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# MOUNTAIN LION PREDATION ON DOMESTIC LIVESTOCK IN NEVADA

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ABSTRACT: The mountain lion has long been considered a serious predator on domestic livestock, primarily sheep, in the state of Nevada. For the past five years (FY77-81), documented losses to lions have averaged 375 animals. While this number is not large, most losses are sustained by only a few individual livestock operators, and the losses constitute a serious economic hardship for these individuals. An average of 23 lions have been taken in response to livestock depredation complaints during each of these five years.

Controlling livestock loss to mountain lions is the responsibility of the Animal Damage Control branch of the U.S. Fish and Wildlife Service. ADC personnel work in cooperation with the Nevada Department of Wildlife, Nevada Predatory Animal & Rodent Control Committee and livestock producers in an effort to keep both livestock losses and the number of lions taken on depredation complaints at an acceptable level.

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## INTRODUCTION

The mountain lion (*Felis concolor*) is truly a magnificent animal and has become a symbol of the American wilderness. Unfortunately, it is also an animal surrounded by controversy. There are at least three strong viewpoints concerning the mountain lion and its management in the West today. The first viewpoint is that of the preservationist who believes that lion populations should be promoted in order to maintain the highest possible levels. He feels that the mountain lion is an important part of our heritage and must be maintained at all cost. The second viewpoint is that of the sportsman. The mountain lion is a challenging trophy animal, and hunters will travel long distances and spend considerable amounts of money in their pursuit. The sportsman feels that the lion population should be managed to provide a huntable surplus. Mountain lion hunting provides many days of recreation and a considerable economic boost to certain individuals and areas. The third viewpoint is that of the stockman who yearly loses livestock, sometimes in considerable numbers, to mountain lions. The stockman wants a management program that will reduce his losses to a minimum level. He wants depredating lions to be taken quickly and with a minimum of bureaucratic red tape.

In Nevada a concerted effort is made to satisfy all three sides of this controversial issue. According to the latest reports of the Nevada Department of Wildlife (NDOW), lion populations are at maximum levels in every management area of the state except one which is currently at 90% (Hess 1981). This certainly indicates a healthy and secure population. The NDOW sells unlimited lion tags for the sport hunt, but places careful limits on the maximum allowable harvest in each management area. This allows a considerable amount of recreational opportunity without endangering the resource.

The responsibility for reducing livestock loss to predators falls to the U.S. Fish and Wildlife Service (FWS) under authority of the Animal Damage Control Act of March 2, 1931. The Animal Damage Control (ADC) program, working under cooperative agreements with the NDOW and others, takes specific depredating lions. This does not stop or eliminate all losses, but does prevent extreme damage in most cases.

## THE MOUNTAIN LION IN NEVADA

The mountain lion has been considered a predator of domestic livestock in Nevada since the advent of white man in this area. The lion has received varying degrees of attention in our ADC Annual Reports throughout the years. During the 1920s and 1930s, little effort was made to identify the species responsible for each depredation, and the lion was merely listed as a known predator. In 1938, two men were hired by the program to hunt lions in the Ely area of eastern Nevada. No further mention was made of these men in subsequent reports, so it is assumed that they worked for a year or less. Nevada ADC Annual Reports for the 1940s show an average annual livestock loss to mountain lions of 70 animals as verified by FWS personnel. Almost all of the animals lost were sheep and lambs. The number of lions taken yearly by the program ranged from one to ten with almost all of them being trapped.

In 1950, a lion hunter was hired specifically to verify claims of lion kills and to hunt lions in sheep areas. During that year, documented lion kills amounted to 501 ewes and lambs and 10 calves. This was a dramatic increase over those reported during previous years. Much of this increase was no doubt due to the fact that there was now a field man specifically looking for lion kills. There were 54 lions taken during the year.

During the years 1950-1965, as many as four FWS lion hunters were on the job at any one time. The mountain lion was at that time an unprotected species, and the hunters took as many lions as possible in the sheep areas throughout the state. The yearly take of mountain lions by the FWS ranged from 54-181 during that period.

In 1965 Fish and Wildlife Service policy shifted from preventive to corrective control in relation to bears and mountain lions. Since that time, lions have been taken only in confirmed kill

situations. Verified livestock losses have averaged 335 animals per year for the last 15 years. The number of lions taken per year has ranged from 7 to 70. There are several reasons for the large differences in numbers of lions taken from year to year, and they will be discussed in a later section.

Although data on mountain lion depredations are incomplete in most states, it appears that Nevada has one of the most serious problems between lions and domestic sheep in the western United States. With the exception of Utah, the states surrounding Nevada have relatively little lion depredation on domestic sheep. California lists a total of only 91 confirmed cases of lion depredation on all species of domestic livestock during a six-year period from 1971-1976 (Sitton 1977). Arizona experiences some depredation problems with lions, but the literature indicates that the majority of these situations involve cattle rather than sheep (Shaw 1975, 1979). Idaho has had a moderate confirmed loss of sheep and lambs over the past five years averaging 52 animals each year (ADC Annual Reports). Utah has a depredation situation which approximates our own. According to ADC Annual Reports from that state, they have experienced an average annual confirmed loss of 304 sheep and lambs, and an average of 15 lions have been taken on complaints each year.

The specific reasons for Nevada's large number of mountain lion depredations on domestic sheep are uncertain. Almost all of the sheep in Nevada are in herded bands on open range. During the summer, these bands are on summer range in the high mountains. These mountain ranges are, of course, where the majority of the lions live, but several of the other western states have similar situations without having similar depredation problems. According to the Nevada Department of Wildlife, the deer populations throughout the state are in healthy condition so lack of natural prey does not appear to be a factor (NDOW, personal communication).

#### CURRENT SITUATION

Presented herein are data on depredation losses to lions during the past five years in Nevada. An increasing effort has been made during the past several years to keep accurate records of losses, and these data should describe the current situation with good accuracy.

During the past five years, ranchers have suffered an average annual loss of 375 animals. As indicated in Table 1, the majority of the yearly loss is in lambs. With a total of 130,000 range sheep

Table 1. Summary of confirmed losses FY 1977-1981.

	<u>FY77</u>	<u>FY78</u>	<u>FY79</u>	<u>FY80</u>	<u>FY81</u>
Complaints Received	80	72	59	48	52
Losses:					
Bucks	9	4	-	2	8
Ewes	144	111	127	143	161
Lambs	221	304	227	260	154
Calves	-	-	1	-	-
Colts	-	-	-	1	-
TOTAL LOSSES	374	419	355	406	323

in Nevada (FWS estimate), this indicates an average yearly loss of 0.29%. This loss would not seem excessive if it was spread evenly over all livestock producers in the state. This, however, is not the case. Of an estimated 90 major livestock producers under the Nevada ADC Program, an average of 15 producers have had problems with lion depredations during each of the past five years. Five individual producers in eastern Nevada have filed 73% of the complaints during this same time period. The average yearly loss of 0.29%, the average number of 15 producers having problems and the five individual producers having serious mountain lion problems during each of the past five years are with the ADC program currently in effect. We judge losses would be much more severe without the program. For these reasons, the mountain lion is considered a serious problem in Nevada.

#### FIELD OPERATIONS

When word of a lion depredation is received in an ADC District Office, a qualified field man is dispatched to the scene as quickly as possible. This is often not a lion hunter as response time and number of current mountain lion complaints may prohibit. This field man inspects the kills in order to determine whether or not a lion is responsible. A mountain lion will almost invariably kill a sheep by biting it on the head or neck which kills the animal instantly. This method of killing leaves large tooth holes in the carcass which are easily identified. Some lions will kill by breaking the neck of the sheep with a swipe of the paw without leaving any mark on the carcass. These kills can usually be verified by the presence of other sign in the area such as tracks or the fact that one or more carcasses are covered with leaves and other debris. According to field observations by ADC lion hunters, however, covering of sheep carcasses is relatively rare. This may be due to the fact that many times the lion will not eat any of the sheep that it has killed and, if it does, it rarely returns to the kill to feed again.

If, upon inspection, the kills are positively identified as being lion kills, we attempt to get a lion hunter to the scene as quickly as possible. Speed is of the essence because most losses occur during the summer months when hunting is difficult and a fresh track is essential to hunting success. There are several factors that make lion hunting a difficult proposition in Nevada. The worst problem is the summer weather. The summer months are usually hot and extremely dry. The dry conditions cause the scent to dissipate very rapidly from the track, and this makes a two- or three-day old track extremely difficult, if not impossible, to follow. The heat also takes its toll on the dogs used to follow the track, and they will usually be played out completely by noon or even earlier. Movement of the sheep by the herder before he discovers the kills is also a problem. Moving the sheep over and around the kills obliterates the tracks and scent of the lion and at times prevents the dogs from finding the lion's trail.

When the lion hunter locates the lion's track, he studies it to determine the sex and approximate size of the animal. This helps while tracking the animal because in most of our sheep areas there is the possibility of more than one lion in the area. If the track that the dogs are following from the kills happens to cross a different, fresher lion track, the dogs might switch tracks to follow the more recent one. This has not happened often in the past but has been known to occur. This is when the hunter's expertise comes into play. If he is trailing a large male lion, for instance, and his dogs tree a female or a smaller male, he will know that it is the wrong animal and release it. Identifying an individual track takes years of experience and is not always accurate, but it is helpful in some situations.

Experience and knowledge of the country are very important to success in lion hunting. A good hunter who knows the area can predict the movements of the lion. This knowledge allows the hunter to cut a considerable distance off the trail. This will often make the difference between success and failure.

An individual lion will usually have a recognizable pattern of killing in that it will kill in the same manner and kill roughly the same number of animals each time. Fortunately, most lions kill small numbers of sheep on each occasion with the average number of kills per incident being six sheep during the last five years. If, however, a lion kills a large number of animals the first time it kills, we have found it likely that this individual will kill a large number if and when it kills again. The largest number of lion kills that we have confirmed for a single incident during the past five years is 59. This occurred during the summer of 1980 just 15 miles east of Ely. This lion killed a larger-than-average number of lambs each time it killed, and had 112 confirmed kills to its credit before it was taken by our lion specialist. This represented an economic loss of approximately \$9800.00 to the producer.

Although a lion is caught on only 37% of the complaints received, our success is usually good in situations where we receive timely word of kills. Communication is the most vital part of solving the lion depredation problem in each specific case, and this is often a real problem. When word of a possible lion kill filters through as many as six different people and three different languages, distortion and loss of time often occur. Many of our unresolved complaints result when we do not receive accurate information or are unable to respond to the complaint for two or three days. Little can be done in these situations unless the lion returns and kills again while we are in the area. Most lions taken in response to depredation complaints are within five miles of the problem site.

Table 2 shows the number of lion complaints received compared with the number of complaints that were actually worked by a lion hunter. A high percentage (85%) of complaints are worked, but inevitably some are not. This is usually due to a lion hunter not being available or word of the kills being received several days after the fact when the dogs would be unable to trail the lion. The true resolution rate of lion complaints is difficult to determine due to several factors. One lion is often responsible for more than one complaint. We may resolve several complaints by removing a single lion and not be aware of it. Predation in some situations is resolved by moving the sheep elsewhere, and problem lions sometimes move out of the area for reasons unknown to us. Field-reporting procedures are being revised and a new Management Information System is presently being designed for the ADC program in order to give us a better grasp on this difficult problem.

Table 2. Depredation complaints FY 1977-1981.

	<u>FY77</u>	<u>FY78</u>	<u>FY79</u>	<u>FY80</u>	<u>FY81</u>
Complaints received	80	72	59	48	52
Complaints worked	65	65	54	39	39
Complaints resolved	*	*	32	30	33
Lions taken	23	17	32	22	20

♦Information not available.

Table 3 presents a summary of the lions that have been taken on depredation complaints during the past five years. Most (67%) of these lions were males. While Seidensticker et al. (1973) found an

Table 3. Lions taken on depredation complaints FY 1977-1981.

	<u>FY77</u>	<u>FY78</u>	<u>FY79</u>	<u>FY80</u>	<u>FY81</u>
Males	14	13	23	11	15
Avg. no. of kills per complaint	7	17	8	18	9
Females	9	4	9	11	5
Avg. no. of kills per complaint	2	5	5	5	5

almost equal sex ratio in the lion population in their study in Idaho, data gathered by the NDOW (Ashman, personal communication) over the past several years have shown a sex ratio in Nevada of approximately two females to each male for a sample of 95 lions. A comparison of these figures with our lions taken seems to indicate that males are much more prone to kill livestock than are females. This may be caused by the fact that males move much greater distances over larger areas than do females, and they are more prone to contact with livestock.

Figure 1 compares the yearly loss of livestock with the yearly take of mountain lions on depredation complaints. The figures for FY77-80 seem to indicate that we may decrease the total livestock loss by

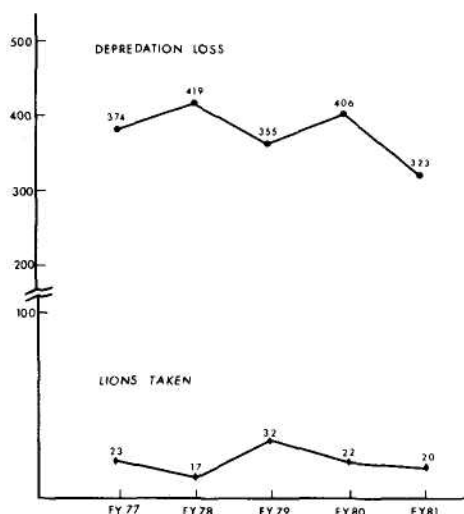


Fig. 1. Depredation Loss versus lions taken.

increasing our take of lions. This, of course, is the purpose of our program. More data are needed to see if this trend continues.

No attempt is made to actually reduce the lion population in any area; only specific depredating individuals are taken. NDOW information cited previously indicates that our program has no lasting effect on the overall population. This means that there are approximately the same number of lions in each area from year to year. Field observations have shown that individual lions vary greatly in their predilection to kill livestock. Some lions seem to kill livestock at every opportunity, but others live in close proximity with one or more bands of sheep all summer without molesting them. Still other lions move completely out of the area as soon as sheep are moved in. There are a few specific locations where a lion will almost inevitably kill when it comes into contact with sheep. The reasons for these high risk areas are not known, but their existence has been recorded over the years.

#### OUTLOOK

The outlook for the lion problem in Nevada does not differ much from the history of the situation over the past 15 years. As previously stated, we have taken a varying number of lions each year on depredation complaints and had a varying number of livestock losses. We will continue to attempt to hold depredation losses to a minimum on an individual case basis.

Our program must be a cooperative effort among several factions including the FWS, the NDOW, Nevada Predatory Animal & Rodent Control Committee, Nevada Woolgrowers, the livestock industry, and the general public. Our ADC program will continue to provide highly dedicated personnel to work in the sheep areas where problems occur.

There are various husbandry practices that the stockmen can and are employing in order to prevent or reduce loss. These include bedding the sheep close to camp or corralling them at night, night-herding, or perhaps simply moving the sheep out of a specific area where trouble is occurring.

The NDOW has classified the mountain lion as a trophy species, as it truly is, and promotes sport hunting. The new permit system which allows unlimited tags but maintains a strictly controlled harvest is increasing the recreational opportunities associated with this species. The NDOW is cooperating with the FWS program in an attempt to reduce depredations. As the mountain lion is classified a game species, our program currently operates under permit issued by the NDOW. We can take actively depredating lions immediately without consultation. In addition, there is presently a system set up to solve problems that arise with chronic depredating lions that we were unable to capture while they were actually killing during the summer. At a yearly meeting in the fall, a list of such lions is presented to the NDOW personnel for their review. If a lion can be identified by sex and immediate area and, if it has caused sufficient damage during the grazing season, permission may be granted to take this individual lion during the winter months when hunting conditions are better. A total of seven such lions was requested and approved for control this year by the NDOW. These situations are carefully considered on a case-by-case basis before a decision is made.

A cooperative telemetry program has been carried out for the past few years between the FWS and the NDOW. Thirty-one lions have been radio-collared and their actions studied to gather information on movements, home-range size and behavior. Data gathered during this study are scheduled to be published during the summer of 1982, and it is hoped that information gained through this program will be beneficial to both agencies.

Finally, accurate information concerning our program must be disseminated to the interested public. The facts concerning the depredation problem and how our ADC program is attempting to alleviate the problem must be available to all parties in order to promote better understanding and a more cooperative attitude among all concerned with this issue.

The mountain lion, like other wildlife species, is a resource which must be carefully managed in order to minimize the damage that it does, to maximize the recreational opportunities associated with the species, and also to insure its viability as a species. With cooperation among all agencies and individuals interested in the management of the mountain lion, it can and will continue to be a valuable part of our wildlife heritage.

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