

MOUNTAIN LION MANAGEMENT GUIDELINES
FOR
MIDDLE PARK: DAU L5

GAME MANAGEMENT UNITS
18, 27, 28, 37, 181, and 371

NORTHWEST REGION



Prepared for:
Colorado Division of Wildlife

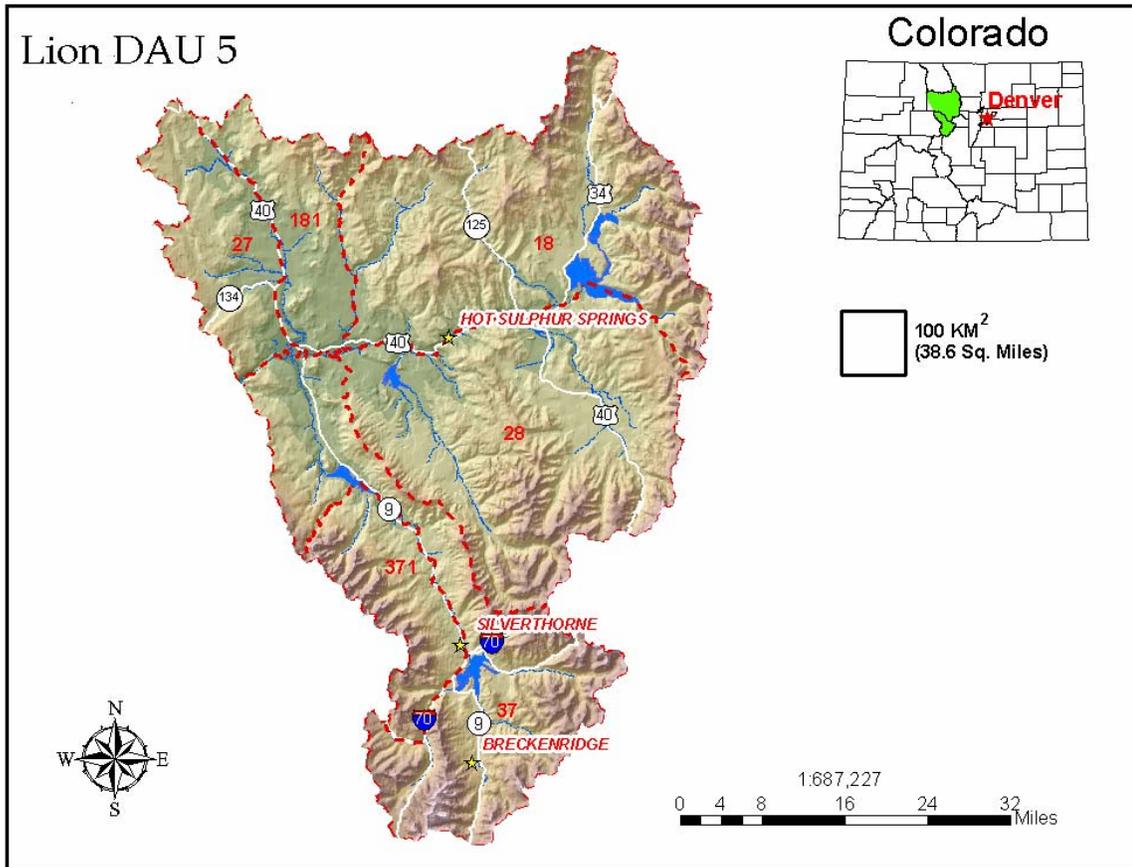


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DESCRIPTION OF DAU AND HABITAT

Middle Park mountain lion Data Analysis Unit (DAU) L5 includes all of Summit County, most of Grand County, and a small portion of Routt County (Figure 1). It is bounded on the north, east, and south by the continental divide and on the west by the Gore Range. The lower elevations of Middle Park are dominated by sagebrush steppe. Plant communities progress through mountain shrub, aspen, Douglas fir, lodgepole pine, and spruce-fir as elevation increases. Property is administered in Middle Park in the following proportions: 55% U. S. Forest Service, 26% privately owned, 9% Bureau of Land Management, 6% National Park Service, and 3% State of Colorado.

Figure 1. Geographical location and GMU's of lion DAU L5



KEY MANAGEMENT ISSUES

Mountain lion hunting season was closed in L5 from the mid 1970's until 1994. The current management objective for L5 is to use harvest quotas in the range of 8 to 15 to manage for a stable to increasing mountain lion population. The Middle Park mountain lion population may receive considerable immigration from more lightly hunted populations to the east.

STRATEGIC GOALS

The present management goal for this population is to manage for a stable to increasing mountain lion population to provide recreational opportunity and maintain mountain lions in their niche as predators of deer and elk.

MANAGEMENT OBJECTIVES

Historical Information- A harvest quota of 2 was set when mountain lion hunting was re-established in 1994. Over the last 10 years it has been raised incrementally to the current quota of 12 where it has been for 4 years. It is generally felt that this population has increased over that time. Over the last 10 years 96% of the L5 harvest quota has been achieved and the 5 year average is 105% quota achievement. On average, 40% and 38% of the harvest has been female over the last 10 and 5 years respectively. Thus far 70 mountain lions have been harvested, 1 was killed by the CDOW as a result of a human fatality from lion attack, 0 were killed by Wildlife Services, 0 were killed by landowners, 7 were killed in human conflict situations, and 2 road kills have been documented. All 6 Game Management Units (GMU's) in this DAU

are in a single hunt code, meaning individual GMU's do not have their own sub quotas. The GMU's with the majority of the mountain lion harvest are 18 and 28 and thus far 31 and 30 have been harvested in each GMU respectively.

Mule deer and elk are the primary prey for mountain lions. In a New Mexico study area, where elk are absent, Logan and Sweanor (2001) found that mule deer comprised 91% of mountain lion kills and 92% of biomass consumed. Mountain lions killed 35% of radio-collared deer in this New Mexico study area (Logan and Sweanor 2001).

The Middle Park mule deer population DAU D9, which corresponds to the same geographic area as the L5 lion population, is one of 4 intensive mule deer monitoring areas in Colorado. This herd contains 90 radio-collared does and 60 radio-collared fawns annually for survival estimation, cause of mortality estimation, and seasonal habitat use and movement mapping. Over the 6 years of this study, 1% of the radio-collared fawns died from mountain lion predation (3 mortalities out of 328 fawn winters) and 2% of the radio-collared does died from mountain lion predation (6 mortalities out of 485 doe years). For reference, mountain lion predation has a similar impact on this deer herd as automobile collisions which account for 3% of radio-collared fawn mortalities and 1% of radio-collared doe mortalities. While mountain lions and automobile collisions are significant sources of mortality annually, availability of winter habitat is generally considered to be the primary long term limiting factor the Middle Park mule deer population.

Rocky Mountain National Park (RMNP) is a refuge for mountain lions because no hunting is allowed in the park. No deer or elk winter range exists in RMNP within L5

boundaries so the majority of mountain lions likely follow migrating deer and elk either out of the RMNP to the west where they are hunted or to the eastern portions of RMNP and the Estes Park area where they may or may not be hunted. Therefore, very few mountain lions are in RMNP on the western slope (L5) during the mountain lion season. No other areas are thought to exist in DAU L-5 large enough to act as refuges. A refuge would need to have light enough hunting pressure to protect lions over most of their home range, thereby acting as a source for other areas within the DAU.

Process- The CDOW, through the DAU planning process, attempts to manage mountain lions by first estimating population size, then a goal for an overall population trend is determined, and finally harvest quotas are set to manage for that trend.

Population estimation- L5 population size was evaluated in three different ways. This was accomplished by applying a low mountain lion density to total area of the DAU under 3,200 m (10,500 ft), by applying high density to area identified as deer or elk winter range within the DAU, and finally by applying high densities to areas that are identified as deer or elk winter range and low densities to areas not identified as winter range that are below 3,200m (10,500 ft). Deer and elk winter ranges are assumed to have the highest mountain lion densities because these are their primary prey species. A high density of 4.6 mountain lions per 100 km² (39 mi²) was applied in these areas based on densities estimated by Logan et al. (1986) on winter range in the Bighorn Mountains of Wyoming. In L5, 1,813 km² (700 mi²) were classified as deer or elk winter range. A density of 2 mountain lions per 100 Km² (39 mi²) was assigned to areas not identified as

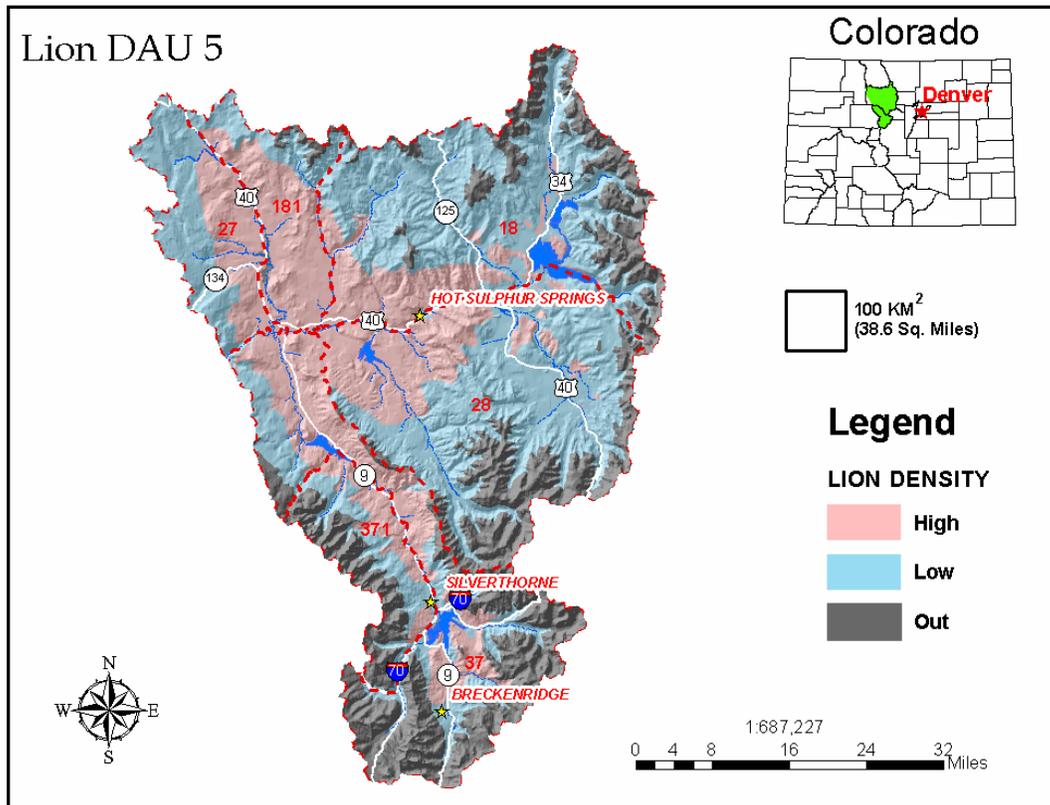
deer or elk winter range that could potentially harbor mountain lions in winter. The area encompassed by this designation was 2,753 km² (1,063 mi²). This criterion was chosen to recognize that these areas contain mountain lions but at a much lower density because large mammal prey base is lacking. It was assumed that no mountain lions exist above 3,200 m (10,500 ft) elevation in winter. Based on these methods and assumptions the mountain lion population in L5 is estimated at between 84 and 138 animals (Table 1).

Table 1. Comparison of L5 population estimates based of 3 methods of calculation.

Method	Area (km²)	Density	Population Estimate
Total DAU area below 3,200 m –low density	4,566	2.0 lions per 100 km ²	91
Deer and elk winter range in DAU – high density	1,813	4.6 lions per 100 km ²	84
Winter range – high	1,813	4.6 lions per 100 km ²	138
Other below 3,200 m-low	2,753	2.0 lions per 100 km ²	

CDOW prefers the combined high and low density approach because it incorporates existing information about mountain lion densities on similar winter ranges and acknowledges that mountain lions do winter in areas where no deer and elk are found (Figure 2).

Figure 2. Mountain Lion DAU L5 showing areas mapped as high mountain lion density in red and areas mapped as low mountain lion density shown in blue.



To date there are no mountain lion density estimates available from studies within Colorado. When this information does become available the CDOW suspects we may have higher mountain lion densities than those documented because of very high deer and elk densities in many areas of western Colorado. Population estimates will be continually revised as better information becomes available.

Population age structure - Ross and Jalkotzy (1992) found an age structure of 48% adults, 19% subadults, and 34% kittens in a moderately hunted mountain lion population and Logan and Sweanor (2001) found an age structure of 56% adult, 10% subadult, and 34% young in New Mexico. Based on these studies we assume that hunted mountain

lion populations are comprised of approximately 52% adults, 14% subadults, and 34% kittens, or dependent young. Accounting for age structure, the L5 population consists of an estimated 91 harvestable mountain lions (Table 2).

Table 2. Projected age structure of L5 mountain lion population based on Logan and Sweanor (2001) and Ross and Jalkotzy (1992).

<u>Adults</u>	<u>Subadults</u>	<u>Cubs</u>	<u>Total</u>
72	19	47	138

Mortality Objective and Harvest Quota – Because quota achievement in L5 is typically 100%, CDOW treats the DAU quota and DAU harvest objective as one in the same. Therefore, the mountain lion quota is the number of mountain lions that we expect to be harvested. The current L5 management objective is to manage for a stable to increasing lion population using an annual harvest quota from 8 to 15.

Logan and Sweanor (2001) documented an 11% rate of population growth rate and suggested an 11% adult mortality rate as a guideline when managing for a stable to increasing population provided that managers have reliable population estimates and that the population is on an increasing trend. This rate includes harvest, other human mortality, and natural mortality. Adult survival rates were 91% for males and 82% for females (Logan and Sweanor 2001). The CDOW assumes that some mountain lion populations in Colorado may be able withstand a higher harvest rate, such as 15%, because of higher prey densities than San Andres Mountains of New Mexico where

Logan and Sweanor (2001) conducted their research. However, this formula must be used cautiously because we do not have reliable estimates of L5 population size.

Previous harvest levels should be taken into account as another tool for evaluating mountain lion quotas.

Immigration and recruitment of local progeny contributed about equally to growth of the adult segment in the aforementioned population (Logan and Sweanor 2001). On average males dispersed 101 km (62 mi) and females dispersed 28 km (17 mi) (Logan and Sweanor 2001). The CDOW suspects that Middle Park may receive considerable immigration from Front Range populations that are less heavily hunted. These dispersers would buffer this population from the impacts of harvest and may help explain why this population has appeared to increase under the current harvest regime. Current radio-collaring efforts on the eastern slope may provide information on dispersal rates to western Colorado.

Applying this 15% mortality objective to the estimated 91 adults and subadults the L5 population can sustain 14 adult and subadult mortalities per year. This accommodates the recent harvest objectives of 10 to 12 while accounting for 2 to 4 human caused and natural mortalities per year. The CDOW documents approximately 1 non-hunting human caused mountain lion mortality annually in Middle Park. A quota of 15 may be appropriate under the current management prescription of stable to increasing if mountain lion numbers continue to increase. Experience has shown that managing within this harvest quota range should accomplish the population objective of stable to increasing.

Harvest Mortality Objective Range: 8-15

Monitoring- CDOW will continue to monitor harvest, age and sex structure of the harvest, and sightings and sign of mountain lions in L5. The CDOW will continue to monitor other, non-hunting, human caused mortality rates to account for other impact to mountain lion populations. Over the last 10 years there have been 2 cases of mountain lions being killed for control purposes in L5. The CDOW has not yet studied mountain lions in L5 to allow estimation of natural mortality rates but natural mortality rates must be considered when determining an acceptable total DAU mortality.

Strategies- Monitored population and harvest indices will be evaluated annually to determine appropriate quota recommendations.

GAME DAMAGE

Fortunately, mountain lion game damage claims have been rare in Middle Park. During the last 10 years only 2 claims have been paid. In 2000, \$800 was paid for depredation of a lama and in 2001, \$120 was paid for depredation of a ewe. The CDOW will continue to monitor mountain lion damage claims and consider game damage when setting harvest quotas.

HUMAN CONFLICTS

Prior to the 1990 there were few mountain lion sightings. However, there were several conflicts during the 1990's with several serious incidents occurring within Rocky Mountain National Park (RMNP). In July 1997, a 10-year old boy hiking ahead of his parents on the North Inlet trail in RMNP was killed by an adult female mountain lion, only the second fatal mountain lion attack in Colorado. Lions attacked joggers in two other incidents in RMNP as well, one victim was scratched and another escaped uninjured. Outside RMNP, hunters have been confronted by and subsequently killed mountain lions in 1996 and 2003.

CDOW will continue to be proactive in educating the public on how to avoid encounters. However, conflicts with mountain lions will likely continue because of increasing development and recreational use in Middle Park. Attacks on humans are not acceptable and immediate action will be taken to destroy an offending mountain lion in these unfortunate instances.

LITERATURE CITED

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