the Big Creek study area, 1977.

## DISCUSSION

The two most abundant raptors recorded in the Big Creek Drainage of the Idaho Primitive Area were the kestrel and the sharp-shinned hawk. They comprised 68 percent and 20 percent, respectively, of the recorded nesting raptors. In general, the kestrel confined its activities to open country; the sharp-shinned hawk resided almost exclusively in open forest and riparian habitats. In grassland habitat kestrel density averaged 4.3 pairs per  $10 \text{ km}^2$  (11.1 pairs/10 square miles). The average nesting range of  $1.76 \text{ km}^2$  is within the average range recorded by Craighead and Craighead (1956) for 11 pairs of kestrels ( $2.02 \text{ km}^2$  in Wyoming) and by Balgooyen (1976) for 32 pairs ( $1.09 \text{ km}^2$  in California). Lack (1966) and Brown (1969) concluded that the size of kestrel territories serves to space individual pairs in the available habitat. The maximum density recorded for sharp-shinned hawks in riparian habitat and in park-like stands of conifers was 1.9 pairs per  $10 \text{ km}^2$  (5.0 pairs/10 square miles). The average nesting range of  $0.86 \text{ km}^2$  corresponds to a nesting range of  $1.1 \text{ km}^2$  obtained in Wyoming for two pairs of sharp-shinned hawks (Craighead and Craighead 1956).

Virtually all of the grassland habitat was well surveyed and therefore all of the kestrel pairs that utilized the study area were probably recorded. Most of the riparian habitat was well searched, but because the viewing distance in forested habitat is limited by trees, only about 40 percent of this latter type of habitat was adequately surveyed. Therefore, woodland hawk populations (sharp-shinned hawks, Cooper's hawks and goshawks) are probably larger than our census indicated. Consequently, it is reasonable to estimate that 13 pairs of sharp-shinned hawks utilized the study area for nesting. In forested habitat an average of 1.6 nesting pairs of sharp-shinned hawks could be expected per  $10 \text{ km}^2$  (4.2/10 square miles).

The golden eagle was the other major component of the raptor population. These birds preyed extensively upon scattered colonies of Columbian ground squirrels. Their relatively large nesting ranges, averaging 70 km<sup>2</sup>, reflect the territory size necessary to support a breeding pair. This compares with an average nesting range of 93 km<sup>2</sup> in California (Dixon 1973) and 70 km<sup>2</sup> in Scotland (Lockie 1964).

Why were there no intermediate-sized hawks such as red-tailed hawks and marsh hawks in the study area this year, when they have nested there in previous years? We hypothesize that the lack of moisture may be involved. The low spring runoff for the last several winters has caused ground water reserves to become depleted; consequently, above-ground stream flow has decreased or ceased altogether. New plant growth and seed production were therefore probably less this year, and plants went into winter dormancy earlier. These events may have affected the songbird and small mammal populations dependent on these plants, in turn affecting the raptors that prey on the small birds and mammals. By the middle of July, kestrels that had fledged their young began to disperse. By the end of July most of the sharp-shinned hawks also began to migrate from the area as their songbird prey base diminished.

To examine what effect these dry conditions may have had on the prey base, a brief census of the small mammal population was conducted. In late July we re-trapped on some of the transects which had been sampled in June of the previous year. Three hundred trap nights were recorded in the bunchgrass habitat and 100 trap nights in riparian habitat. Four adult deer mice (*Peromyscus maniculatus*) were taken; neither of the two females trapped was pregnant. This compares with 26 mice taken from the same areas for the same number of trap nights the preceding year. As indicated above, these data suggest that small mammal populations may have been depressed from the preceding year and the decline in raptor populations on the study area may have reflected this decline in prey base. Balgooyen (1976) hypothesized that the difference between nesting range sizes in his kestrel data and in that presented by Craighead and Craighead (1956) was a function of available prey. Both red-tailed hawks and marsh hawks also prey heavily on

small rodents (Craighead and Craighead 1956) and both species have previously been known to nest in the study area. However, in 1977, red-tailed hawks were restricted to the wetter mountain meadows and marsh hawks were entirely absent from the nesting population.

Apparently the available prey base was still sufficient to support the smaller raptor species, but these also left as soon as their young had been fledged. By August only a few representatives of these smaller species remained.

The possibility of using the Big Creek Drainage as a release site for species such as the prairie falcon (*Falco mexicanus*) definitely has merit. Suitable nesting cliffs exist from Mile Hi to Cabin Creek and also near the mouth of Big Creek. The level of human disturbance would be low. Columbian ground squirrels are present in the Mile Hi area in large concentrations and could serve as a food base. If the formerly irrigated pastures near Cabin Creek are allowed to be recolonized by the ground squirrels, this food base would increase substantially.

## SUMMARY

The objective of this study was to gather preliminary information on the densities of raptors in the pristine habitat of the Idaho Primitive Area. Between mid-May and early August, 12 raptor species were recorded in the study area along Big Creek. The most abundant species was the kestrel, inhabiting the grassland habitat at a species density of 4.3 pairs per 10 km<sup>2</sup>. The sharp-shinned hawk was the most common woodland dweller and restricted its nesting to open forest and riparian habitats. The estimated density of this species was 1.9 nesting pairs per 10 km<sup>2</sup> of suitable habitat.

It is hypothesized that due to drought conditions in the study area this year, the small mammal prey base was depressed. This may have resulted in the absence of red-tailed hawks and marsh hawks from the study area, where they had nested the previous year. The dry conditions also may have forced resident raptors to migrate from the study area earlier than usual.

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