

SUGGESTIONS FOR THE MANAGEMENT OF MOUNTAIN LIONS
AS TROPHY SPECIES IN THE INTERMOUNTAIN REGION

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Since 1964, my colleagues and I have been involved in intensive research on a population of mountain lions in Idaho. This population is in a wilderness environment, is relatively free of human hunting pressure, and is what might be termed a "natural" population. We have gathered quantitative data on both the biology and ecology of this species through various means; currently we are collecting information of a specific nature through the use of radio-telemetry. Our findings are pertinent to the management of mountain lions in similar habitats throughout the Intermountain region.

We have concentrated our efforts on the population inhabiting roughly 200 square miles (in winter) in the Big Creek drainage in the Idaho Primitive Area. We have captured, individually marked, and released 58 lions since 1964. We have recaptured the greatest percentage of these many times; total captures number near 300. We have instrumented, with radio transmitters, 12 different lions and for the past 1½ years have followed them closely throughout the year. Simultaneously we have studied big-game prey species populations and established lion-prey relationships. We have, and are currently, studying range conditions, or more simply, the food supply of mule deer and elk, the major prey species. Thus we have, and are investigating the complete pyramid--plants--grazers and browsers--carnivores. It is a greatly simplified pyramid but it deals with the species and trophic level relationships important to us as game managers.

From our research thus far we have made the following observations and drawn some conclusions:

1. The mountain lion population has remained stable. This is accomplished by a fairly rigid social organization. The population is made up of resident adults, juveniles still with their mother, and transient (or non resident) adults.
2. The density of lions is about one resident adult per 12-14 square miles in winter; this decreases greatly in summer when lions disperse from winter range.
3. In general, the resident population is made up of approximately 50% adult females, 20% adult males, and 30% young-of-the-year.
4. Resident females normally produce young at 2-year intervals. Average litter size is 2.5.
5. Resident females are essential to the maintenance of a population. Resident males are expendable if adjacent populations produce young which may

become transient (or potential residents) on the area. These transient males may act as breeders for resident females.

6. In the wilderness environment where we conducted our work lions had little effect on ultimate numbers of mule deer and elk. Other factors acting separately or collectively acted to hold down ungulate populations. Winter food was believed the most critical, with weather an indirect factor.

7. Our evidence indicates lion predation is actually beneficial to deer and elk populations. This is extremely important in setting management objectives in any wilderness and semi-wilderness environment where these species interact.

There are other findings which are important in management, but these are the principal ones. With this information we can construct a plan for managing mountain lions as a trophy species that will insure continued survival of lion populations. First we'll consider the application, to management, of species biology and second, the application of regulations to the hunter.

Let's attempt to construct a management plan for my state, Idaho.

We know the density--and I regard this maximum density--of lions in our study area. Knowing that hunting pressure and other factors are similar, we may validly project this density to similar wilderness habitat throughout Idaho. For semi-wilderness areas where human activity and other factors are less conducive to maximum density, we may arbitrarily set a density some degree lower than maximum. The same is true for less favorable or "fringe" areas where some lions are known to exist. Then by applying our known productivity data we can set limits on numbers of lions to be harvested in each area. This is the best we can do until we gain additional data from harvested lions.

To manage for a sustained population, we must harvest at some level below the total annual increment; certainly we cannot harvest more than the annual increment. This implies (1) a permit hunt as well as (2) a hunt-unit designation. Both are absolutely essential in any long-range management plan. Hunt units initially must be arbitrarily set up, but in a state like Idaho this is no real problem. Units of similar habitat types (wilderness, semi-wilderness, fringe) with natural physical boundaries are easily established. The number of lions allowed killed initially in each unit may be determined by using our arbitrary density figures and the productivity data, as discussed. The hunt-unit has the further functional advantage of distributing hunting pressure more evenly.

I mentioned that our population was made up of different *kinds* of lions: residents, transients, juveniles. And, equally important to management, is our detailed knowledge of how these different kinds of individuals maintain social order within the population. I cannot overemphasize the importance to any management program of sound data on these two aspects. Our evidence shows clearly that we must, if we are to maintain populations of lions, leave the

resident adult female segment of the population intact. This is difficult because many hunters cannot recognize sex differences, but every effort should be made to discourage the killing of females. Certainly there is no problem when a female is accompanied by young but alone they are difficult to distinguish from young adult males. My evidence to date indicates a female will not breed until she is established on a territory. Once established, however, she will probably accept any male, resident or transient. Therefore it is essential that a population of resident females be maintained. If adjacent populations are producing, then males, resident or transient, are expendable.

The important thing to bear in mind is that management must be uniform; that is, adjacent populations should be harvested at similar levels, depending on their relative densities. If one unit is grossly over-harvested and if this overharvest is maintained over a period of time, then it is almost inevitable that population levels will decline in all adjacent units. Replacement animals will simply not be available when old animals are killed or eventually die.

This plan is not without its faults and a certain amount of guesswork; it is vastly better than no plan at all, and it is a start. If information is collected from the harvested animals, the validity of the system can be tested. And this brings up the next point--regulations, or what I like to call making the hunter aware of his responsibilities.

Our scarce, low density species, or trophy species, are perhaps the most desired of all big game. Lions have maintained this desired status despite the fact most Fish and Game Departments have pretty well ignored them. Now these departments are asked--often commanded--by an alarmed and sometimes angry public to preserve and manage this species. I think the best way to start is to elevate the lion to trophy status immediately--make it equally as prestigious as say bighorn sheep. The tack we should take is that it is not a right but a privilege to kill this animal. Montana has an excellent program along these lines for grizzly and I understand lions are to be included in the same program. The lion rightfully deserves such status. Once trophy status is awarded officially, then I believe hunters will respect it and will willingly assume their responsibilities, rather than regarding strict regulation as undue harassment. Evidence for this is the bighorn program in Nevada and the response hunters make there. A recent Michigan study suggests further that such involvement gives the individual hunter "status" and he more willingly cooperates.

A permit hunt implies some sort of special license or tag. This tells us who is hunting. Next we need mandatory reporting--whether the hunter was successful or not, where the animal was killed, when it was killed, etc. We further need to know what *kind* of lion was killed--its sex and age. This means the hunter must surrender a portion of the animal, perhaps temporarily, to the management agency. After a period of time this information tells us what pattern our harvest is taking and what kind of lions are making up the kill. The age and sex of the kill in each unit over a period of time should allow us to determine whether our original density estimates and our unit designations were accurate. If not, then they should be changed. In any event this kind of data is absolutely essential on species which are relatively scarce--bighorn sheep, grizzly bears,

and mountain lions are all scarce when compared to deer and elk and we cannot afford to let one shred of information escape us.

There are other areas of responsibility which hunters could be asked to assume such as submitting to a competency test in determining a male from female lion. Perhaps we should determine the competence of guides and dogs. The management agency could assist in this by holding short training sessions, such as Nevada does for its bighorn permit holders. These training sessions, if handled properly, serve also as excellent public relations devices.

The lion is an intelligent, adaptable animal capable of living in diverse environments. It is obvious that ecological conditions in the Southwest, on the Pacific Coast, or in other regions may differ from those we have investigated in Idaho. I suspect, however, that the biology and basic behavior of the lion varies but little from region to region, and I do believe that the principles I have outlined do form the basis of a management program anywhere.

What I have stressed in this paper is that any management plan must be based on sound information. This means research, and it means continuing research. Habitats are changing rapidly in many areas of the western United States and the only way we, as managers, can keep up is through research. The application of species biology, based on research, and regulation to the management of this fine trophy animal should insure huntable populations well into the future.

