

Detecting Female Mountain Lions with Kittens³

Abstract

Mountain lion (*Felis concolor*) hunting programs typically include prohibitions against killing females with kittens. It may be difficult, however, for hunters to differentiate females with kittens from other mountain lions because young are often not with their mothers. We investigated the association between female mountain lions and their kittens in southern Utah, using radio-telemetry locations and examinations of tracks of females known to have kittens. Females were with their kittens on 67 percent of the occasions radio-collared families were located, but kitten tracks were found with their mother's only 25 percent of the time. Because tracks are the sign most available to hunters, 75 percent of females with kittens would not be recognized. The effectiveness of regulations designed to protect female mountain lions with young is limited by the ability of hunters to identify these individuals.

Introduction

Most states and provinces with viable mountain lion populations allow sport-hunting of the species. Regulations governing these hunts often include prohibitions against killing kittens and females accompanied by kittens. The effectiveness of such regulations, however, requires that the hunter be able to identify protected individuals. Kittens may be recognizable to a hunter because of their size and spots, while a female with dependent young may be difficult to identify. Kittens can survive on their own at six months (Shaw 1980, Hemker *et al.* 1984), but will likely die if abandoned at an earlier age. The most common method of hunting mountain lions is to locate a track, generally in the snow, and release trained dogs to trail and tree the animal. Although nursing females can be recognized by worn or matted hair around their nipples, such sign may be present for only a short period. Eaton and Velandar (1977) noted that three captive mountain lion kittens stopped nursing at 60 days. The short duration of such sign and the difficulty of seeing matted hair on a mountain lion in a tree limits the utility of this approach in identifying females with kittens. Relying on tracks to identify females with kittens may be similarly limited because kittens do not always travel with their mother (Hemker *et al.* 1984). This paper

examines the frequency with which kittens are found with their mother as one measure of the ability of hunters to determine whether a female mountain lion has young.

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Study Area

The study area encompasses 4,500 km² of the Boulder, Escalante, and Canaan Mountains in southern Utah. Research efforts were concentrated in a core area of approximately 1,900 km². Elevation varies from 1,350 m on the Escalante River to 3,355 m on the Boulder Mountain. Precipitation comes mainly as snow in the winter and afternoon thunder storms during August and September. Average annual precipitation ranges between 18 cm at Escalante and 60 cm at higher elevations.

Most of Utah's major vegetation zones are represented on the study area. Below 1,800 m, sparse pinyon pine (*Pinus edulis*) and juniper (*Juniperus osteosperma*) dominate the overstory; desert grass/shrub complexes dominate the understory. Bare sandstone ridges occur in the rougher terrain, and dense pinyon-juniper woodlands are interspersed with big sagebrush (*Artemisia tridentata*) flats in the less rugged areas between 1,800 m and 2,400 m. Ponderosa pine (*Pinus ponderosa*) and Gambel oak (*Quercus gambelii*) dominate the zone between 2,400 m and 2,700 m. Above 2,700 m, small mountain lakes and sub-alpine meadows are surrounded by Engelmann spruce (*Picea engelmannii*) and white

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fir (*Abies concolor*) forests and stands of quaking aspen (*Populus tremuloides*).

Methods

Adult mountain lions were treed using trained dogs, immobilized with a ketamine hydrochloride and xylazine hydrochloride mixture, and fitted with radio-transmitter collars (Hemker *et al.* 1984). Kittens were located and captured by searching areas where adult females concentrated activities. Kittens were either fitted with drop-off collars similar to those described by Garcelon (1977) or recaptured periodically to enlarge their collars to accommodate growth; they also were fitted with progressively larger transmitters as they grew. Age of kittens was estimated based on tooth eruption (Ashman *et al.* 1983) and they were placed into one of three age-related classes (class 1: 0-6 months, class 2: 7-12 months, class 3: 13-18 months). Radio-collared mountain lions were located from an airplane or by triangulating from known locations on the ground during daylight hours.

We assumed that a hunter's ability to distinguish a female with kittens was directly related to the time a female was with her kittens, particularly the frequency with which they traveled with her. Same-day telemetry locations of females and their kittens and the frequency with which kitten tracks were found with their mother's tracks were used as measures of association. Tracks of radio-collared females were located by driving roads in a truck or snowmobile and riding trails and roads on horseback, all common methods employed by sport-hunters. Telemetry data were collected from 1979 to 1983. Track searches were conducted during 1982 and 1983.

Results

Radio-collared females and their radio-collared kittens were located on the same day 414 times. Class 1 kittens were with their mothers 63 percent of the times they were both located, class 2 kittens 69 percent, and class 3 kittens 65 percent (Table 1). Tracks of class 1 kittens were found with those of their mother's only 19 percent of the times their mother's tracks were encountered. Tracks of class 2 kittens were found with their mother's tracks 43 percent of the time (Table 1). Too few tracks of females with class 3 kittens were found to include in these analyses.

TABLE 1. Percent of time female mountain lions were radio-located with their kittens and percent of time female and kitten tracks found together.

Age of kittens (mo)	Telemetry locations			Tracks		
	Litters	N	%	Litters	N	%
0-6	2	109	63	4	75	19
7-12	4	222	69	2	28	43
13-18	5	83	65			

Discussion

Mountain lions are nocturnal/crepuscular (Ackerman 1982) and would more likely be with their young during daylight hours. Thus, our day-time telemetry data probably overestimated the proportion of time females spend with their young. Additionally, the probability of locating a female and her kittens on the same day was enhanced when they were together or close to one another. This bias is probably greater in data for class 2 and 3 kittens, because females tend to move greater distances as their kittens become older (Hemker *et al.* 1984).

The percent of time kitten tracks are found with their mother's tracks is a more direct measure of the probability of a hunter knowing whether a mountain lion has kittens. Only one of five times a hunter locates tracks of a female with class 1 kittens would it be obvious that she had kittens. The probability of detecting kittens more than doubles after the kittens are about six months of age, but is still less than 50 percent. Because a female's trail will eventually lead to her kittens, however, a hunter will occasionally be able to detect the presence of kittens before capturing the female. Unfortunately, the likelihood of dogs trailing a female to her kittens is greatest during the period that the female returns frequently to her kittens to nurse. Kittens of this age are often unable to escape and are susceptible to being caught and killed by the dogs (Roberson 1984:124).

Regulations that prohibit killing female mountain lions with young will always have limited effectiveness because hunters cannot easily recognize these females. Additional protection of females and their kittens may be provided by adjusting the timing of sport-hunting seasons. Generally, the older kittens are, the more easily

their mother will be recognized as having kittens, the better their chances of survival if orphaned,

and the less likely they will be caught and killed by dogs.

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