

To: Mr. Kenneth Sowles

Re: Possible nesting location for falcons in the Idaho Primitive Area

Location: Vale Falls, located on the Middle Fork of the Salmon River

Date of Obs.: 24 May 1976

The area would appear to be an ideal nesting location for falcons. While in the area on the 24th, four individual American Kestrels were observed either at rest or in flight.

According to information contained in Bent (1961) the area would appear ideally suited for Prairie Falcons (Falco mexicanus). The area contains sufficient water and rock faces necessary for the Prairie's nesting requirements (slides 1-3). On either side of the river rock walls approximately 200-300 ft. high exhibit the type of nesting area; cracks and offsets with sheltering overhangs and southern exposures, highly preferred by F. mexicanus (slides 4-6) (Bent 1961).

Food availability may be questionable but in close proximity to the cliffs are open and lightly timbered areas (slide 7) from which rodents and small game could possibly be obtained. The cliff faces themselves contain a variety of small birds that have been recorded as Prairie Falcon food (Bent 1961).

The only affect on the area by man is the occasional passage of an aircraft and float trips. Access by trail is virtually impossible, thus possibly insuring the nesting birds in Vale Falls of little human disturbance.

Summary: The positive points for this area are the presence of ideal nesting habitat, water, and its relative inaccessibility to the average hiker. Possible negative aspects are the air traffic and questions concerning the food sources available in the surrounding areas.

Reccommendation: Any future studys concerned with possible raptor introduction into the Primitive area should consider the Vale Falls area closely.

Taylor Ranch Field Station
10 June 1976
Charles L. Elliott

Bent, A.C. 1961. Life histories of North American birds of prey. Vol. 2. Pages 18-42, 99-106. Dover Pub., Inc. New York. 482pp.



University of Idaho

Inter-Office Memorandum

To Ken Sowles

From S. R. Peterson

Subject Final Report for T. Thurow

Date November 7, 1977

Find attached for your review, Tom Thurow's final copy of the past summer's work. I think the data are quite good and can add some useful information to the literature on raptors. Perhaps Ali may be interested in publishing it through the Station. The figures would have to be dressed up a bit by the station artist.

I have sent copies to D. Johnson in Biological Sciences and M. Hornocker for their comments.

SRP

cc: A. Moslemi

To Ken Sowles

From S. R. Peterson

Subject Birds of Prey Report

Date October 10, 1977



University of Idaho

Inter-Office Memorandum

Find attached the first draft of Tom Thurow's report. It is good for a first draft of a project like this out but I have instructed him to improve several shortcomings. Hopefully, I will have a corrected version back by the end of October as a final report to your office.

SRP
SRP *ps*

To Dean John Ehrenreich, College of Forestry
From Maurice G. Hornocker
Subject _____



University of Idaho

Inter-Office Memorandum

May 3 1973

Date May 2, 1973

Dear John:

Enclosed is a copy of Andy Ogden's thesis on prairie falcons.

I hope you will find it helpful and informative.

Sincerely,

Maurice^{nt}
Maurice G. Hornocker
Unit Leader

MGH: wr

RAPTOR POPULATIONS AND NESTING SEASON RANGES IN THE

IDAHO PRIMITIVE AREA

Thomas L. Thurow
Dr. Steven R. Peterson

The Idaho Primitive Area, a 1.8 million acre wilderness located in central Idaho, offers a unique area for studying animal populations under pristine conditions. Little is known about raptor populations in an environment such as this which has been altered little by man's activities. Consequently, this wilderness expanse was selected as an area for studying birds of prey in a relatively undisturbed setting. The purpose of this investigation was to determine the relative frequencies and densities of raptors which inhabit a representative portion of the habitat types found in the Idaho Primitive Area.

STUDY AREA

The study area was located along 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). Vision was often obstructed by ridges or cliffs due to the pronounced topographic relief, but approximately 0.6 mile on each side of the river was accurately surveyed. The land area encompassed by the study site was approximately 51.6 mi² (1.8% of the total Primitive Area). As time permitted other sections of the Primitive Area were sampled to determine species presence in those areas.

Vegetation within the Big Creek drainage study area consisted of approximately 58 % conifer forest, 40 % grassland and 2 % riparian habitat^(1, 2). Additional description of the study area can be found in Hornocker (1970) or Seidensticker et al. (1973).

METHODOLOGY

The study area was surveyed throughout the summer (May 20 to August 4) in a systematic manner which covered an approximate total of 665 miles (440 miles on foot, 225 miles on horseback). The Big Creek Trail, which closely follows Big Creek, served as a convenient avenue for censusing the study area. Other side trails were also used to survey the study area in more detail.

Nest sites were recorded when found, but the primary emphasis was directed toward establishing raptor nesting ranges and assessing densities of the various species inhabiting the study area. Binoculars (7 x 50) were used when needed to confirm identifications. Sighting records of paired and single raptors were plotted on 7 by 15 minute topographic maps. This procedure accurately defined the nesting range in most cases. Even though a large number of observations is not generally needed to define a range with reasonable accuracy (Craighead and Craighead 1956), the size of some nesting ranges were not calculated because of insufficient sightings.

RESULTS

Twelve birds of prey were recorded within the study area during this investigation. These were the 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 sited frequently and an Osprey (Pandion

haliaetus) was sited in 1976 on June 10 and 12 in the Chamberlain Basin portion of the Primitive Area.

Kestrels

Kestrels were beginning to nest in the warmer and drier portion of the study area near the Middle Fork of the Salmon River when I arrived (first nest recorded May 27). This species was the most abundant raptor in the study area and utilized the grassland and open cliffs as hunting and nesting sites. Nesting chronology near the mouth of Big Creek was 2 - 3 weeks ahead of Kestrels nesting 25 miles upstream (elevation difference of 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 than this creek because the vegetation changed from grassland on the south facing slopes to conifer forests of Ponderosa Pine (Pinus ponderosa), Douglas Fir (Pseudotsuga menziesii) and, at higher elevations, to Lodgepole Pine (Pinus contorta). ~~Time differences in~~ The chronology of plant development exhibited roughly the same time lag between the mouth of Big Creek and Monumental Creek as the Kestrel reproductive cycle.

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 grassland or brush was utilized by at least one pair. The average size of the nesting range was 0.68 mi² (Table 1).

Because Big Creek primarily runs West to East, the south slope and north slope of the drainage support quite different types of vegetation. The north facing slope was predominantly covered by Douglas Fir and south facing slopes were composed mainly of

bunchgrass (Agropyron spicatum) and balsamroot (Balsamorhiza sagittata). Since the Kestrel is 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, the location of the nest site and the relative abundance of prey. Figure 3 illustrates the size and shape of some of the nesting ranges.

Sharp-shinned Hawks

The Sharp-shinned Hawk was the second most common hawk on the study area. This species shows a preference for open riparian habitat or park like stands of conifer forest. Consequently because this preferred habitat was often discontinuous in the study area, nesting sites exhibited a tendency toward isolation. The average nesting range was 0.33 mi^2 and the shape was generally structured to follow a waterway and/or the favored hunting habitat. Consequently several nesting ranges were long and narrow. Observations of Cooper's Hawks and Goshawks reflected less rigidity in regards to preferred habitat.

Red-tailed and Marsh Hawks

Both Red-tailed Hawks and Marsh Hawks were observed to nest within the study area in previous years but neither species was recorded to nest in the drainage in 1977. During this study, Red-tailed Hawks were found nesting in the higher meadows of Chamberlain Basin while breeding Marsh Hawks were completely absent from the study area and also from known nest sites recorded in Chamberlain Basin the previous year. One female Marsh Hawk was observed migrating through the Big Creek Drainage on August 3.

Golden Eagles

Four pairs of Golden Eagles included the study area as part of their nesting range; two of those pairs nested in the study area. Colonies of Columbian Ground Squirrels (Citellus columbianus) were the favored hunting areas. Burned areas and a Yellow-bellied Marmot (Marmota flaviventris) colony were also hunted regularly. Overlap of nesting ranges occurred at the peripheries, especially near good 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 the Golden Eagles nesting range approximated 27 mi².

Ravens

Nesting ranges of this species tended to be widely separated from each other. The area close to the nest was vigorously defended against other ravens or hawks which flew near that vicinity but the entire range was not. A nesting range of 3.2 mi² was determined for one pair which was regularly observed.

Owls

The Owl family was difficult to census because of its nocturnal habits. Nevertheless representatives of five species of owls were sited throughout the summer. All of these were found in a Douglas Fir forest type 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 Primitive Area by the U. S. Forest Service. Additional studies should increase sightings of different species of owls in the area. The Great Gray Owl has been noted as a permanent resident in the Primitive Area but was not recorded in this

survey.

DISCUSSION

The two most abundant raptors recorded in the Primitive Area, the Kestrel and the Sharp-shinned Hawk, composed 68% and 20% respectively of the recorded nesting pairs of raptors. In general, the Kestrel confined its activities to open country and the Sharp-shinned Hawk resided almost exclusively in the open forest and riparian habitats. In grassland habitats the Kestrel density averaged 11.1 pairs per 10 mi.² with an average size nesting range of 0.68 mi.². This corresponds to the .78 mi.² average size of nesting range for 11 pairs of Kestrels near Moose, Wyoming (Craighead and Craighead 1956). A maximum density for Sharp-shinned Hawks was recorded at 5.0 pairs per 10 mi.²: The average size nesting range of .33 mi.² corresponds to a nesting range size of .42 mi.² obtained in Wyoming for 2 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. However, because in forested habitat the viewing distance is limited by trees, less than half ($\approx 40\%$) of this habitat was adequately surveyed. Therefore woodland hawk populations are probably higher than the data indicate even though most of the riparian habitat and creek bottoms were well searched. This habitat appears to be favored by Sharp-shinned Hawks, Cooper's Hawks and Goshawks and therefore these species are more likely to be observed there. Consequently, a reasonable estimate of approximately 13 pairs of Sharp-shinned Hawks utilized the study area for nesting. In forested habitat an average of 4.2 nesting pairs

of Sharp-shinned Hawks could be expected per 10 mi². Cooper's Hawks and Goshawks may also prove to be more abundant.

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 27 mi.² reflect the territory size necessary to support a breeding pair. This compares with the average size nesting range of 36 mi.² (Dixon 1937) and 27.1 mi.² (Lockie 1964).

Why was there an absence of intermediate size hawks such as Red-tailed Hawks and Marsh Hawks in the study area this year when they have been known to nest there in previous years? We hypothesize that the lack of moisture this year may be associated with their absence. The low spring runoff for the last several winters have caused ground water reserves to become depleted. Consequently ^{above ground} the stream flow has decreased ~~and some began to run only underground.~~ ^{or ceased altogether.} New plant growth and seed production had become less, and plants went into winter dormancy earlier. These events may influence the small mammal populations dependent on these plants. By the middle of July this year, Kestrels that fledged young began to exit from the study area. By the end of July most of the Sharp-shinned Hawks 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 retrapped 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 were obtained in riparian habitat. Four deermice (Peromyscus maniculatus) were taken; all of which were adults. Neither of the

two females recorded were pregnant. This compares to 26 mice being taken from the same areas for the same number of trap nights a year before. These data suggest that small mammal populations may have been depressed from the year before. The decline in overall raptor populations of the primitive area reflected this prey base decline. Both Red-tailed Hawks and Marsh Hawks prey heavily on small rodents. Both have previously been known to nest in the study area. However in 1977 Red-tailed Hawks were restricted to the 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 they also left as soon as their young had fledged. By August only a few representatives of these species remained from the summer nesting population.

The possibility of the Big Creek drainage serving 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 could serve as a food base and are present in the Mile Hi area in large concentrations. If the irrigated pastures near Cabin Creek are allowed to become 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 and it inhabited the grassland habitat at a species density of 11.1 pairs per 10 mi². The

Sharp-shinned Hawk was the most common woodland dweller and restricted its nesting ranges to the open forest and riparian habitats. A density of 4.2 nesting pairs of this species per 10 mi.² was estimated.

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

Idaho Primitive Area

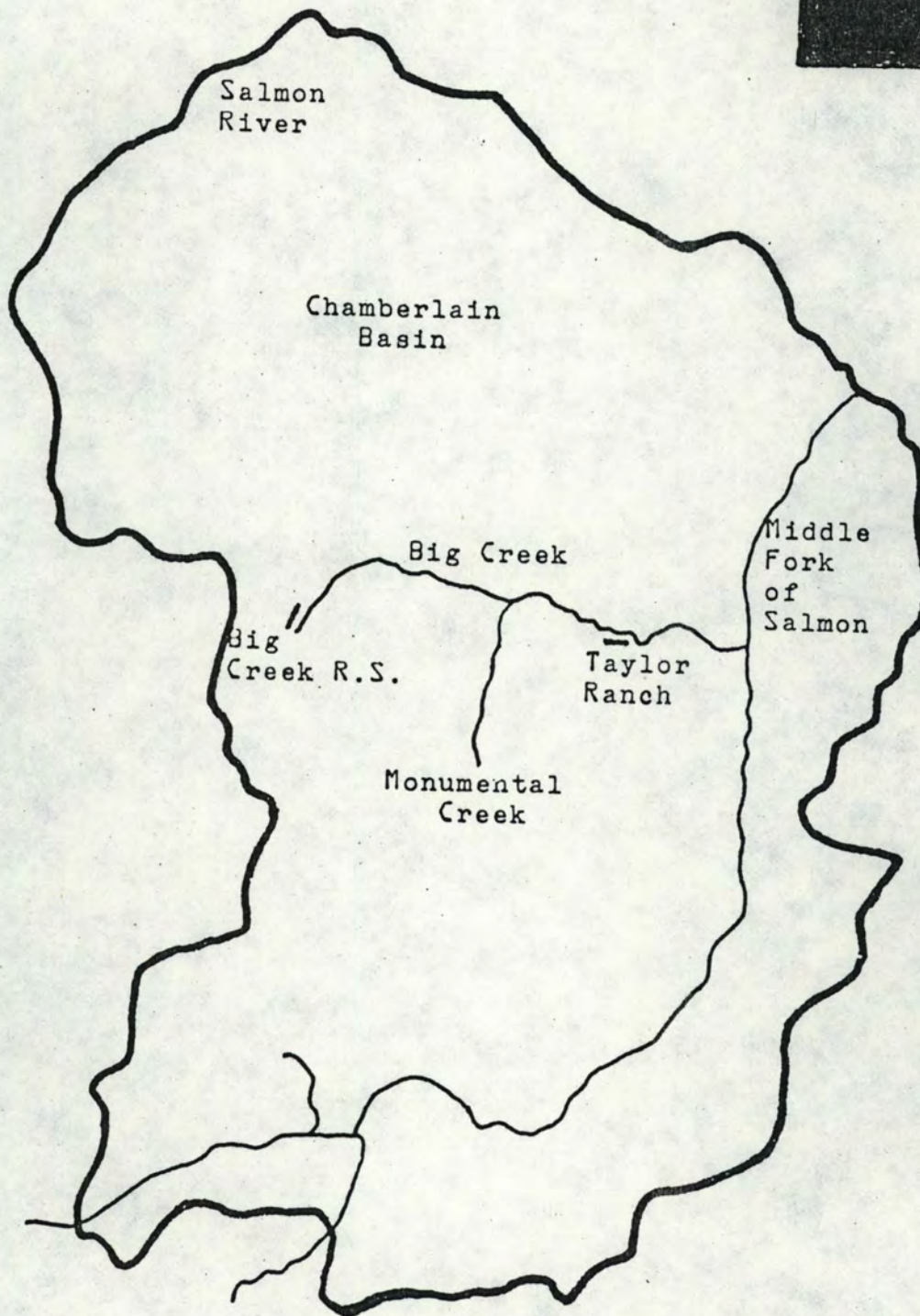


Figure 1. Big Creek in relation to the Idaho Primitive Area.

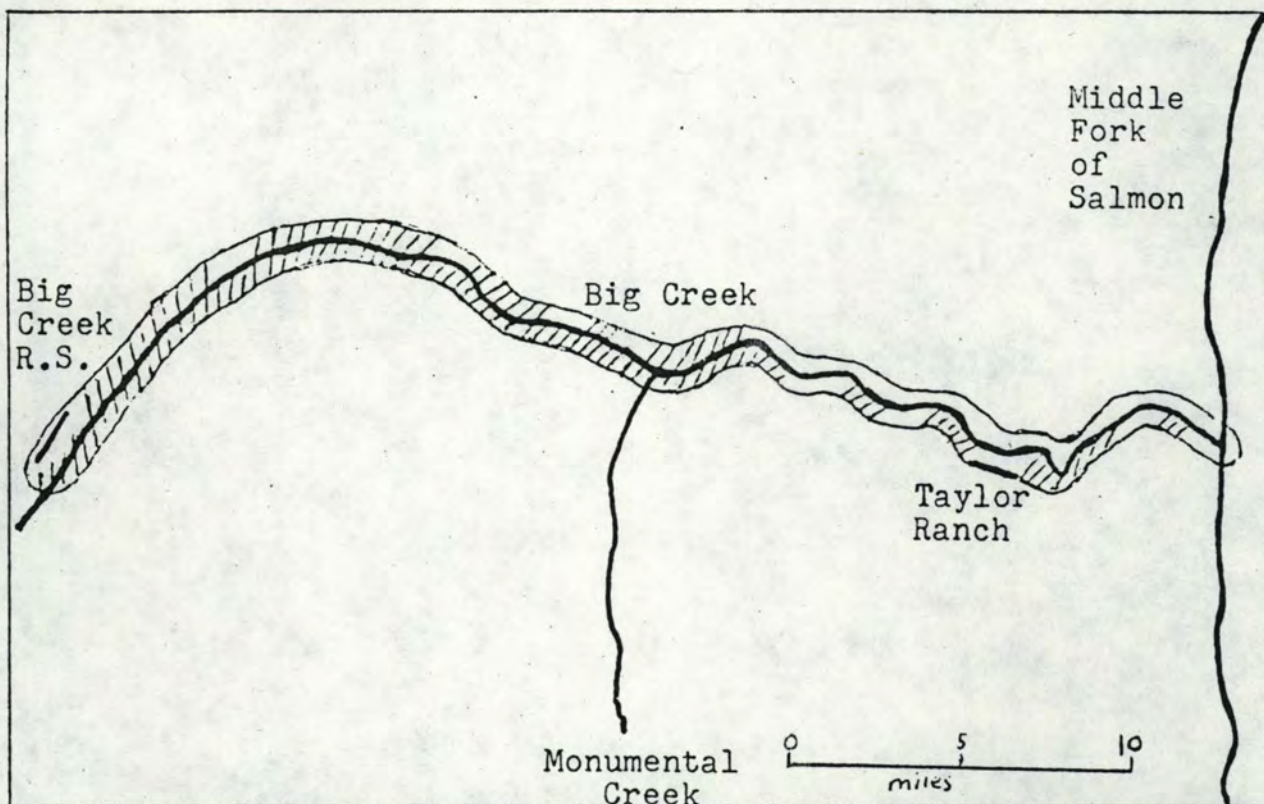




Fig. 2. A general habitat distribution map along the Big Creek study area. Forested habitat= Grassland habitat=,

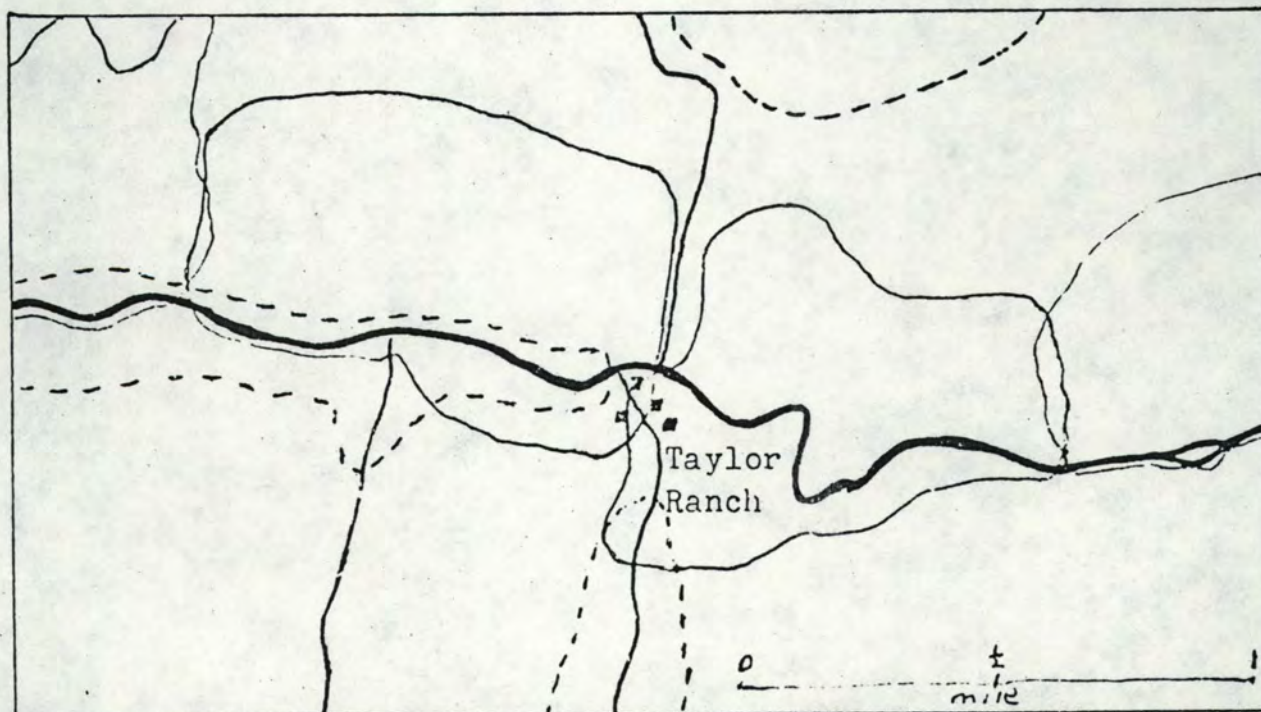


Fig. 3. Nesting ranges of the Kestrel (solid-lined enclosures) and Sharp-shinned Hawk (broken-lined enclosures) on a portion of the study area.

Table 1. Nesting season ranges of raptors within the study area.

SPECIES	OBSERVED AREA (Sq. mi.)	MAXIMUM DIAMETER (miles)	NUMBER OF OBSERVATIONS	
Kestrel n = 23	.41	0.9	10	
	.42	1.05	13	
	.49	1.1	21	
	.68	0.95	25	
	.47	0.8	31	
	.54	1.1	45	
	.64	1.3	12	
	.60	1.1	75	
	.46	1.0	41	
	.76	1.1	43	
	.91	1.65	29	
	1.20	1.6	32	
	.77	1.1	37	
	.70	1.1	24	
	.80	1.1	21	
	.46	1.1	26	
	.72	1.2	15	
	.64	0.95	17	
	.74	1.2	14	
	.90	1.3	12	
	.69	1.3	19	
	.82	1.8	15	
	.78	1.1	7	
$\bar{X} =$	$\frac{.68}{23} = .0296$	$\frac{1.17}{23} = .0509$	$\frac{25.4}{23} = 1.1043$	
range=	(0.41-1.20)	(0.8-1.8)	(7-75)	
s=	0.19	0.24	15.4	
Sharp-shinned Hawk n = 7	.34	1.7	22	
	.31	1.6	34	
	.42	0.95	9	
	.26	1.7	4	
	.31	1.6	6	
	.47	1.5	5	
	.22	1.5	5	
$\bar{X} =$	$\frac{.33}{7} = .0471$	$\frac{1.51}{7} = .2157$	$\frac{12.1}{7} = 1.7286$	
range=	(0.22-0.47)	(0.95-1.70)	(4-34)	
s=	0.09	0.26	11.5	
Cooper's Hawk n = 1	.76	1.7	3	
Golden Eagle n = 2	24.0	29.0	55	
	30.0	32.0	35	
	$\bar{X} =$	$\frac{27.0}{2} = 13.5$	$\frac{30.5}{2} = 15.25$	$\frac{45}{2} = 22.5$
	range=	(24-30)	(29-32)	(35-55)
	s=	4.24	2.12	14.1
Raven n = 1	3.2	2.6	30	

Literature cited

- Craighead, F., and J. Craighead. 1956. Hawks, owls and wildlife. Stackpole Co., Harrisburg, Pa., 443pp.
- Dixon J. B. 1973. The Golden Eagle in San Diego County, California. Condor 39:49-56.
- Hornocker, M.G. 1970. An analysis of mountain line predation upon mule deer and elk in the Idaho Primitive Area. Wildl. Monogr. No. 21:1-39.
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- Seidensticker, J., M. Hornocker, W. Wiles and J. Messick. 1973. Mountain lion social organization in the Idaho Primitive Area. Wildl. Monogr. No. 35:1-60.

TEACHING/RESEARCH/SERVICE
Wildlife Resources
(208) 885-6434



University of Idaho
College of Forestry,
Wildlife and Range Sciences
Moscow, Idaho 83843

October 17, 1977

Mr. Thomas Thurow
467 S. State St.
Provo, Utah 84601

Dear Tom:

Thanks so much for the manuscript. It is very interesting and useful. Find attached a copy with my comments. If you can send me a corrected version as soon as possible I will have our secretary type up the final copy.

We need three additional figures developed for it so I am returning the maps to you. If you can rough them out, I will have a graphics artist redraw them.

- 1) A Habitat Map - see if you cannot come up with a rough map that shows how the habitats are distributed along big creek in the study area.
- 2) A map showing at least pair locations of Kestrels and preferably nesting ranges in reference to this habitat.
- 3) Perhaps a similar one for Sharpshins but this may not be necessary.

Thanks again for a good summers work and a good initial report. Ken Sowles would like a final report by the end of this month to use in obtaining additional money for more study in this area.

Hope all is going well with you at BYU. Say hello to Gerran.

Sincerely,

Steven R. Peterson
Assistant Professor

SRP/bg

✓ cc: K. Sowles

To Kenneth Sowles



University of Idaho

Inter-Office Memorandum

From Steven R. Peterson

Subject Preliminary Proposal to Study the Breeding Raptor
Population of Big Creek, Idaho Primitive Area

Date 10 May 1977

JUSTIFICATION:

Little is known about raptor populations in primitive or wilderness areas. A species list including seven breeding raptors was developed by Seidensticker and Welch for Big Creek and Chamberlain Basin in the Idaho Primitive Area, but this list does not indicate much about the relative species composition, especially in different habitat types.

Birds of prey are held in high esteem by many people and we are beginning to realize that many raptors at the top of the food chain in their respective environments, are important indicators of environmental quality. Some species cannot tolerate a strong presence of people or related activity. Most species exhibit a direct response to changes in their prey as well as indirectly to changes in their prey's habitat.

Recently, peregrin falcons were reintroduced into this state from captive-reared stock. There will probably be requests for additional releases in other areas. The Idaho Primitive Area may offer such sites but suitable nesting cliffs would have to be mapped and evaluated in relation to potential food supplies and human disturbance.

METHODOLOGY:

Senior student, Thomas Thurow, and myself, have developed a methodology to sample the diurnal raptor populations in the Big Creek drainage of the Idaho Primitive Area (Figure 1). This memorandum briefly outlines our ideas but a more detailed study plan will be submitted by the end of May 1977.

The study area will consist of a strip of country extending 0.6 miles on either side of Big Creek from the Big Creek Ranger Station to the Middle Fork of the Salmon River. There is approximately 39 square miles within this study area, and it is roughly divided into 54 percent forest, 41 percent grassland, and 5 percent riparian habitat. These habitats will be sampled daily (proportionate by time and area) for raptors throughout the summer months. Observations will be recorded concerning the type of habitat used by each species throughout the day as well as by season.

Most of the work will be accomplished out of the Taylor Ranch, but additional short reconnaissance trips may be made to other parts of Primitive Area as time permits.

REPORTING RESULTS:

The data will be summarized in a short paper to the College, and the results will be presented at the annual meeting of the Idaho Chapter of the Wildlife Society meeting to be held in Moscow this winter. If the study proves worthwhile, with the possibility of extending the study to include all of the Idaho Primitive Area, a more expanded proposal will be developed next year.

Respectfully Submitted,

A handwritten signature in cursive script, appearing to read "S.R. Peterson".

Steven R. Peterson

Idaho Primitive Area

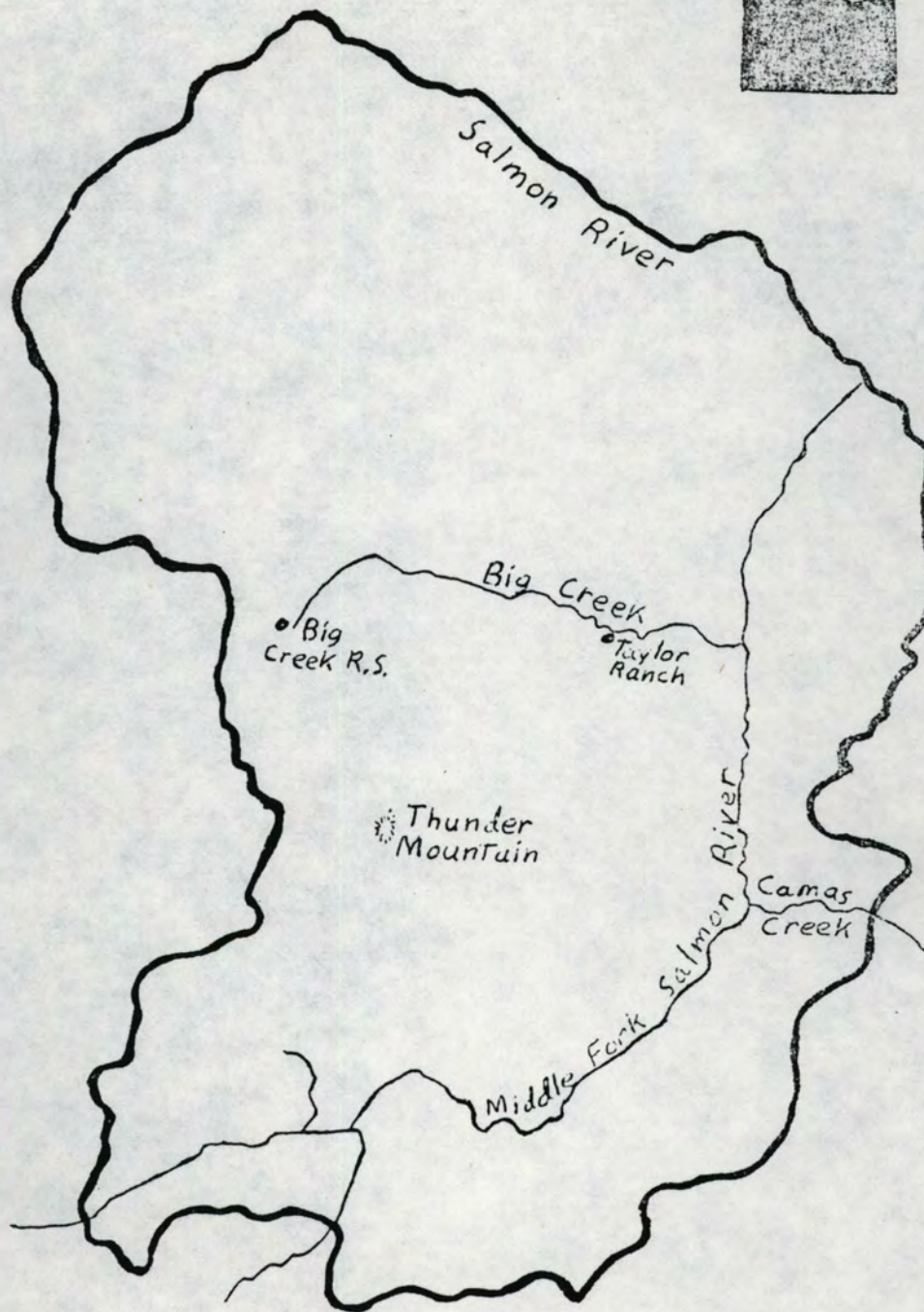


Figure 1. Big Creek in Relation to the Idaho Primitive Area.

A RAPTOR INVENTORY OF THE BIG CREEK DRAINAGE

A Research Proposal

Submitted

by

Barbara A. Schrader

1 April, 1977

INTRODUCTION

The birds of the Idaho Primitive Area have been studied little, and there is a lack of information on the species currently inhabiting the area. It is likely that intensive observations could result in the classification of more resident raptors on the Big Creek drainage than current records show. (Appendix A). This study is intended as an initial step in the inventory of these populations. Moreover it could provide baseline information for future research on the birds of prey of the Primitive Area.

The objective of the study is to determine the raptor species existing along Big Creek, and their relative abundance to cover types and elevation.

STUDY AREA

The study will be conducted at Taylor Ranch Research Station in the Idaho Primitive Area. This is a roadless area of rugged terrain, in east-central Idaho. Four study areas have been established: (Figure 1)

1. Big Creek (Monumental Ck.-Middle Fork, Salmon R.)
2. Cold Meadows
3. Cabin Creek
4. Rush Creek

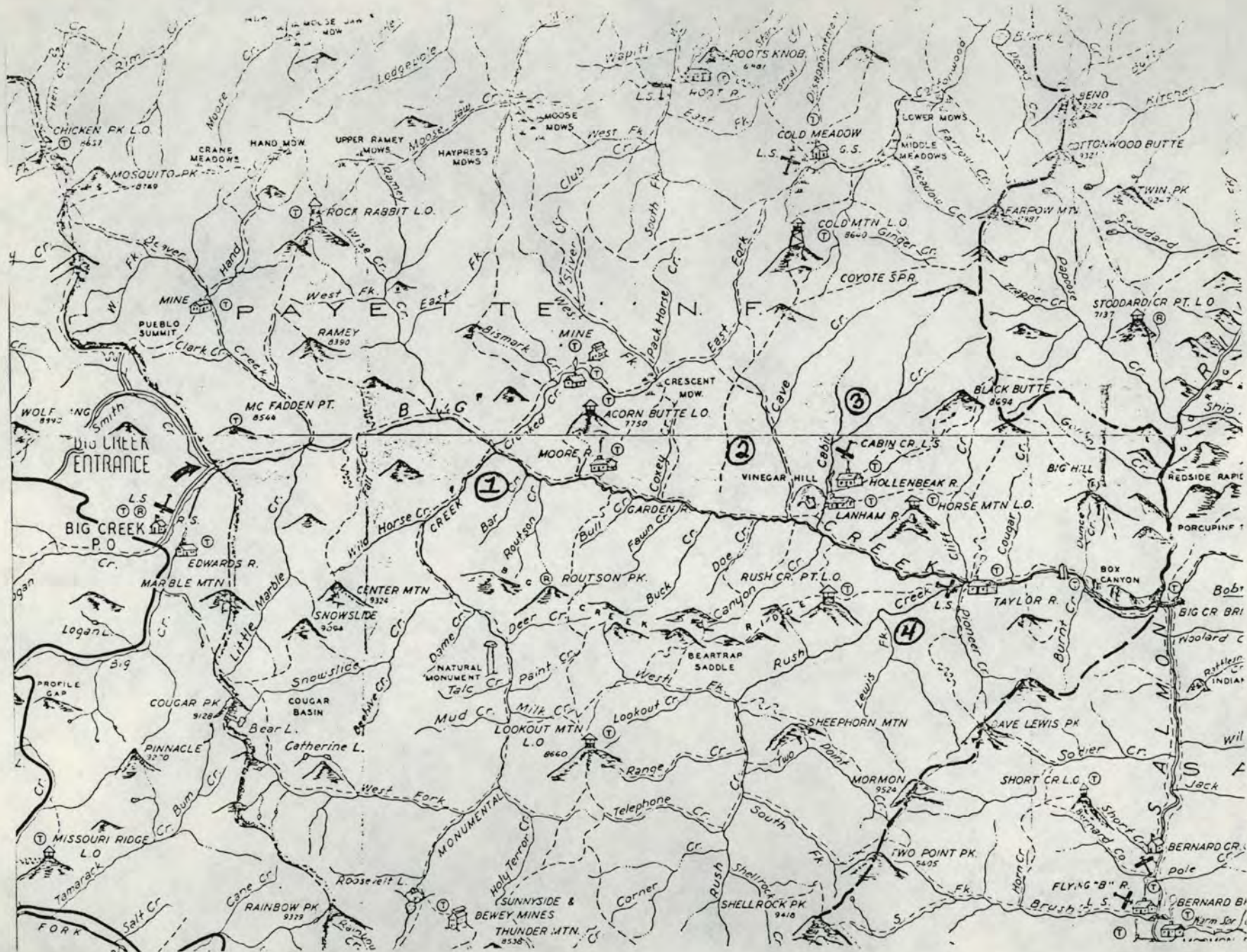


FIGURE 1.

METHODS

The study methods for each area will be essentially the same. All areas will be travelled on foot except Rush Creek which will be surveyed on horseback, if possible. Study periods will consist of 15 day blocks in which the study area will be travelled. The areas will be divided into 4-mile plots, ^{- too large!} three observation days minimum being spent at each plot. This preferably would be a cliff or point of high elevation overlooking the creek or an area frequented by raptors.

Observation will consist of three hours spent at dawn and before dusk walking an established transect, using a predator call every twenty minutes along the route. During the course of the day observation scanning will take place from the selected vantage point for a 2-3 hour minimum. During this observation time pigeons will be used as live bait to lure in raptors. Nighttime observations for owls will employ predator calls at selected sights within the observation plot.

All signs of nesting activity, raptor kills, and pellets will be reported. Data will include species, age, sex, cover type, location, time of day, and weather conditions(Appendix B).

Materials needed for the project will include a spotting scope and possible use of the Taylor Ranch horses. Binoculars, topographic maps, and general backpacking equipment have already been secured.

LITERATURE REVIEW

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- Boeker, Erwin L., 1974. Status of Golden Eagle Surveys in the Western States. Wildlife Society Bull. 2(2):46-49
- Burleigh, Thomas D., 1972. Birds of Idaho. Caxton Press, Caldwell, Idaho.
- Craighead, J. and F., 1969. Hawks, Owls, and Wildlife. Dover Publications, New York.
- Grubb, Teryl G., David A. Manuwel, and Clifford M. Anderson, 1975. Nest Distribution and Productivity of Bald Eagles in Western Washington. Murrelet 56(3):2-6
- Larrison, Earl J., Jerry L. Tucker, Malcolm T. Jollie, 1967. Guide To Idaho Birds. Journal of the Idaho Academy of Science.

APPENDIX A. BIRDS OF PREY OF THE IDAHO PRIMITIVE AREA

(According to Larrison, Tucker, Jollie, 1967, Guide To Idaho Birds and U.S. Forest Service, Birds of Big Creek and Chamberlain Basin.)

<u>Species</u>	<u>Status</u>	<u>Cover Type</u>	<u>Prey</u>
Goshawk	PR	patchy timber	squirrels, rabbit small birds, grouse
Sharp-shinned Hawk	SR	timber	small birds
Hawk			
Cooper's Hawk	SR	timber	small birds
Red-tailed Hawk	SR	forest margin clearings	squirrels, gophers rabbits, reptiles
Ferruginous Hawk	M	open sagebrush grassland	mice
Golden Eagle	PR	canyon flats, open ridge and high summits	small mammals
Marsh Hawk	SR	grassland	mice
Osprey	SR?	riparian	fish
Kestrel	SR?	riparian	mice
Great Horned Owl	PR	forest margin forest margin open valley	grasshoppers most available food source
Great Gray Owl	PR?	dense conifer wet mt. meadows	rabbits, rodents birds
Saw-whet Owl	PR?	mixed conifer sub-alpine conifer	squirrels, mice birds

PR=Permanent Resident
 SR=Summer Resident
 M=Migratory

APPENDIX B. OBSERVATION SHEET

DATE TIME OF DAY

SPECIES SEEN AGE SEX

WEATHER

COVER TYPE

LOCATION

BEHAVIOR

ADDITIONAL COMMENTS