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Status Report on Boreal Owl Surveys in Southwestern Montana, 1989.

by

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SUMMARY

Song-playback surveys conducted in forested habitats of southwestern Montana during the winter of 1989 yielded 29 owl responses. Nine boreal owl responses were heard, representing eight different owls, during seven of the thirty surveys. Boreal owls were heard in either Picea engelmannii, Abies lasiocarpa, Pseudotsuga menziesii, or Pinus contorta forest types between 6,000 and 7,800 ft elevation. Five and three owls were heard on the west and east sides of the Continental Divide respectively. Owl calling sites were between 12 and 120 ft from forest openings and within 300 ft of water. Suggestions are made for future research on boreal owls to comply with monitoring and management regulations defined in the National Forest Management Act of 1976.

Analysis of stand structure at primary calling sites indicated number of canopy levels ranging from one to four with canopy closure estimates from 40 to 80 percent. All stands contained from 2 to 10 snags per acre. Ages of dominant trees ranged from 80 to 200 years, with DBH values between 11 and 24 inches and heights from 54 to 90 feet.

INTRODUCTION

The boreal owl (Aegolius funereus) is a small, nocturnal owl found in coniferous forests of northern North America and Eurasia (AOU 1983, Clark et al. 1987). Although generally secretive, the male boreal owl is often vocal during the early breeding season (Feb.- May), and can be located using nocturnal surveys (Palmer 1987). Previous studies indicate that only potentially breeding males call (Hayward et al. 1987), implying that owl calling activity indicates the presence of breeding populations.

The status of the boreal owl in southwestern Montana is poorly known, though its presence has been established on a regional basis by confirmed nesting studies in Colorado (Palmer and Ryder 1984) and Idaho (Hayward and Garton 1983). In southwestern Montana during the winter of 1984 four singing males were heard in the Big Hole Valley during a coordinated survey effort (Hayward et al. 1987). Holt (1986) located boreal owls in west-central Montana along the Idaho border. No nests have been found to date.

Survey results in the Rocky Mountain Region indicate that boreal owls in Montana occur in mature spruce (Picea engelmannii)-fir (Abies spp.) forest types greater than 5,000 ft elevation, which at times may be associated with lodgepole pine (Pinus contorta)/wet meadow complexes (Holt and Hillis 1987).

The Region 1 of the United States Forest Service (U.S.F.S) lists the boreal owl as a Sensitive Species, and thus is required to monitor their status and population trends on forest lands under the National Forest Management Act (NFMA) of 1976 (16 U.S.C. 1600). Additionally, NFMA requires that suitable habitat be maintained to support viable boreal owl populations throughout their range on Forest Service Lands.

During the winter of 1989 a cooperative study of the boreal owl was initiated between the Beaverhead and Bitterroot National Forests and the Montana Natural Heritage Program.

Primary objectives of this study were to develop a better understanding of the distribution, habitat requirements, and population status of the boreal owl in southwestern Montana. This project is the first of four years, designed to gather sufficient baseline data on boreal owls. These data will subsequently be used in population monitoring, viability assessment, and forest planning. This report is a summary of the efforts during 1989 to document the occurrence of boreal owls in southwestern Montana on portions of the Beaverhead and Bitterroot National Forests.

STUDY AREA

The study area consists of portions of Beaverhead, Deerlodge, Silverbow, and Ravalli Counties along the Continental Divide (Fig. 1). Elevations in the area range from about 4,500 ft to 8,500 ft with a variety of forest cover types, aspects, and slopes. Lower elevation sites on the west slope of the Continental Divide in Ravalli County are dominated by ponderosa pine (Pinus ponderosa) and Douglas fir (Pseudotsuga menziesii). Subalpine fir (Abies lasiocarpa) and lodgepole pine occur at higher elevations along the Divide. Engelmann spruce is found in cool moist sites, primarily along creeks and draws in the subalpine zone throughout the area.

Douglas fir stands also occur along dry foothills in the eastern portion of the study area, east of the Continental Divide, while lodgepole/subalpine fir dominate the higher elevation sites. The remainder of the study area is primarily lodgepole/subalpine fir cover types with spruce/subalpine fir occurring in wet areas, draws, and around wet meadow complexes. Aspen (Populus tremuloides) and willow (Salix spp.) are present in isolated patches throughout the area as riparian or paloustrian species

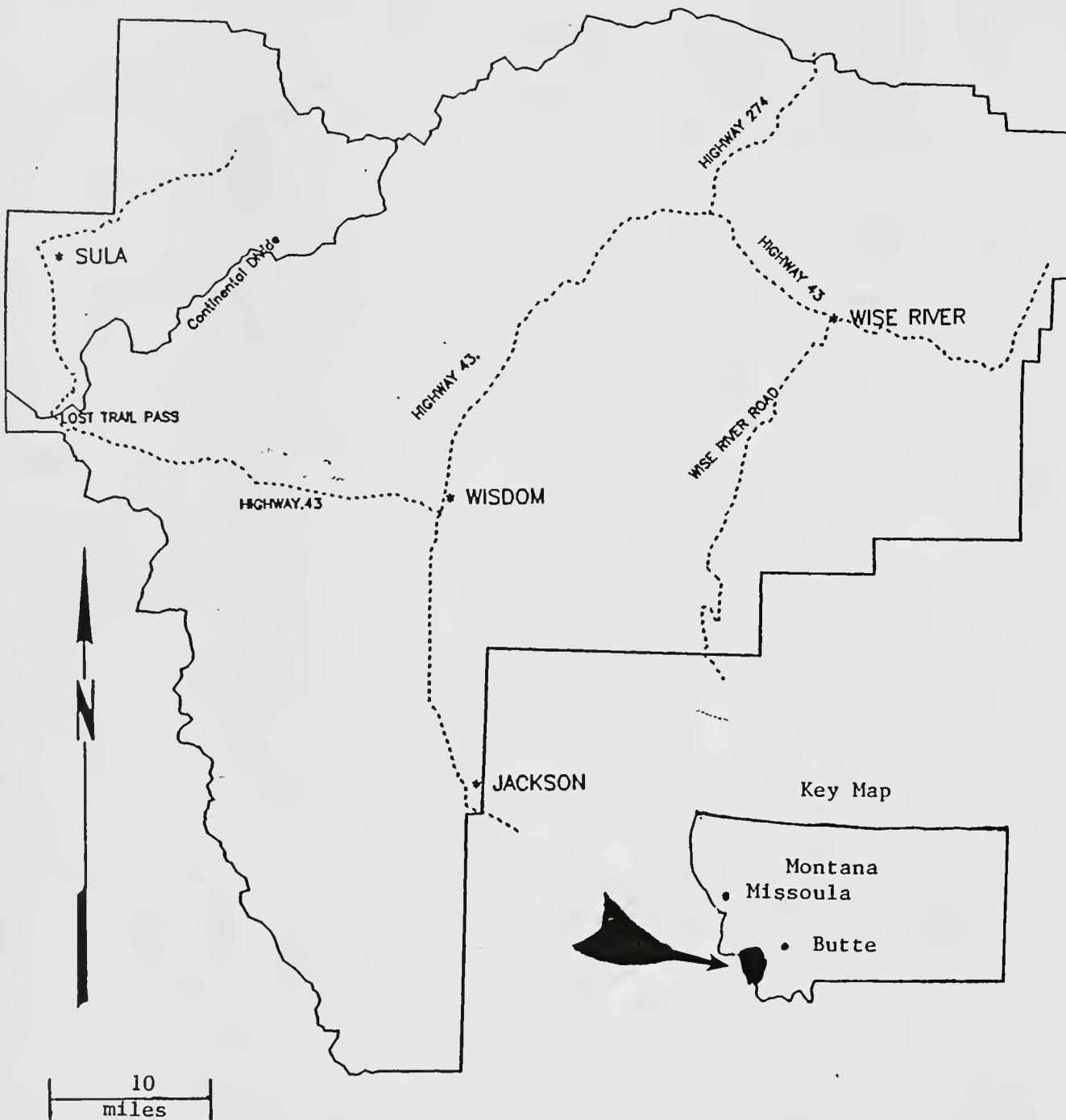


Figure 1. Map of the study area in Southwestern Montana.

METHODS

Owls were surveyed using the song playback technique (Fuller and Mosher 1981) from vehicle and snowmobile along survey routes from 24 February to 4 May, 1989. Survey routes were selected to include a variety of forest types and elevations. See Figure 2 for route delineations and Table 1 for a list of routes by District.

There were twenty-five survey routes which included areas of three Ranger Districts on two National Forests. Wise River and Wisdom Ranger Districts were included on the Beaverhead National Forest, and Sula Ranger District on the Bitterroot National Forest.

Surveys started one half hour after dusk and lasted approximately four to five hours or until 2300 or 2400 hours. Routes were selected to be eight to ten miles long with playback stations between one half and one mile apart depending on topographic and/or habitat variation. At each station I listened for calling owls for two to three minutes, played one species' call for two to three minutes, and listened again for two to three minutes. This was repeated three times per station. Boreal calls were played most often, but occasionally great gray (Strix nebulosa) or saw-whet owl (Aegolius acadicus) calls were played at alternating stations. Survey report forms were completed for each survey attempt, and owl observation forms filled out for routes where owls were heard. See Appendix I for sample report and observation forms. Approximate locations of owl responses were mapped on U.S.G.S. Topographic maps (7.5 min.). These sites were then visited for habitat analysis during the summer months of 1989.

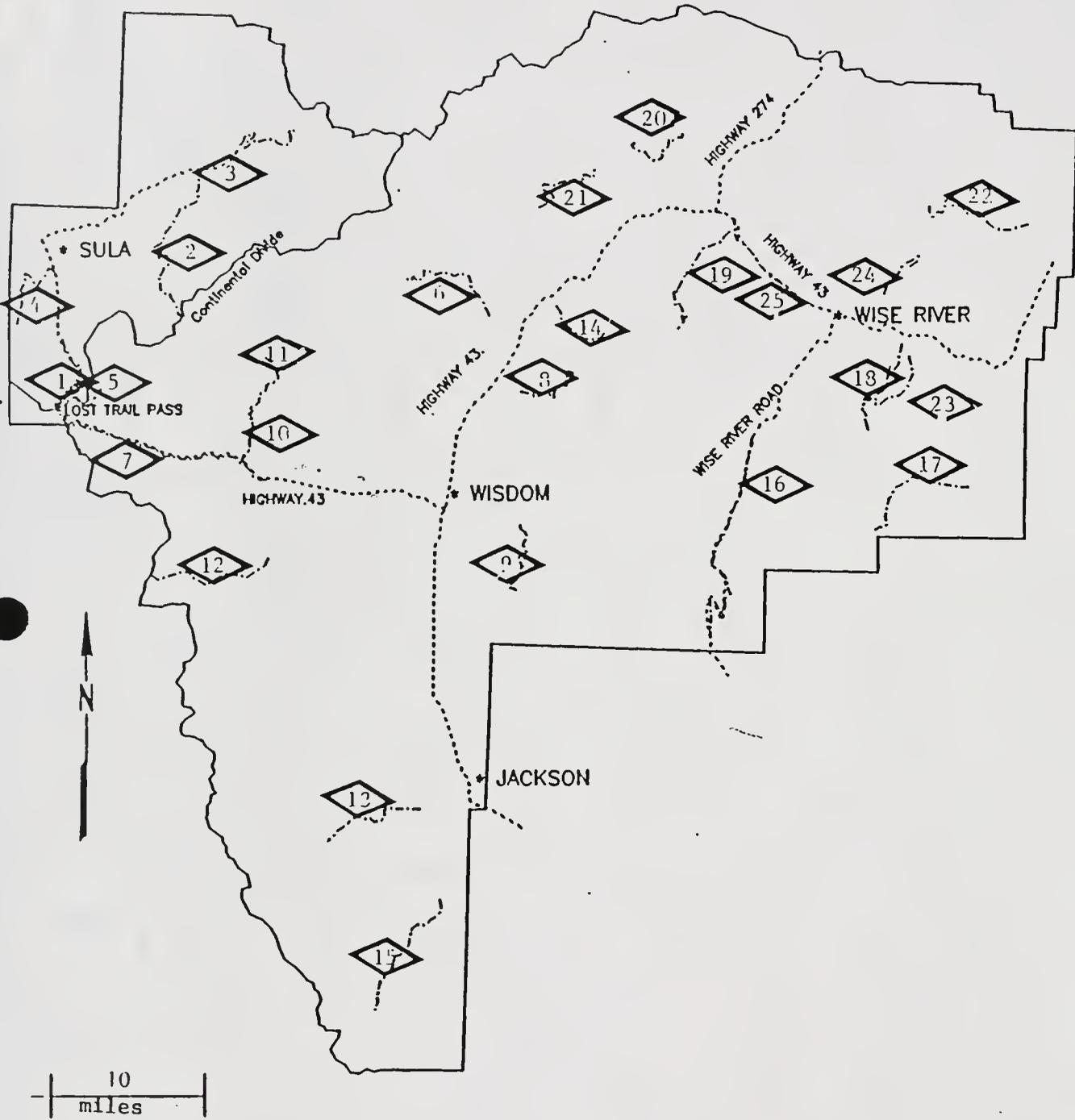


Figure 2. Owl survey routes within the study area, 1989-1993.

Table 1. Owl survey routes by Forest District and length, 1989.

| ROUTE NAME | DISTRICT | LENGTH(mi) | N | TOTAL SURVEYED(mi) |
|----------------|------------|------------|---|--------------------|
| Lost Trail | Sula | 8 | 2 | 16 |
| Meadow Cr. | Sula | 13 | 1 | 13 |
| Lick Cr. | Sula | 7 | 1 | 7 |
| Andrews Cr. | Sula | 7 | 1 | 7 |
| Gibbon Trail | Sula | 8 | 1 | 8 |
| Howell Cr. | Wisdom | 10 | 2 | 20 |
| Chief Joseph | Wisdom | 15 | 1 | 15 |
| Doolittle | Wisdom | 8 | 1 | 8 |
| Steel-Fox | Wisdom | 9 | 1 | 9 |
| Johnson Cr. | Wisdom | 10 | 1 | 10 |
| Upper Johnson | Wisdom | 6 | 1 | 6 |
| Big Hole Pass | Wisdom | 8 | 1 | 8 |
| Miner Lake | Wisdom | 8 | 1 | 8 |
| Squaw Cr. | Wisdom | 7 | 1 | 7 |
| Skinner Meadow | Wisdom | 6 | 1 | 6 |
| Wise River | Wise River | 15 | 2 | 30 |
| Trapper Cr. | Wise River | 9 | 3 | 27 |
| Triangle | Wise River | 11 | 1 | 11 |
| Bryant Cr. | Wise River | 10 | 1 | 10 |
| East LaMarche | Wise River | 8 | 1 | 8 |
| Fishtrap | Wise River | 8 | 1 | 8 |
| Divide Cr. | Wise River | 8 | 1 | 8 |
| Quartz Hill | Wise River | 8 | 1 | 8 |
| Jerry Cr. | Wise River | 6 | 1 | 6 |
| Highway 43 | Wise River | 8 | 1 | 8 |
| TOTAL | | | | 281 |

N = Number of trips

HABITAT ANALYSIS

Habitat analysis consisted of a site description of the area around each owl response site. Macro-habitat parameters recorded at each site were: elevation, aspect, slope percent, distance to nearest opening (clearcut, meadow, or park >1 acre), distance to water, distance to nearest disturbance source (e.g. road, highway, recreation area). Micro-habitat parameters recorded included forest type, number of canopy levels, percent canopy closure, number of snags per acre, basal area of dominant tree species, age, mean diameter at breast height (DBH), and mean height of dominant tree species.

In an attempt to compensate for possible owl location error, a second adjacent stand was chosen at each site in a direct line with the listening point from the primary location for identical analysis. Though this method did not increase the accuracy of the habitat analysis, it did serve to broaden the potential habitat types in which owls may have been calling. In subsequent survey years, attempts should be made to locate singing males to precise stands, thereby increasing the validity of the data.

Calculations of basal area, number of snags per acre, and percent canopy closure were based on estimates concurrent with standard U.S.F.S. stand examination procedures.

Median value and range for each habitat parameter were calculated for primary, secondary, and total stands analyzed.

RESULTS

Thirty surveys were conducted during the period, covering 272 miles. Approximately 51 miles were covered on the Sula District, 97 on the Wisdom District, and 124 on the Wise River District (Table 1).

Twenty-nine owl responses were heard of which nine were boreals. The remaining species and numbers heard were saw-whet (6), great gray (2), and great horned owls (Bubo virginianus) (12). The nine boreal responses were heard in seven different locations (Appendix II). Results suggest that of the nine boreals heard, eight were different owls (See owl observation forms in Appendix III).

Of the eight different boreal owls heard, five were located on three survey routes on the Sula District. Two were heard on the Meadow Creek route, two on the Lost Trail Pass route, and one on the Gibbon Trail route. Two were heard on the Wisdom District: one on the Skinner Meadows route and one on the Chief Joseph Pass route. The one boreal located on the Wise River District was heard on the Bryant Creek route. Seven of the nine total responses were elicited by song playback, while the remaining two owls were calling prior to any taped playback. Specific responses are described on owl observation forms found in Appendix III.

An estimate of boreal responses per mile of survey effort yields approximately one boreal owl response per 34 mi of survey. As an estimate of survey effort by forest district, the data yield approximately one response per 10 mi for the Sula District routes, one response per 48 mi for the Wisdom routes, and one response per 124 mi for the Wise River routes.

Habitat Characteristics

Boreal owl calling sites located during the survey occurred between 6,000 ft and 7,800 ft elevation. All sites were found to be in spruce/subalpine fir, lodgepole/subalpine fir, Douglas fir/lodgepole, or lodgepole/spruce forest types. Primary sites were within 120 ft of forest openings and within 320 ft

Table 2. Macro-habitat characteristics of Boreal Owl calling sites, 1989.

| SITE NAME | ELEVATION | ASPECT | SLOPE(%) | DISTANCE OPENING | DISTANCE WATER | DISTANCE DISTURBANCE |
|-------------------|---------------------|-----------------|--------------|---------------------|-------------------|-------------------------|
| Skinner 1 | 7000 | 210 | 10 | 160 | 950 | 950 |
| Meadows 2 | 7000 | 180 | 10 | 35 | 150 | 3100 |
| Meadow 1 | 6500 | 120 | 45 | 320 | 320 | 320 |
| Creek 2 | 6600 | 90 | 50 | 250 | 380 | 250 |
| Mink 1 | 6000 | 90 | 20 | 95 | 35 | 95 |
| Creek 2 | 6000 | 90 | 30 | 95 | 160 | 95 |
| Lost 1 | 6800 | 70 | 60 | 250 | 65 | 250 |
| Trail 2 | 6800 | 70 | 50 | 330 | 250 | 330 |
| Joseph 1 | 7100 | 200 | 20 | 35 | 95 | 480 |
| Creek 2 | 7100 | 90 | 20 | 65 | 125 | 330 |
| Bryant 1 | 7800 | 60 | 30 | 65 | 95 | 3200 |
| Creek 2 | 7800 | 10 | 30 | 125 | 160 | 3200 |
| Ski Hill 1 | 7100 | 95 | 0 | 95 | 65 | 160 |
| 2 | 7100 | 90 | 0 | 125 | 65 | 160 |
| Median (range) | 6800 (6000-7800) | 110 (10-210) | 30 (0-60) | 175 (35-330) | 500 (35-950) | 1700 (95-3200) |
| 1 | 6800 (6000-7800) | 135 (60-210) | 30 (0-60) | 175 (35-330) | 500 (35-950) | 1700 (95-3200) |
| 2 | 6800 (6000-7800) | 95 (10-180) | 25 (0-50) | 175 (35-330) | 220 (65-380) | 1700 (95-3200) |

Table 3. Micro-habitat characteristics of Boreal Owl calling sites, 1989.

| SITE NAME | | FOREST TYPE | CANOPY LEVELS | %CANOPY CLOSURE | SNAGS/AC | BASAL AREA/AC | AGE | DBH (IN.) | HEIGHT (FT.) |
|-----------------|---|-------------|---------------|-----------------|----------|---------------|--------------|--------------|--------------|
| Skinner Meadows | 1 | LP/SAF | 1 | 40 | 2 | 140 | 80 | 11 | 54 |
| | 2 | LP/SP | 3 | 60 | 4 | 160 | 150 | 22 | 65 |
| Meadow Creek | 1 | LP/DF | 2 | 40 | 5 | 30 | 200 | 24 | 85 |
| | 2 | LP/SAF | 1 | 50 | 2 | 111 | 70 | 8 | 55 |
| Mink Creek | 1 | SAF/SP | 4 | 80 | 4 | 150 | 110 | 18 | 80 |
| | 2 | SAF/DF | 2 | 60 | 2 | 44 | 90 | 12 | 70 |
| Lost Trail | 1 | DF/SP | 4 | 70 | 5 | 85 | 200 | 20 | 90 |
| | 2 | DF/SAF/LP | 2 | 60 | 2 | 125 | 130 | 12 | 70 |
| Joseph Creek | 1 | LP/SAF/SP | 3 | 70 | 3 | 125 | 110 | 12 | 60 |
| | 2 | LP/SAF | 2 | 50 | 2 | 44 | 120 | 12 | 60 |
| Bryant Creek | 1 | SP/SAF | 3 | 70 | 5 | 33 | 140 | 12 | 75 |
| | 2 | LP/SAF | 2 | 50 | 2 | 40 | 110 | 8 | 55 |
| Ski Hill | 1 | SP/SAF | 2 | 40 | 10 | 80 | 200 | 20 | 60 |
| | 2 | LP/SAF/SP | 2 | 50 | 4 | 125 | 150 | 12 | 60 |
| Median (range) | | | 2.5 (1-4) | 60 (40-80) | 6 (2-10) | 95 (30-160) | 135 (70-200) | 16 (8-24) | 72 (54-90) |
| Primary | 1 | | 2.5 (1-4) | 60 (40-80) | 6 (2-10) | 90 (30-150) | 140 (80-200) | 17.5 (11-24) | 72 (54-90) |
| Secondary | 2 | | 2 (1-3) | 55 (50-60) | 3 (2-4) | 100 (40-160) | 110 (70-150) | 15 (8-22) | 62.5 (55-70) |

LP-Lodgepole pine.
 SAF-Subalpine fir.
 DF-Douglas fir.
 SP-Engleman spruce.

Table 4. Types of forest openings nearest Boreal Owl calling sites, 1989.

| SITE NAME | | TYPE OF OPENING |
|-----------------|---|---------------------|
| Skinner Meadows | 1 | Dry Park |
| | 2 | Mesic Meadow |
| Meadow Creek | 1 | Clearcut/road |
| | 2 | Clearcut/road |
| Mink Creek | 1 | Road |
| | 2 | Road |
| Lost Trail | 1 | Road |
| | 2 | Road |
| Joseph Creek | 1 | Mesic Meadow |
| | 2 | Mesic Meadow |
| Bryant Creek | 1 | Clearcut |
| | 2 | Clearcut |
| Ski Hill | 1 | Wet Meadow/Ski Hill |
| | 2 | Wet Meadow/Ski Hill |

of water or wet meadow areas. Slopes ranged from zero to 60 percent for primary sites with aspects from 60 to 210 degrees. Distances from potential human disturbance ranged from 100 ft to just under 1 mile (Tables 2,3). Types of forest openings nearest calling sites included clearcuts, parks, meadows, and roads (Table 4).

Analysis of stand structure at primary sites indicated number of canopy levels ranging from one to four with canopy closure estimates from 40 to 80 percent. All stands contained from 2 to 10 snags(> 8") per acre. Ages of dominant trees ranged from 80 to 200 years, with DBH values between 11 and 24 inches and heights from 54 to 90 feet (Table 3).

DISCUSSION

The presence of boreal owls in the study area during the breeding season is an indication that, though no nests were found, boreals are present in southwestern Montana as potential nesters, and can be monitored as such in the future. Data from this survey should be considered as evidence of boreal activity, and not as a basis for owl density calculations or population levels within the study area.

Boreal owls were heard in primarily high elevation (6,000-7,800 ft) spruce/subalpine fir, subalpine fir/lodgepole, and Douglas fir/subalpine fir forest types. This is consistent with findings in the Bitterroot Divide (Holt and Hillis 1987) and central Idaho (Hayward et al. 1984). Though surveys covered additional forest types, including ponderosa pine and Douglas fir/juniper (Juniperus spp.) at lower elevations, no responses were heard in these forest types.

Forest openings nearest boreal calling sites were man-made at five of the seven sites (Table 4). G. Hayward (Pers. commun.) suggested that man-made

openings (i.e. clearcuts) may in some cases be "beneficial" to boreals because they create edge habitat which the owls use for hunting. It should be noted however, that man-made openings are often accompanied by the potential for human disturbance such as road traffic or firewood cutting, which may not benefit the owls. The potential also exists for the invasion/colonization of these openings by competing owl species such as Great horned, saw-whet, or barred owls (Strix varia). Such invasions may have a negative effect on boreal owl management goals. Additional research is needed to clarify the relationship between owl habitat use and forest management.

Regional variation of both calling activity of male boreals and breeding success of nesting pairs has been noted (Hayward et al. 1986). These variations are apparently a direct result of fluctuations of prey populations and/or availability. These findings are particularly significant in their application to the design and duration of owl surveys and monitoring.

Short term (one-two years) preliminary surveys cannot take into account yearly fluctuations in calling activity, which could influence management activities in the area with potentially drastic results. Additionally, as this study shows, an apparent regional difference in owl densities exists between the east and west sides of the Continental Divide. If management were directed solely by this one year study, without taking into account the possibility of regional variation in calling rates, very little management for boreal owls would take place on the eastern Districts due to few or no owls found there. Additional survey years may result in very different results, and should serve to assemble the necessary data describing boreal owl distribution and abundance over the study area.

As a suggestion for further research, boreal owl surveys should be continued in southwestern Montana with initial emphasis on nest location

attempts. In addition to new survey routes, repeat surveys should be made in spruce/fir forest types using routes covered by this study. Nest location and nest site analysis are important so that management guidelines for these areas can incorporate boreal habitat requirements for NFMA compliance.

Site specific data on seasonal and yearly boreal habitat requirements are needed on a long term basis to ensure a viable boreal population on forest lands in the region.

LITERATURE CITED

- American Ornithologists Union. 1983. The checklist of North American Birds, 6th Edition. 877 pp.
- Clark, R.J., D.G. Smith, and L. Kelso. 1987. Distributional status and literature of northern forest owls. pages 47-55. In : R.W. Nero, R.J. Clark, R.J. Knapton, and R.H. Hamre, eds. Biology and conservation of northern forest owls: symposium proceedings. Gen. Tech. Rep. RM-142. Fort Collins, CO. U.S. Dept. Agric., Forest Service, Rocky Mountain Forest and Range Exp. Stat., 309p.
- Fuller, M.R. and J.A. Mosher. 1981. Methods for detecting and counting raptors: a review, p. 235-246. In C.J. Ralph and Jim Scott (eds). Estimating the number of terrestrial birds. Stud. Avian Biol. 6.
- Hayward, G.D. and E.O. Garton. 1983. First nesting record for the boreal owl in Idaho. The Condor 85:501.
- Hayward, G.D., E.O. Garton, and P.H. Hayward. 1984. Habitat requirements of the boreal owl in central Idaho. A progress report to the North American Bluebird Society, 15 p.
- Hayward, G.D., P.H. Hayward, and E.O. Garton. 1986. Habitat requirements and distribution of the boreal owl in central Idaho. Annual progress report, Dept. of Fish and Wildlife Resources, College of Forestry, Wildlife and Range Sciences, University of Idaho, Moscow, Idaho, 16p.
- Hayward, G.D., P.H. Hayward, E.O. Garton, and R. Escano. 1987. Revised breeding distribution of the boreal owl in the northern Rocky Mountains. The Condor 89:431-432.
- Holt, D.W. 1986. 1986 boreal owl survey results on the Lolo National Forest, Missoula, Montana. U.S. Forest Service Intermountain Range and Exp. Sta. Rep., Missoula, Montana, 4p.
- Holt, D.W. and J.M. Hillis. 1987. Current status and habitat associations of forest owls in Montana. pages 281-288. In : R.W. Nero, R.J. Clark, R.J. Knapton, and R.H. Hamre, eds. Biology and conservation of northern forest owls: symposium proceedings. Gen. Tech. Rep. RM-142. Fort Collins, CO. U.S. Dept. Agric., Forest Service, Rocky Mountain Forest and Range Exp. Stat., 309 p.
- Palmer, D.A. 1987. Annual, seasonal, and nightly variation in calling activity of boreal and northern saw-whet owls. pages 162-168. In : R.W. Nero, R.J. Clark, R.J. Knapton, and R.H. Hamre, eds. Biology and conservation of northern forest owls: symposium proceedings. Gen. Tech. Rep. RM-142. Fort Collins, CO. U.S. Dept. Agric., Forest Service, Rocky Mountain Forest and Range Exp. Stat., 309 p.
- Palmer, D.A. and R.A. Ryder. 1984. The first documented breeding of the boreal owl in Colorado. The Condor 86:215-217.

ACKNOWLEDGEMENTS

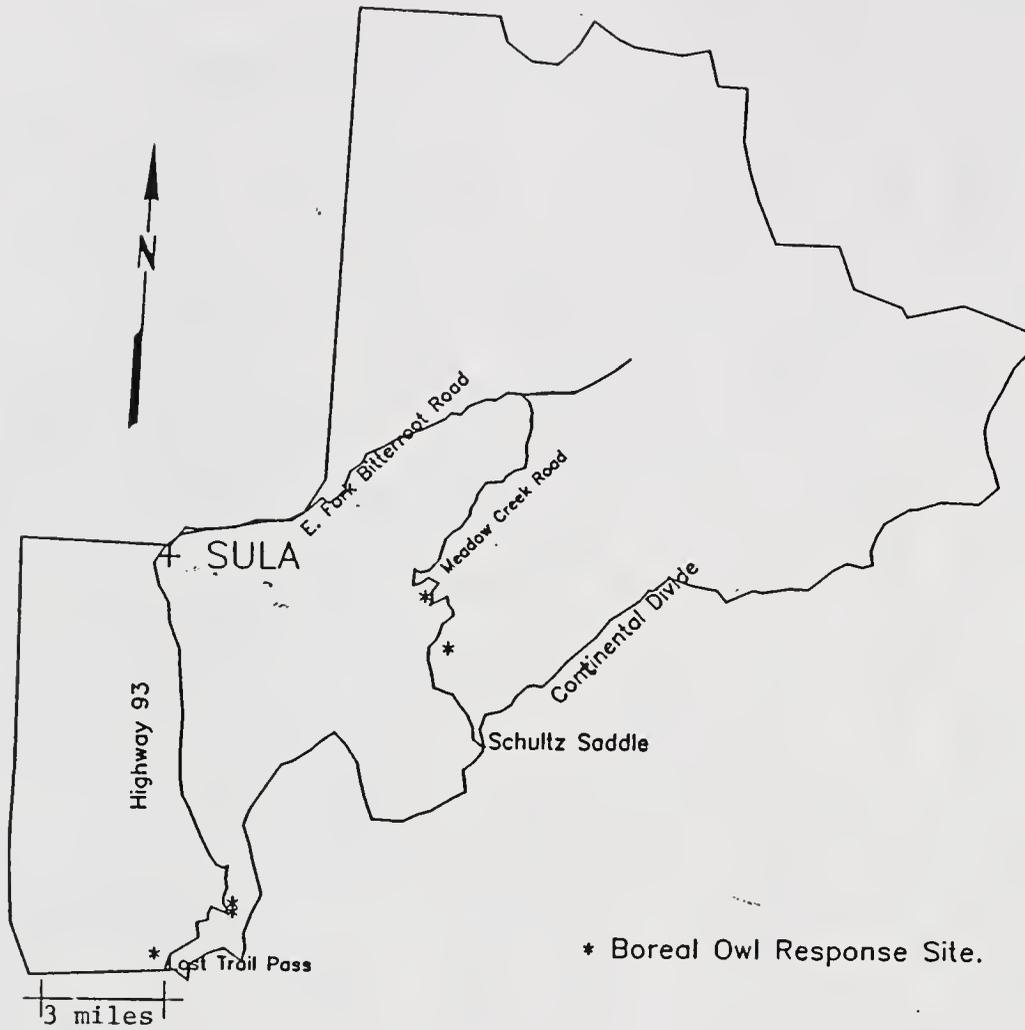
Many people assisted me at various times during the course of this project. John Promozic accompanied me as a volunteer during most of the night surveys. L. Mullen, J. and G. Easley, P. Olsen, J. Jones, D. McKnight, D. Genter, and T. Holland each assisted with one or more night surveys and helped push and/or pull non-cooperative snowmobiles as needed. L. Mullen helped during the habitat analysis at owl calling sites. D. Genter, J. Jones, and L. Mullen edited various drafts of the report. The Wise River, Wisdom, and Sula Ranger Districts of the U.S. Forest Service made available vehicles and snowmobiles with which to conduct the surveys. The personnel of the Wise River Ranger District, especially D. Smith and G. Kostelecky, made their time and computer available for the writing of the final report.

APPENDIX I

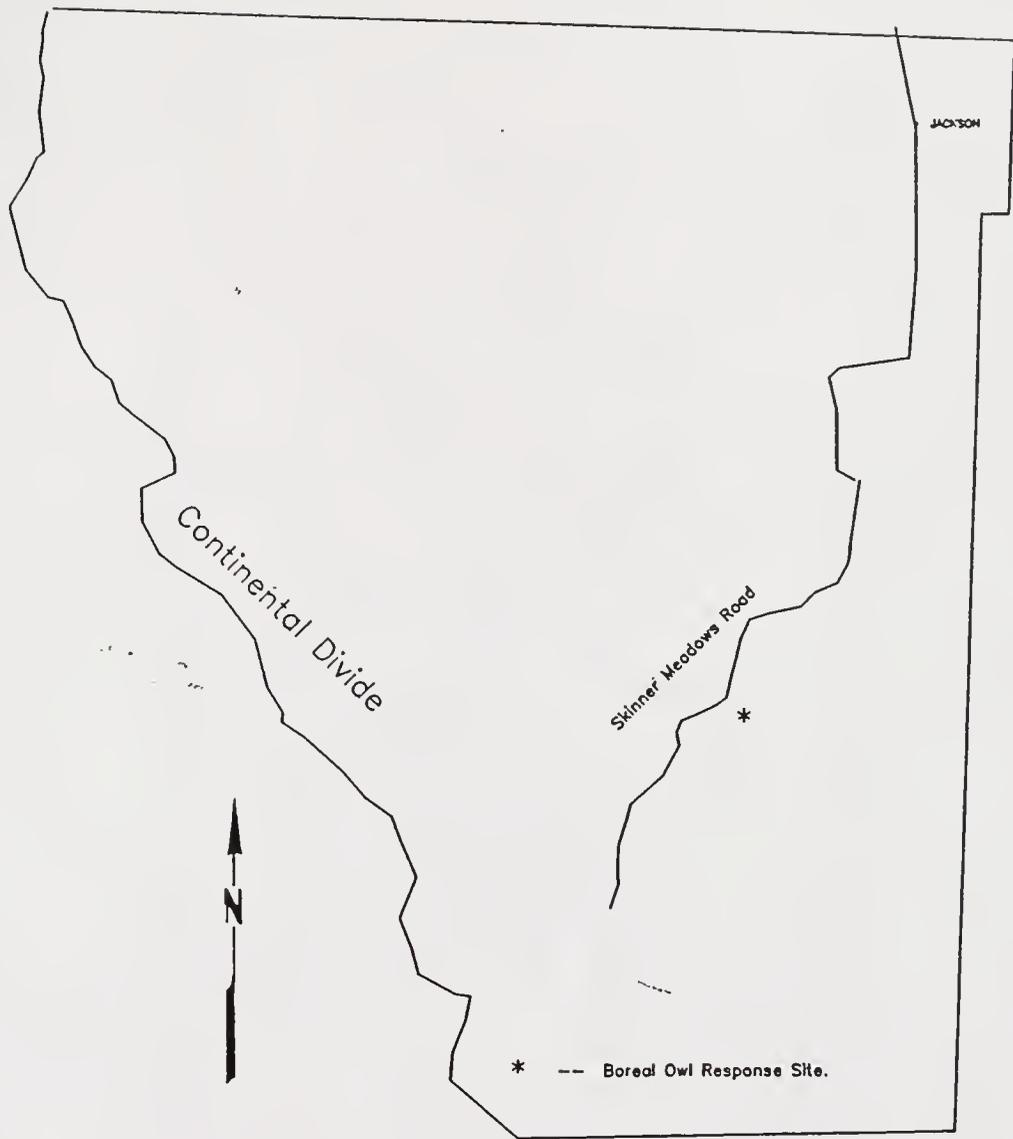
Sample Survey Report and Owl Observation data forms.

APPENDIX II

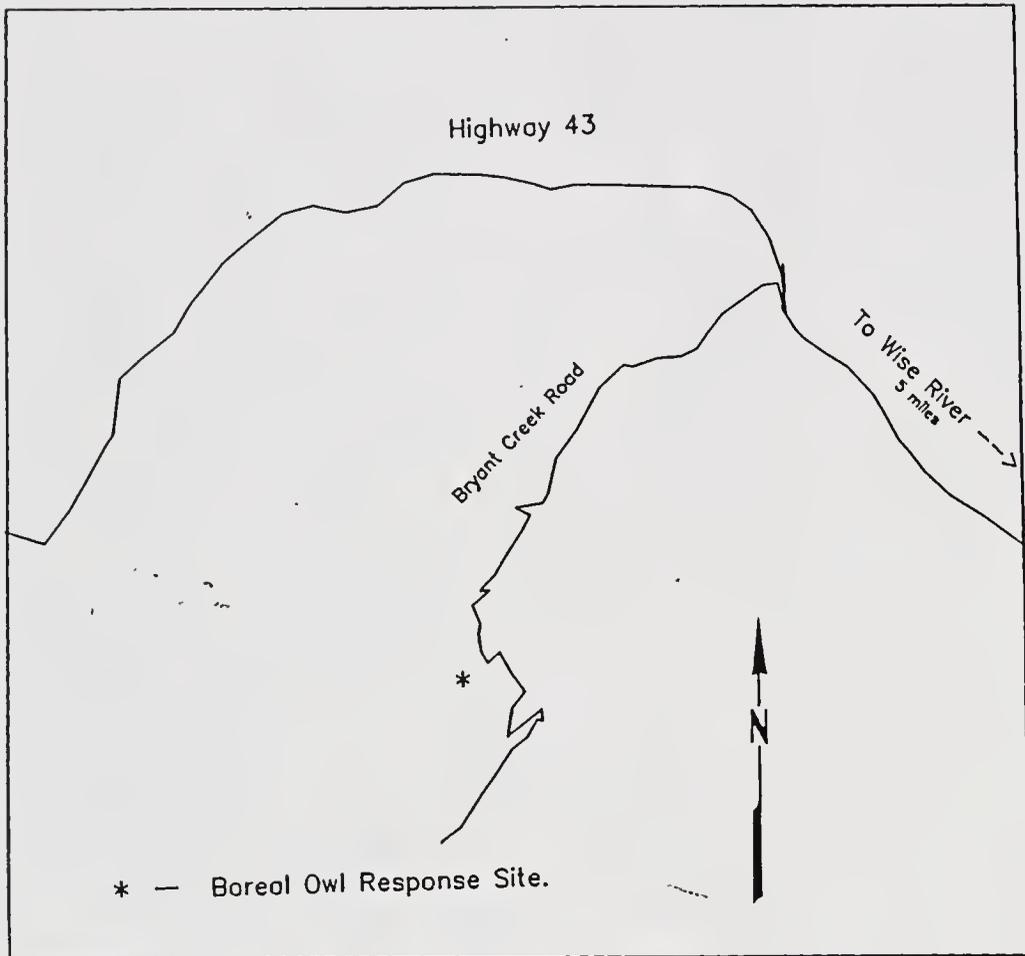
Boreal Owl Response Site maps.



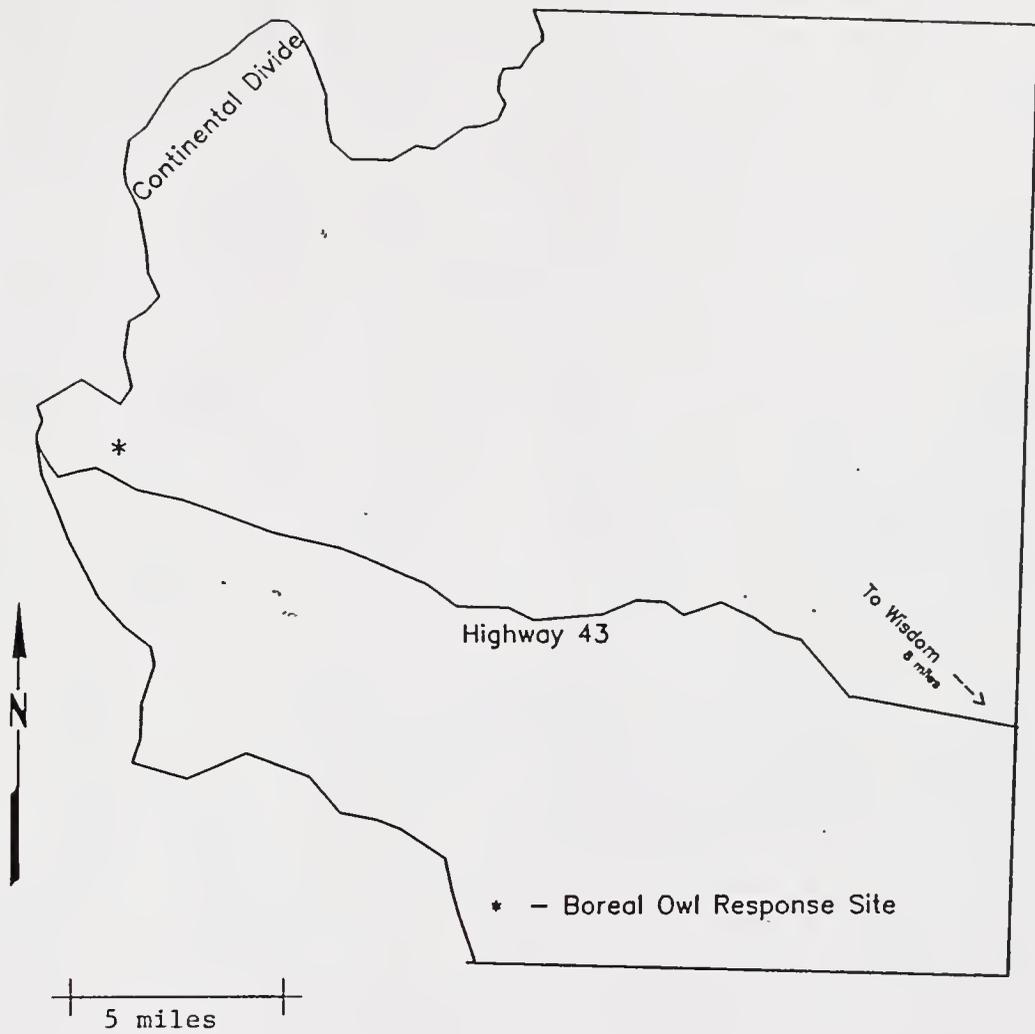
Site map for Lost Trail Pass, Meadow Creek, and Gibbons Pass survey routes.



Site map for Skinner Meadows survey route.



Site map for Bryant Creek survey route.



Site map for Chief Joseph Pass survey Route.

APPENDIX III

Completed Survey Report and Owl Observation Forms.

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