MOUNTAIN LION DATA ANALYSIS UNIT L-20
MANAGEMENT PLAN

GAME MANAGEMENT UNITS
68, 681, 76, 79, 80 & 81
Southwest Region

Prepared for:
Colorado Division of Wildlife

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DESCRIPTION OF DAU, HABITAT AND PAST MANAGEMENT

Mountain Lion Data Analysis Unit (DAU) L-20 is located in southern Colorado on the west side of the San Luis Valley (Fig. 1). The Continental Divide forms the western boundary of the unit, the New Mexico border is the southern boundary, and the unit extends north to Poncha Pass. Total area is 13,469 km^2 (5,207 $miles^2$). The DAU includes some extremely rugged terrain in the San Juan Mountain Range, rising to over 14,000 feet in elevation at San Luis Peak; the La Garita Mountains and Cochetopa Hills are also found here. The Rio Grande River has its headwaters in this unit. Other major drainages include the Conejos and Alamosa Rivers, and La Jara, La Garita, Carnero,

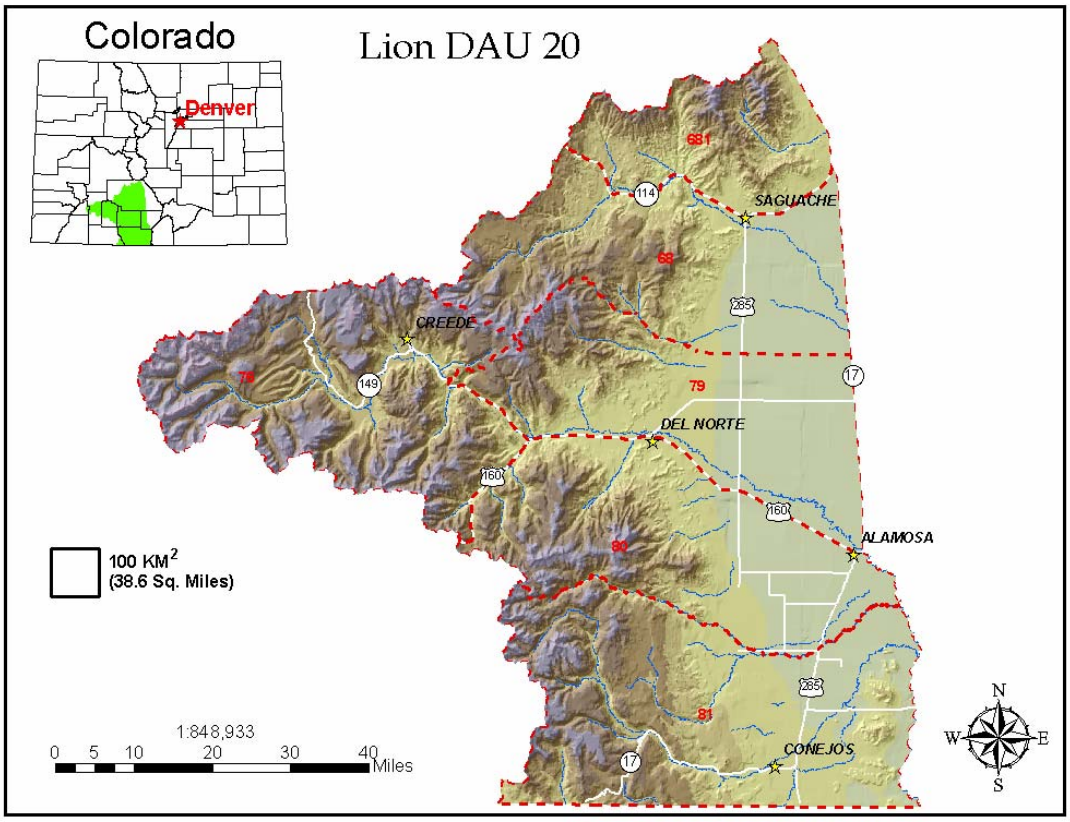


Figure 1

and Saguache Creeks. La Garita Wilderness Area, South San Juan Wilderness Area and most of the Weminuche Wilderness Area fall within the boundary. The floor of the San Luis Valley, rising from 7,500 feet in elevation, is a high desert which is intensively farmed for potatoes, barley, alfalfa and other commercial crops where it can be irrigated—generally making for unsuitable mountain lion habitat. L-20 is comprised of the following Game Management Units (GMUs): 68, 681, 76, 79, 80 and 81. Portions of Rio Grande, Conejos, Mineral, Hinsdale and Saguache Counties make up the DAU.

Two-thirds of the DAU is public land. The USDA Forest Service is the largest landholder, with 50.9% of the total. The privately owned land is ranched, farmed, or utilized as home sites and private recreation areas. The Bureau of Land Management

manages 13.0% of the land, followed by the State of Colorado at 3.5% and the US Fish and Wildlife Service (Monte Vista National Wildlife Refuge) at 0.4%.

The unit's sizable ungulate populations provide a substantial prey base for mountain lions. Post-season elk numbers are presently estimated around 18,500, with a population objective of 12,500. Mule deer are near their population objective of 21,000 after making a slow recovery following a period of decline. Bighorn sheep herds in the area include the Conejos Canyon, Alamosa River, Natural Arch, Bellows Creek, Bristol Head, Rio Grande Box, San Luis Peak and Trickle Mountain herds, although all have experienced die-offs over the last several decades and probably don't number over 400-500 animals at present. The comparative prey density index value for the whole DAU, based on a 5-yr. average deer and elk post-season population estimate, is 7. This index value ties L-20 for fifth among eight lion DAUs wholly or partially in southwestern Colorado and falls below mid-point of the range of 0.5 - 19 for different DAUs in the state of Colorado.

Among 21 lion DAUs in Colorado, L-20 ranks 17th in documented off-take during the period 1980-2003. With DAU size factored in, L-20 ranks 19th among DAUs with a total off-take of 0.67 mountain lions per 100 km^2 over the same period.

Use of the quota system to manage mountain lion hunting in Colorado first began in 1972. Hunting should stop once the quota has been reached, but there have been occasional problems with administration of the system in the past. Presently, hunters desiring to hunt lion within a given unit are required to check a central message board by phone the night prior to the day they intend to hunt. Lions harvested in a unit are required to be checked at a Division of Wildlife office within 48 hours. The quota in L-20 started out at one in 1980, when GMU 68/681 was the only open area. GMU 80 opened in 1981 with a quota of three; GMU 81 opened the following year, with a quota of two; GMU 76 opened in 1986 with a quota of one; and GMU 79 opened in 1987, with a quota of one. Since all GMUs in the DAU have been open to hunting, the quota has ranged from 11 to 13, and the entire DAU has never closed to hunting, except for 1980 (figure 2).

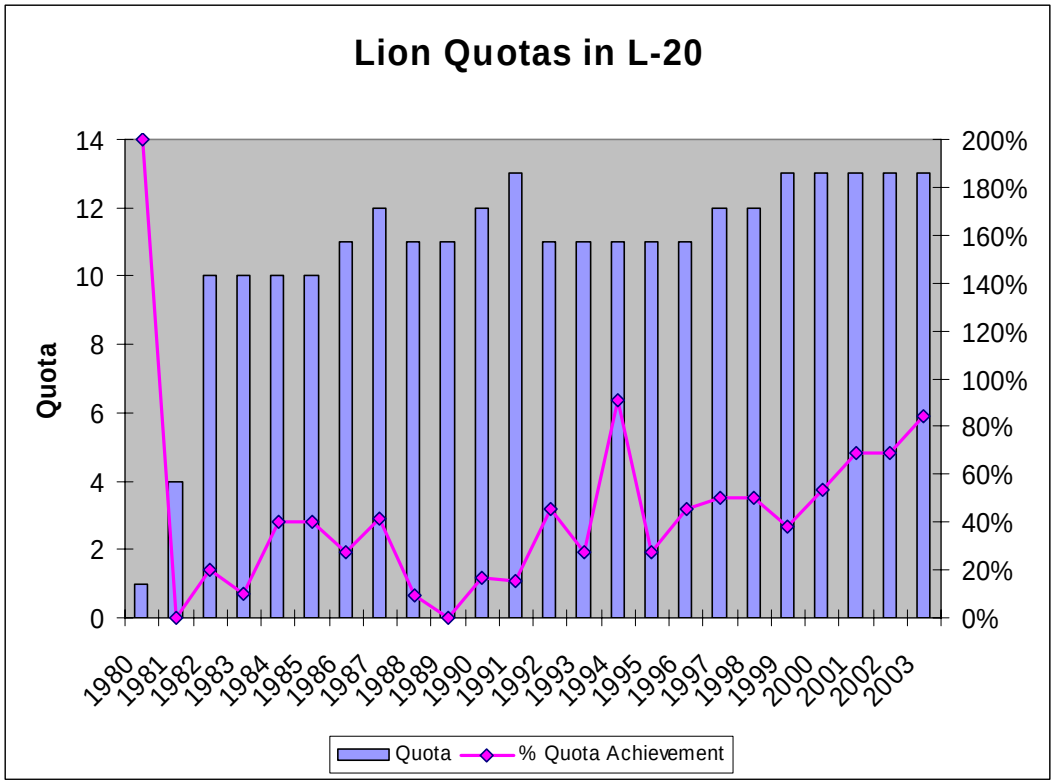


Figure 2

Annual harvest has ranged from 0 to 11 mountain lions between 1980 and 2003 in L-20 (figure 3, for years 1989-2003). During the period 1999 through 2003, harvest has averaged 8.2; and during the period 1994 through 2003, harvest averaged 7.1. Other mortality, such as control kills or vehicle collisions has only amounted to four animals between 1980 and 2003, compared to legal harvest of at least 105. Percent female lions in the harvest has averaged 48% over the past three years, and the five-year average female harvest and ten-year harvest have been 49% and 46% respectively (figure 4).

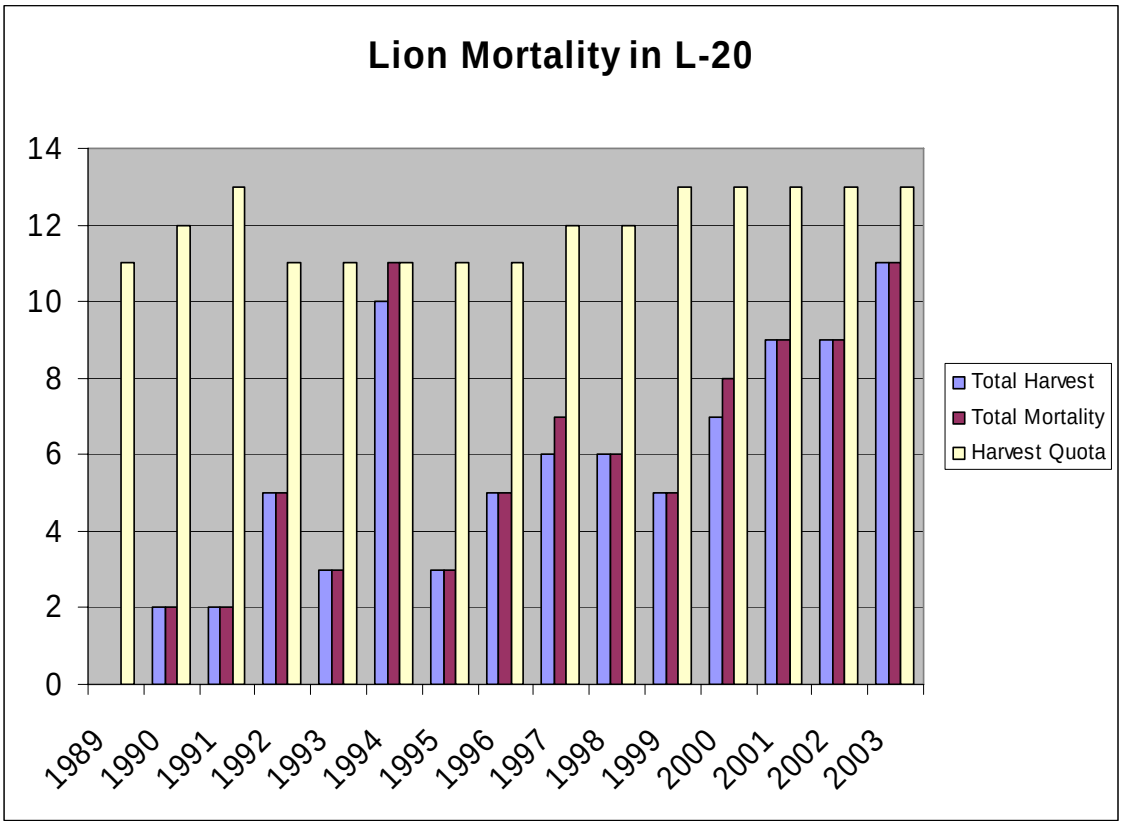


Figure 3

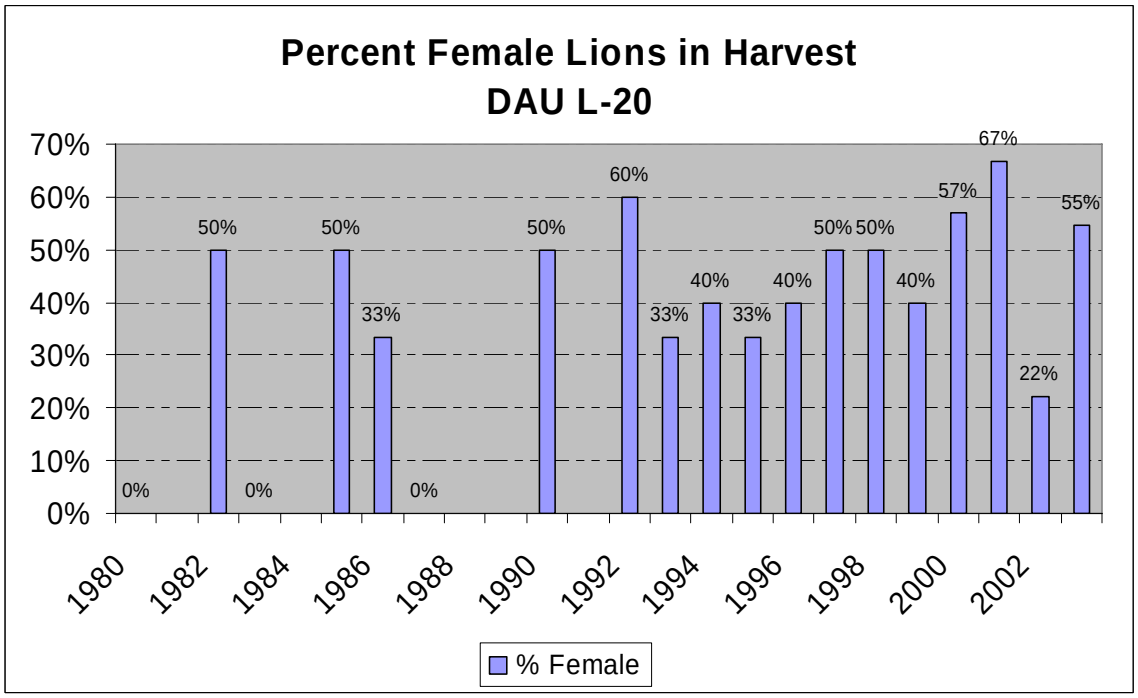


Figure 4

Along with this gradual increase in the annual harvest, reports from houndsmen and observations of Division of Wildlife (CDOW) field personnel indicate that the population has probably increased over the past three to five years.

Under Colorado law, CDOW is liable for damage caused to livestock by mountain lions. Damage claims processed in L-20 have only averaged 0.2 per year over the past five years with an average monetary value of $200. Two claims in 1997 amounted to $1836, constituting the highest amount claimed (figure 5).

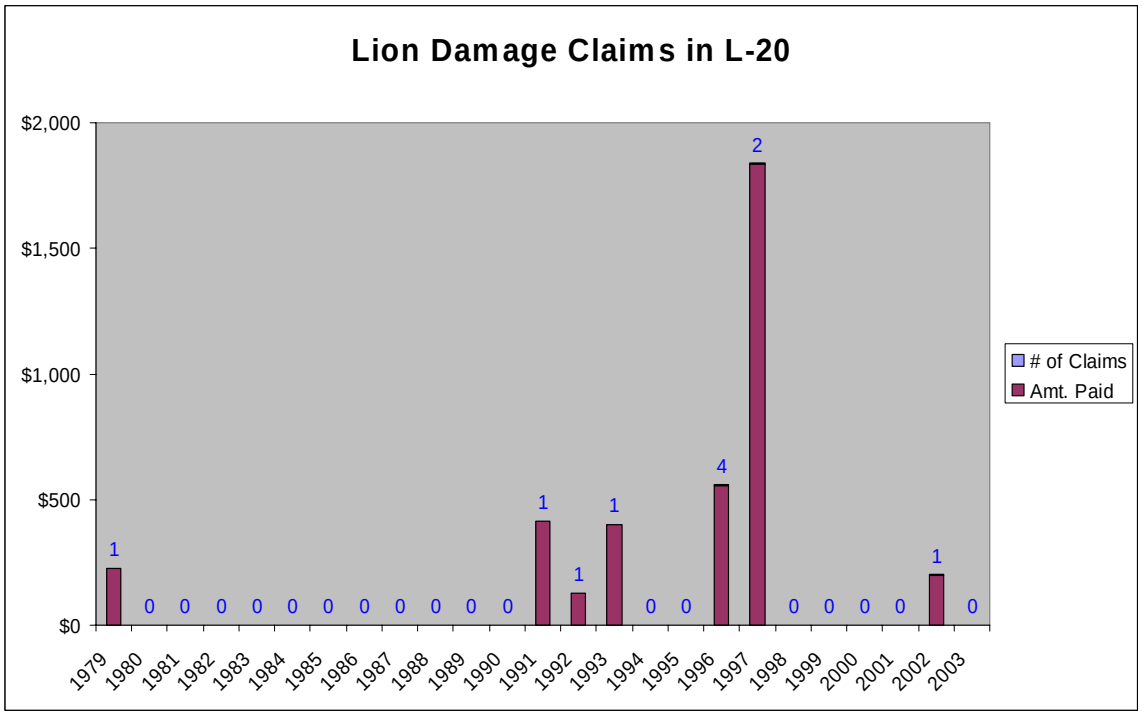


Figure 5

ISSUES

A public meeting was held in Monte Vista to gain public involvement in the DAU plan revision process for L-20. Ten members of the public attended and three persons submitted written comments. Two issues were identified: (1) houndsmen reiterated their position that they would like to maintain or increase hunting opportunity (*i.e.*, no net loss in the statewide quota); and (2) predation on mule deer and bighorn sheep may be depressing those populations. Houndsmen also like the current method of breaking out quotas into four blocks for L-20: GMUs 68/681, GMUs 76/79, GMU 80 and GMU 81. A public meeting was held earlier in Alamosa to discuss management of lion DAUs on the east side of the San Luis Valley. One person attending that meeting was very adamant that mountain lions were predating too many deer, and that lion populations ought to be suppressed for that reason. Another concern submitted by e-mail from that earlier meeting was outdoor recreationists feeling threatened by the presence of mountain lions, and as a consequence not being able to enjoy their backcountry experience.

STRATEGIC MANAGEMENT GOALS

The strategic goal for DAU L-20 is to maintain a stable and healthy mountain lion population though manipulation of the harvest. This has been the goal in the past and no input gathered during public participation for the plan revision indicated a change is warranted or desired. Achievement of this goal will be accomplished through adaptive management: monitoring data collected on the harvest and other mortality, and adjusting quotas as needed. If significant changes occur in the ungulate prey base, this may also call for changes in the allowable annual off-take. The current population projection discussed in the next section is based on the best science, and as new information becomes available from additional studies, it will be incorporated into management. Game damage and human conflicts are sporadic, relatively minor occurrences which are best managed on a case by case basis, with any removal actions directed toward individual offending animals.

MANAGEMENT OBJECTIVES

It is extremely difficult to obtain an accurate estimate of how many mountain lions are in a given area. In most instances, CDOW will not have the resources to develop a precise population estimate for a given area, much less track this accurately over an extended period of time. Without intensive field work, the only other method of assessing potential size of the population is to rely on density information previously collected and published in the literature from other localities. Using this information, along with Geographic Information Systems (GIS), managers can estimate how much similar habitat exists over the area of interest and project a possible population.

Based on mark-recapture radio telemetry studies conducted in North America in habitat types similar to those found in western Colorado, we could expect to find mountain lions in densities at least as high as 4.6/100 km^2 given the prey rich environment found in Colorado. A density of 3.0 mountain lions/100 km^2 has been representative of moderate densities in other areas, with 2.0 mountain lions/100 km^2 characterizing low density habitat. Since L-20 is not considered to have the best mountain lion habitat in Colorado, densities lower than these levels might be expected.

A GIS analysis of potential habitat in L-20 was conducted using information in CDOW's Wildlife Resource Information System (WRIS). Initially, areas of intensive agriculture on the valley floor and those areas above timberline which do not constitute suitable mountain lion habitat were excluded from the analysis. Suitable habitat was then subdivided into areas believed capable of supporting higher mountain lion densities, such as mule deer winter range, areas where moderate mountain lion density might be expected, such as higher elevation areas used by wintering elk, and areas of low prey density capable of only supporting low mountain lion densities. Under this scenario, 4995.5 km^2 was designated relatively higher density, 3991.2 km^2 moderate density, and 435.2 km^2 relatively lower density (figure 6). If standard densities of 4.6, 3.0 and 2.0 are applied to the various strata, a possible population of 358 individuals would be projected for the DAU. Based on relatively fewer prey in this DAU compared to other areas in Colorado, this latter projection likely represents the upper limit of the possible mountain lion population in this DAU. Using more conservative estimates of 3.0 lions/100 km^2 for high density habitat, 2.0 lions/100 km^2 for moderate density and 1.0 lions/100 km^2 for low density, a possible mountain lion population of 234 individuals is projected for DAU L-20.

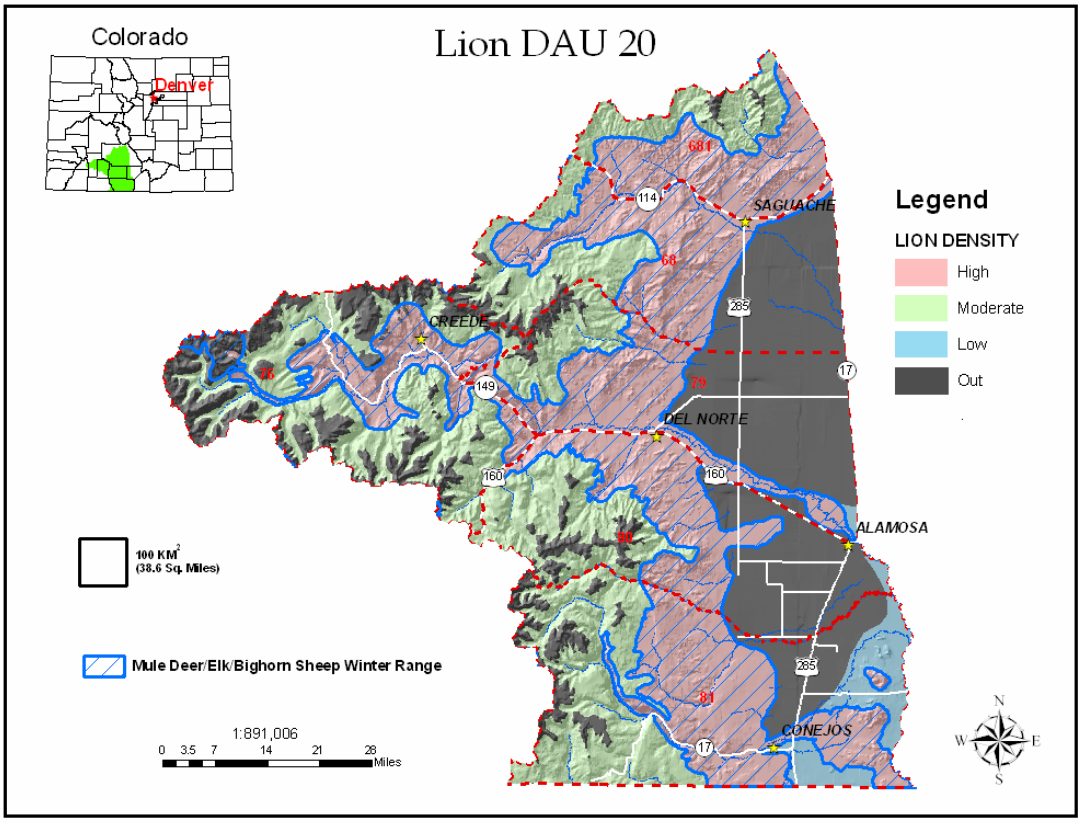


Figure 6

Annual growth rates as high as 28% have been documented for a protected mountain lion population following a period of significant suppression (Logan and Sweanor, 2001). Since this recovery was observed in a relatively prey sparse environment, a similar or perhaps more dramatic response could be expected in the prey rich environment of western Colorado. When the goal is maintaining a stable or increasing mountain lion population, we believe limiting total mortality to between 8% to 15% of the adults and subadults in the population will allow us to meet the management goal (Apker, pers. comm.). If mortality from other sources (*i.e.*, control kills and road kills) is significant, this would need to be factored in along with the harvest.

Several studies have documented age and sex structure of mountain lion populations (Logan and Sweanor, 2001; Ross and Jalkotzy, 1992). The average age structure reported in these studies yield 52% adult, 14% subadult and 34% cub. If we consider 66% of the population legal for harvest, and using a conservative removal rate of 8% of the adults/subadults, then a sustainable removal rate for L-20 would be 12.4 individuals per year for our more conservative population projection discussed above. The 5-year documented average harvest rate of 8.2 mountain lions is below the calculated allowable removal rate, as is the highest recorded harvest of 11 mountain lions. An alternative method of assessing current management is to estimate a mountain lion density needed to support the documented annual removal rate of 8.2 adults/subadults over the portion of L-20 deemed suitable mountain lion habitat. Using the conservative 8% rate, this would require 1.65 mountain lions per 100/km^2, which is well within the projected

probable lion density in the DAU. Thus it appears from a habitat-based population projection, our past and proposed management of mountain lions in this DAU is reasonably conservative given unknowns about actual mountain lion populations.

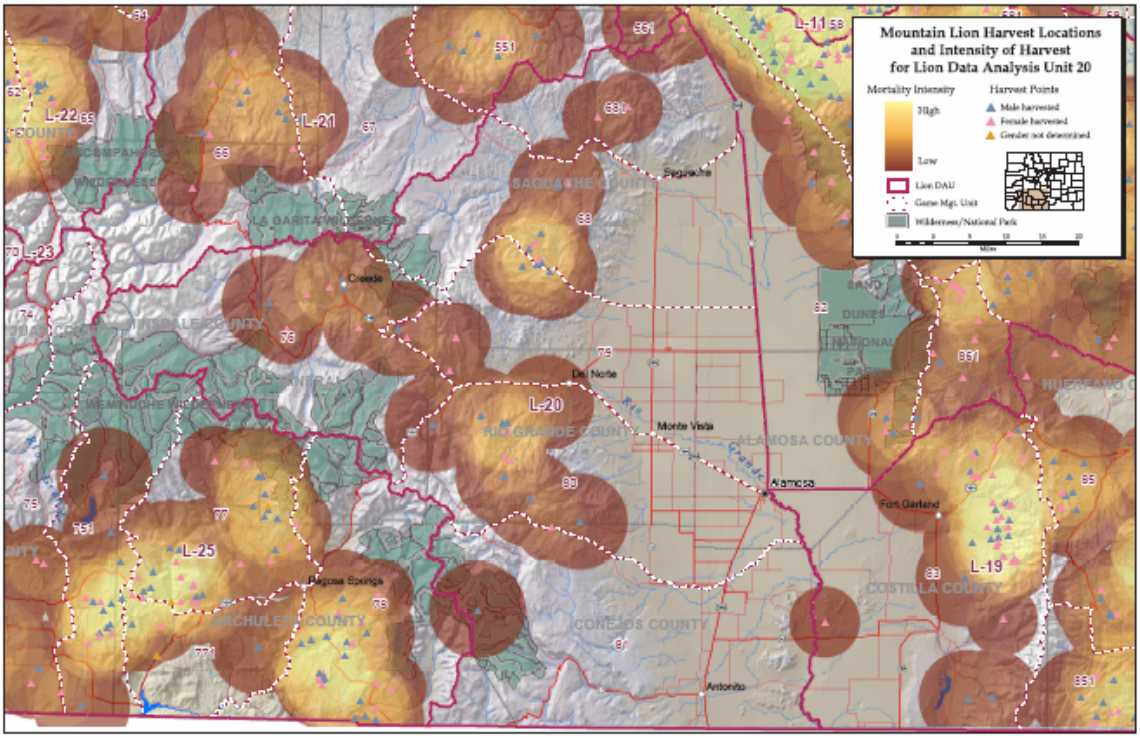
The best information currently available indicates the percentage of females in the harvest should be kept below 50% on average to maintain adequate recruitment of young into the population. Since harvest in this unit is approaching this level with the current annual loss of 7 or 8 individuals from this population, this may indicate managers should proceed cautiously if increasing the annual removal rate.

REFUGE AREAS

The presence of refugia, where mountain lions are protected from human-induced mortality, could impact the allowable annual mortality in any DAU. These areas might act as a source area for emigrating animals which could then relocate in territories previously occupied by harvested animals. In order to be totally effective, any refugia would need to be large enough to encompass home ranges of numerous mountain lions—such refugia would ideally need to be at least 2,000 to 3,000 km^2 in size, with 1,000 km^2 being the lower limit for effectiveness (Logan, pers. comm.).

Reported harvest over the past ten years has not been spread uniformly across the DAU (figure 7). Harvest is uncommon along the Continental Divide and in designated wilderness areas at higher elevation, where access is more difficult and few large prey items are available during the winter. The lower foothill regions generally contain more private property intermingled with public land, which makes it difficult or impossible to trail mountain lions with hounds for any distance; thus, fewer hunter kills might be expected in these areas also. The other large area with no harvest shown is within GMU 81. This is probably due more to a combination of low lion density, low harvest and lack of reported harvest location, rather than any significant access limitation.

Refuges do not appear to be a factor in the management of mountain lions in L-20. Furthermore, so long as harvest in this DAU is taking place at a rate well below the sustainable level, refugia are not an issue.



MORTALITY OBJECTIVE

Habitat projections of the mountain lion population in L-20 suggest an allowable annual off-take in the range of 12 to 23 adults/subadults based on a conservative removal rate of 8% and a more liberal 15% rate. In the past, 97% of the mortality in the unit has been hunting mortality, which can be controlled through harvest quotas. If unusual non-hunting mortality should occur at any time, the following year's quota could be reduced to compensate for this loss.

The DAU will likely continue to be managed with subquotas based on blocks of GMUs. The larger these subquotas can be, the less individual hunting opportunity will be affected and the less potential for hunter overcrowding caused by subquotas closing adjacent units. The question is, how much can these be increased without causing an undesirable shift in population composition, or exceeding the rate at which the population can replace its losses. Since we are dealing with a relatively unknown quantity, caution is warranted. Any increase in the quota should be done slowly and incrementally, so the response can be closely monitored.

SUMMARY

The mountain lion population in L-20 is stable or increasing, based on evaluation of harvest data from 1980-2003 and anecdotal evidence. CDOW and interest groups desire to maintain the current population; however, some members of the public may not be supportive of an increase in population. Population projections based on mountain lion densities from studies in other localities and available habitat in L-20 suggest the 5-year annual off-take average of 8.2 mountain lions can be increased to about 12 mountain lions annually and remain consistent with the DAU goal.

LITERATURE CITED

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Ross, P.I. and M.G. Jalkotzy. 1992. Characteristics of a hunted population of cougars in southwestern Alberta. Journal of Wildlife Management. 56(3):417-426.