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RESULTS OF BOREAL OWL (*Aegolius funereus*) SURVEYS ON THE JEFFERSON DIVISION OF THE LEWIS & CLARK NATIONAL FOREST

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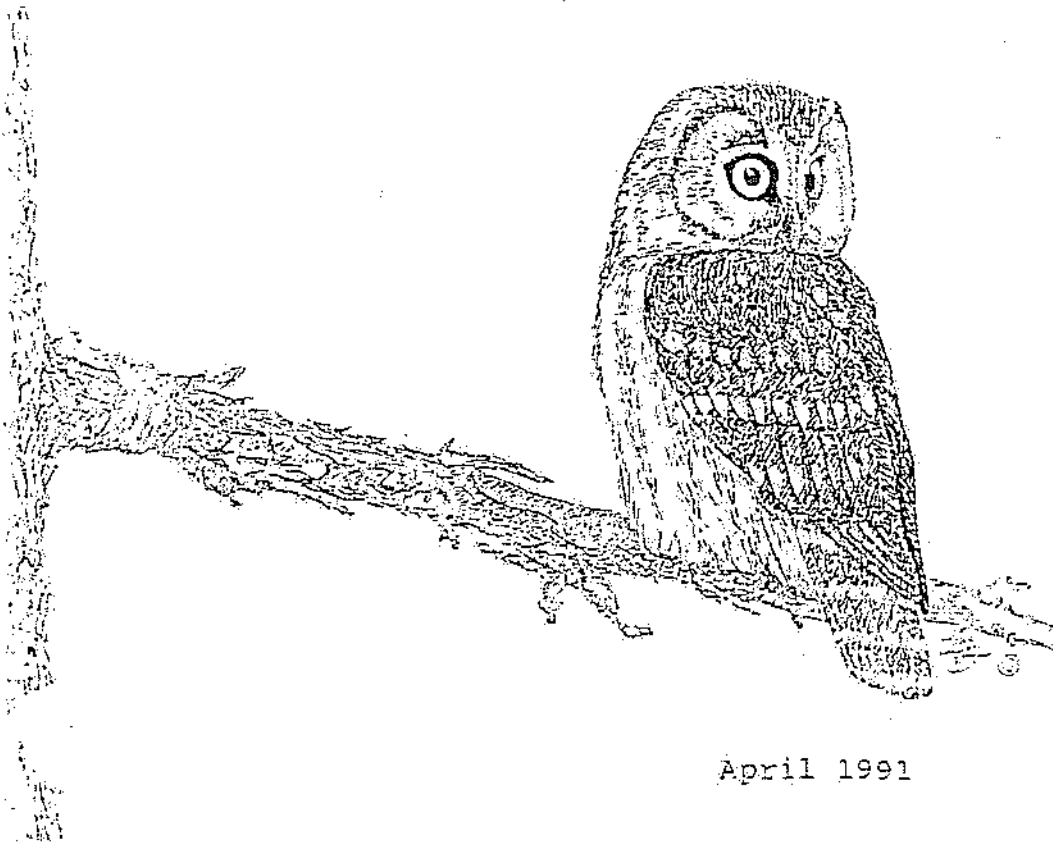
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SUMMARY

A survey for boreal owls was conducted on the Lewis and Clark National Forest in the Little Belt Mountains of central Montana during February and March of 1991. The call playback method was used to survey for owls on 19 nights. A total of 13 survey routes were established, encompassing 87 calling points and 70.2 miles. Some routes were surveyed more than once for a total of 88.5 miles. All owl observations were recorded and mapped. Habitat classifications were obtained from timber typing maps for all boreal owl locations. Boreal owls were heard at 8 calling points, represented 6 individuals. All but one were located in lodgepole pine (Pinus contorta) timber types. The other was in a whitebark pine (Pinus albicaulis) timber type. All were located between 6400 ft. and 8088 ft. in elevation. Other owl species located, in order of abundance, were northern saw-whet (Aegolius acadicus), great horned (Bubo virginianus), barred (Strix varia), great gray (Strix nebulosa), and a western screech owl (Otus kennicottii). Surveys are recommended for at least 3 more years in the Little Belt Mountains to accurately determine the population characteristics and habitat used by boreal owls.

INTRODUCTION

The boreal owl (Aegolius funereus) is a highly nocturnal owl which inhabits northern hemisphere coniferous forests around the world. They are generally 21.5 to 30.5 cm long (Farrand 1983) and weigh 100-140 gm (Earhart and Johnson 1970). Boreal owls are small, brown owls with many white spots on their crown, nape, and back. Yellow eyes and a yellowish bill are framed by distinctive black facial frames which are spotted with many small white spots. Their white underparts are streaked with chocolate brown. Juveniles are dark chocolate brown with white spots across the back and white eyebrows and cheek spots.

Boreal owls are secondary cavity nesters, usually occupying cavities constructed by the northern flicker (Colaptes auratus) or pileated woodpecker (Dryocopus pileatus). Boreal owls will also use artificial nesting boxes (D. Genter per. comm.). Boreal owls are territorial and a nesting pair will actively defend the area around the nest site (D. Genter per. comm.). After the courtship in March and April, 4 to 6 pure white eggs are laid. The eggs are incubated for 27-28 days by the female and the young fledge 28-33 days after hatching (Terres 1980). Boreal owls prey mainly on small mammals, primarily redback voles (Clethrionomys gapperi) but also pocket gophers (Thomomys talpoides), shrews (Sorex spp.), and deer mice (Peromyscus maniculatus). Some insects and birds are also eaten (Hayward et al. 1987).

The owls are generally secretive throughout the year, residing

the call playback technique (Fuller and Mosher 1981) from vehicles, snowmobiles, and skis along selected survey routes between February 21 and March 27, 1991. Survey routes were primarily at elevations higher than 5000 ft. and in areas with large patches of old growth forests (Figure 3). Routes were selected and prioritized based upon conversations with Forest Service Biologist Don Sasse.

Surveys were started one half hour after sunset and lasted approximately 4 to 5 hrs, weather permitting. Playback stations were one half to 1 mile apart along the survey route. The spacing varied widely on some routes due to the topographic and/or habitat variation. Some survey routes were completed in their entirety on a single night, others were completed in segments surveyed on different nights. Therefore some segments of survey routes overlapped and were surveyed more than once, other portions only once. Time and estimated wind speed and direction were recorded at each calling station. Temperature was recorded at the first and last calling station each night. Elevation of each calling station was determined from topographic maps. At each station we listened for calling owls for 2 to 3 minutes, played 1 species call in all 4 directions for 2 to 3 minutes, listened for 2 to 3 minutes, and then repeated the procedure. Boreal owl calls were played most often, but occasionally great gray (Strix nebulosa) or northern saw-whet (Aegolius acadicus) calls were also used depending on habitat and calling responses. Survey report forms were completed for each survey conducted and owl observation forms were completed for each owl heard (Appendix 1). All calling points and owl

locations were recorded on 7.5 minute U.S.G.S. topographic maps along with the date and time for each calling point and observation (Appendix 2). Calling points were numbered with the route number followed by the calling point number. Owl locations were described according to the timber type of the stand the owl was located in. These types are named for the major volume species in the stand, regardless of tree size, and other species of trees may be present.

RESULTS

Surveys were conducted on 19 nights during the survey period. Weather, especially wind, caused some of the 19 surveys to be cut short and resulted in total survey cancellation on other nights. A total of 15 survey routes were established which totaled 70.2 miles and encompassed 87 calling points. The total number of miles surveyed was 82.6 miles (Table 1). The elevation of calling points ranged from 4720 ft. to 8088 ft. Temperatures during the surveys ranged from 14 to 36 degrees Fahrenheit.

Boreal owls were detected at 8 calling points with a minimum of 6 birds detected. Northern saw-whet owls were the most common owl detected, being heard at 12 stations with a minimum of 14 birds detected. Seven great horned owls (Bubo virginianus) were detected at 5 stations. Two barred owls (Strix varia) were repeatedly located in one area from 3 calling stations and a great gray owl and western screech owl (Otus kennicottii) were located at one calling point each. One unknown owl call was heard at one calling station (Table 2).

boreal owls in lodgepole pine habitat types with scattered meadows or grass/sage openings. This discrepancy with the prevalent habitat type reported may be due to the limited amount of spruce/fir stands available at higher elevations in the Little Belt Mountains, or may be a factor of the habitat classification methods used in this survey.

Boreal owls in the Little Belts may have problems with warm summer temperatures since boreal owls are easily heat stressed (Hayward et al. 1987). Therefore, dense stands of timber which would provide cool moist sites for roosting may be important to boreal owls in the Little Belts. Also the high level of wood cutting on the district (Sasse pers. comm.) may limit the availability of suitable nesting snags for boreal owls. Hayward (pers. comm. in Mullen 1990) suggested that clearcuts may provide edge habitat used by owls for hunting. However, Mullen (1990) warned that man-made openings also are often accompanied by the potential for increased human disturbance and the invasion of competing owl species, especially great horned owls.

Boreal owls have extremely variable calling activity (Hayward et al. 1986, Palmer 1987). Variations in prey populations directly influence calling activity by reducing breeding activity during periods of low prey populations (Hayward 1987). Bondrup and Nielsen (1978) found that pair formation will also cause the male to stop calling. Hayward (1983) noted that one male did not respond to surveys during the normal courtship period because he was already paired. Palmer (1987) found courtship periods ranging from 4 to 59

days with the longest courtship periods found for unpaired males. The variability in boreal owl calling activity shows that we can not effectively determine population dynamics of the boreal owl in the Little Belts from 1 survey season.

CONCLUSIONS AND RECOMMENDATIONS

This survey confirms that boreal owls are present in the Little Belt Mountains and expands the known range of the boreal owl into the isolated mountain ranges of central Montana. Hayward (1987) noted that the potential vulnerability of local populations to extinction depends upon the degree of interchange among demes. Determining and providing for the required degree of interchange may be especially important to populations in isolated mountain ranges such as the Little Belts. Boreal owls may also be present in the other isolated mountain ranges of central Montana such as the Crazy, Castle, Snowy and Judith Mountains. Surveys in the proper habitats in these mountain ranges would be beneficial to determine the eastern extent of boreal owls in Montana and the geographical relationship of boreal owl populations to one another.

Further investigations into the exact vegetative composition of the stands owls were located in would be beneficial. Since boreal owls generally use only conifer snags over 21" diameter at breast height in forested stands as nesting cavities (Hayward 1990), an upper size limit for conifers cut for firewood in high elevation areas may be considered. Small mammal surveys should also be conducted to determine the small mammal species occupying the

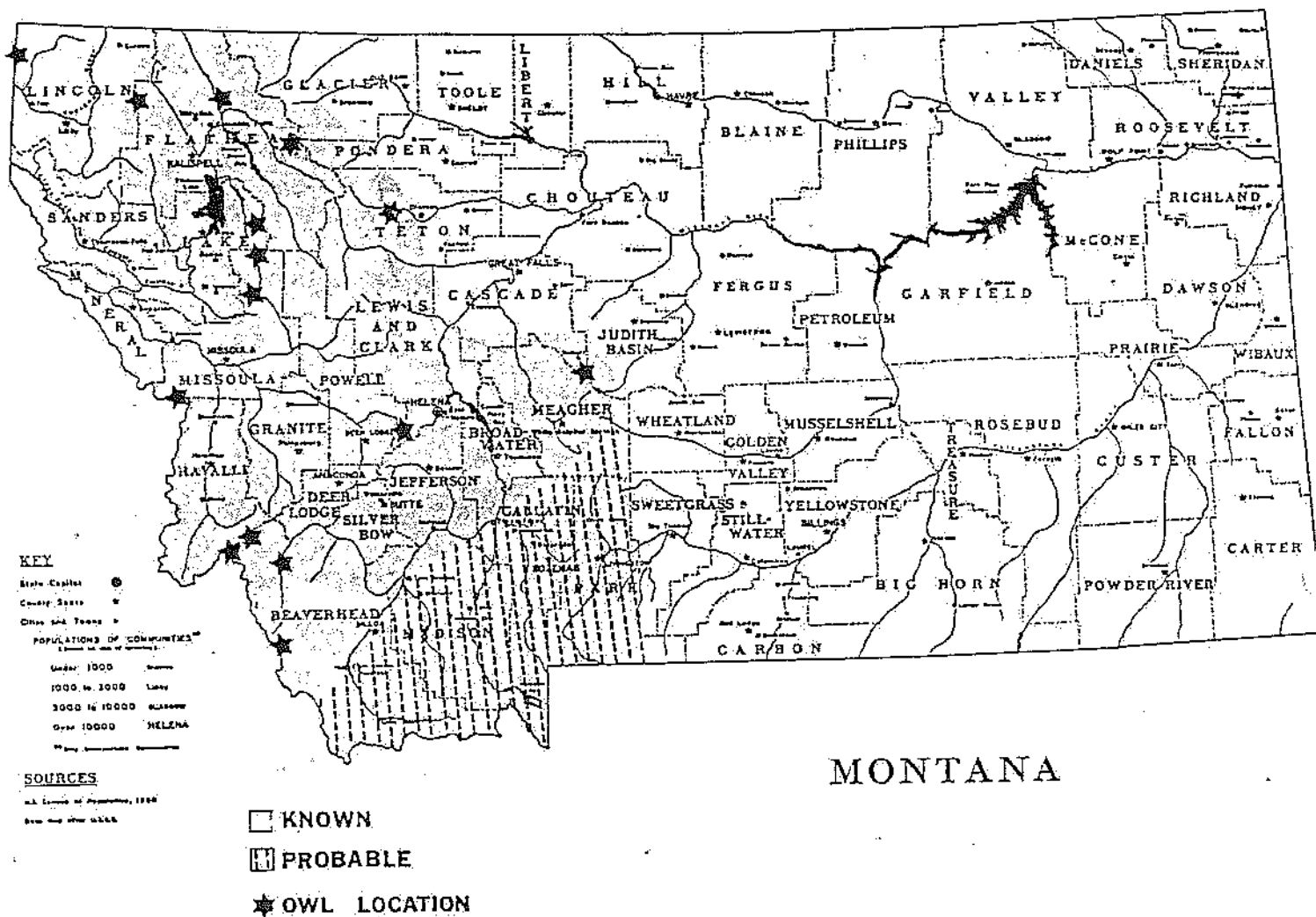


Figure 1. Distribution of the boreal owl in Montana.

species	calling point	date	elevation	time	aspect	number	moon
Boreal	5-009	2/24/91	6700	2045	NW	1	FQ
Boreal	8-026	2/26/91	8080	1900	S	1	FM
Boreal	10-034	3/8/91	6400	2225	N	1	LQ
Boreal	8-037	3/11/91	7400	2300	SW	1	LQ
Boreal	13-053	3/13/91	7840	2333	S	1	NM
Boreal	13-054	3/13/91	7840	7	S	1	NM
Boreal	3-065	3/15/91	6680	2237	W	1	NM
Boreal	3-066	3/15/91	6640	2204	W	1	NM
Northern Saw-Whet	10-031	2/21/91	5400	2055	NE	1	FQ
Northern Saw-Whet	10-031	2/21/91	5400	2135	NE	1	FQ
Northern Saw-Whet	10-034	3/2/91	5960	1900	N,S	3	FM
Northern Saw-Whet	2-072	3/4/91	5960	1914	N	2	FM
Northern Saw-Whet	2-070	3/8/91	6320	2225	N	1	LQ
Northern Saw-Whet	2-069	3/8/91	6160	2129	NW	1	LQ
Northern Saw-Whet	2-068	3/8/91	6920	2049	W	1	LQ
Northern Saw-Whet	2-075	3/19/91	5600	2133	S	1	NM
Northern Saw-Whet	2-076	3/19/91	5240	2207	S	1	NM
Northern Saw-Whet	1-002	3/19/91	5240	2240	SW	1	FQ
Northern Saw-Whet	1-003	3/19/91	5160	2252	SW	1	NM
Northern Saw-Whet	12-060	3/20/91	5000	2130	NE	1	FQ
Northern Saw-Whet	12-061	3/20/91	4840	2145	NE	1	FQ
Great Horned	1-001	2/21/91	5100	2025	S	2	FQ
Great Horned	2-075	3/14/91	6200	45	S	1	NM
Great Horned	3-067	3/14/91	6200	2303	SE	1	NM
Great Horned	12-056	3/15/91	6500	2131	NW	1	NM
Great Horned	12-052	3/20/91	4960	2130	-	2	FQ
Barred	10-031	3/2/91	6500	1900	N	1	FM
Barred	10-031	3/2/91	5920	1900	-	1	FM
Barred	10-031	3/4/91	6100	1918	NW	1	FM
Barred	7-060	3/8/91	6500	2129	NE	1	LQ
Barred	7-060	3/8/91	6200	2129	W	1	LQ
Great Gray	12-069	3/19/91	5300	2240	N	1	FQ
Great Gray	12-069	3/20/91	5300	2040	N	1	FQ
Western Screech	3-073	3/19/91	5480	2100	-	1	NM
Unknown	10-032	3/2/91	6080	2035	-	1	FM

Table 2. Owl observations, 1991.

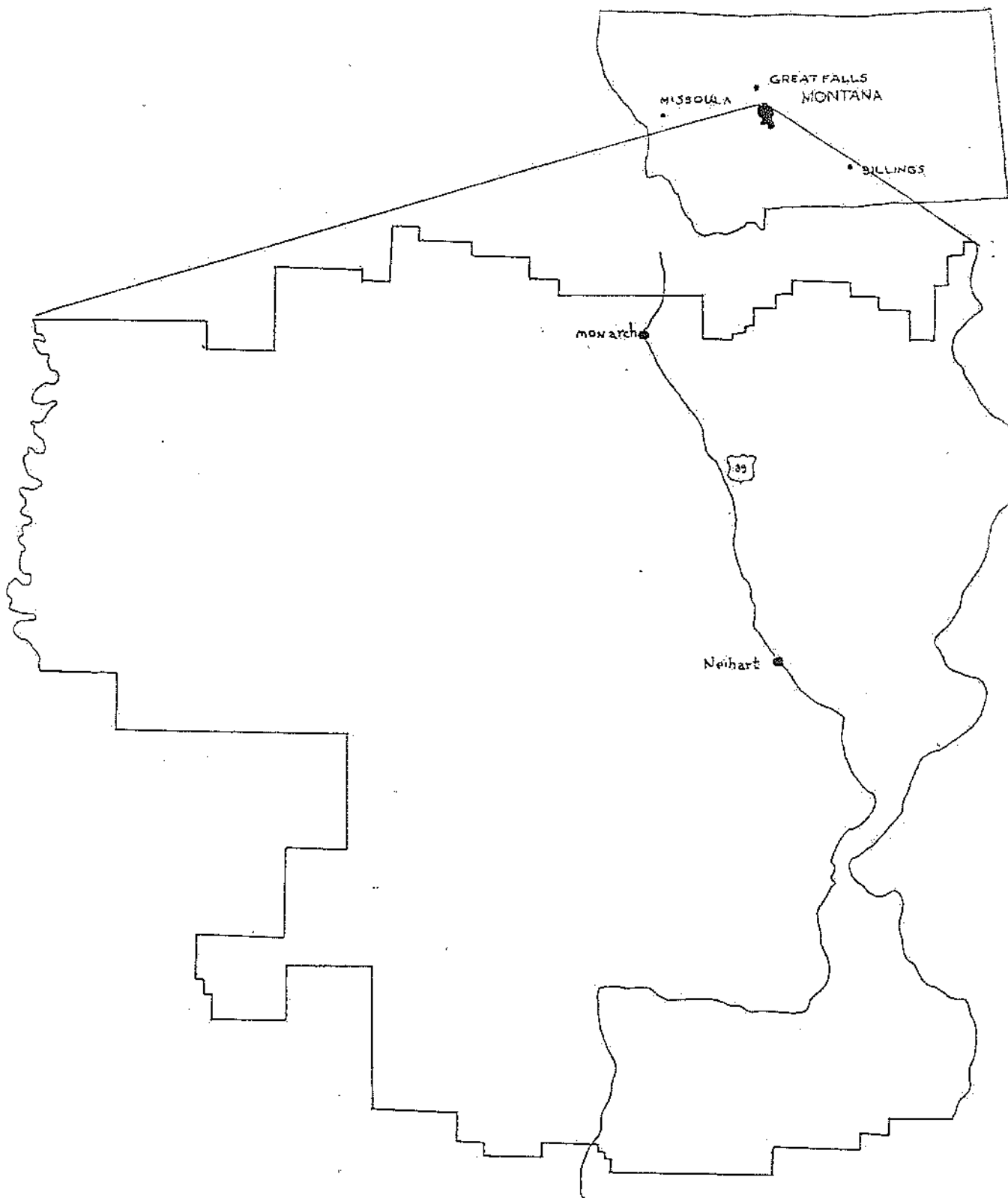


Figure 2. Map of survey area, Kings Hill Ranger District,
Lewis and Clark National Forest.

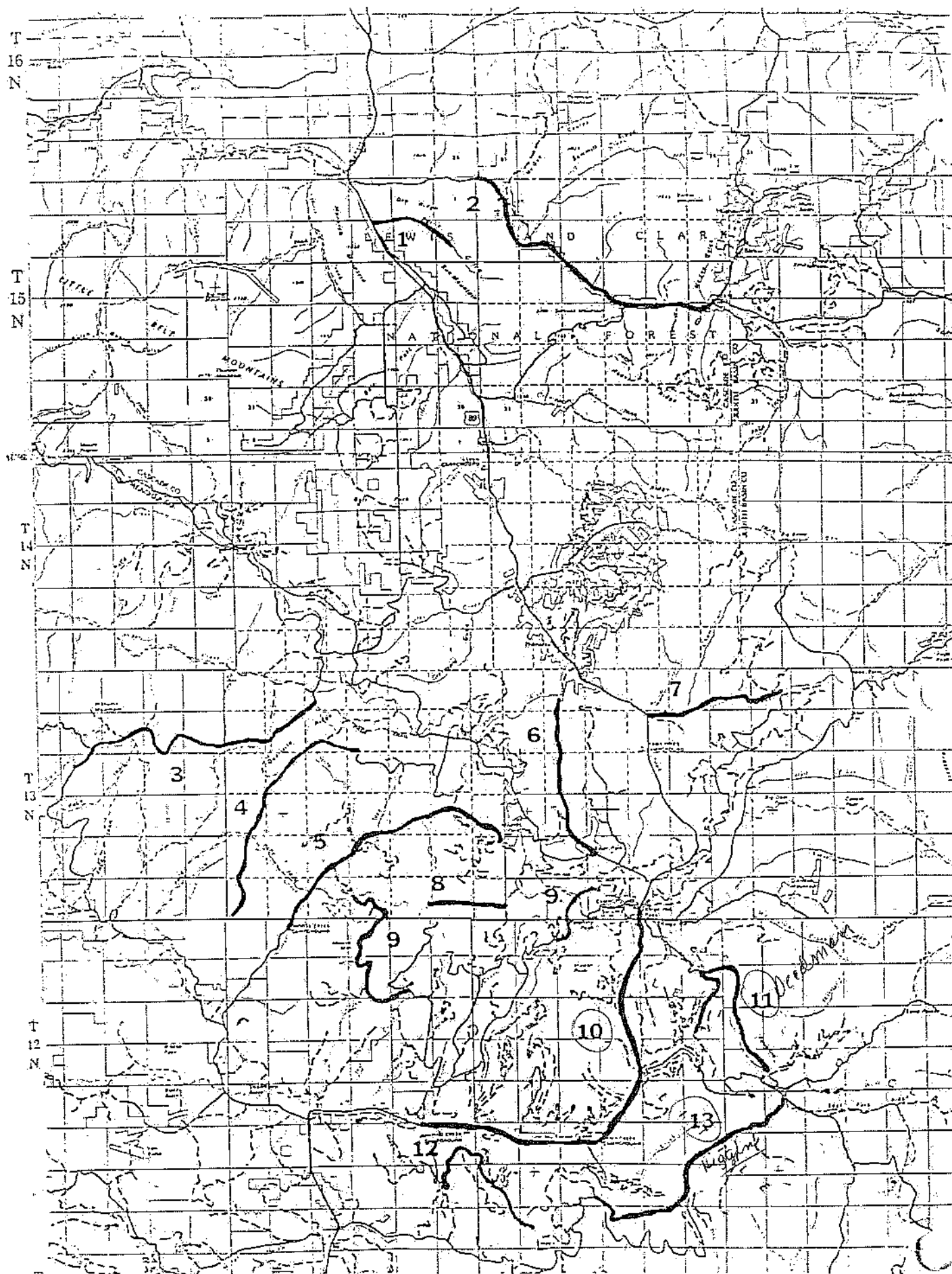


Figure 3. Locations of survey routes within the study area, 1991