



Oregon

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To: The Honorable Jackie Dingfelder, Chair
Senate Committee on Environment and Natural Resources



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Dr. Tim Hiller, Carnivore Biologist
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The Oregon Department of Fish and Wildlife appreciates the opportunity to provide information regarding cougar management and research in Oregon. In addition to our testimony and presentation today, we wanted the Committee to have this background information that we also provided to the House Committee on Agriculture and Natural Resources on April 2, 2013.

INTRODUCTION

The Oregon Department of Fish and Wildlife (department) is charged through the Wildlife Policy (496.012) to manage all fish and wildlife. Seven co-equal goals serve as the underlying foundation for management actions undertaken by the department. They include, 1) maintaining optimum populations of fish and wildlife, 2) developing land management actions that foster public enjoyment of wildlife, 3) permit utilization of wildlife, 4) develop and maintain public access, 5) regulate populations in a manner compatible with primary uses of the land and waters of the state, 6) provide optimum recreational benefits, and 7) make decisions that benefit wildlife and that allow for the best social, economic and recreational utilization of all user groups.

Background

The department's first cougar management plan was adopted by the Oregon Fish and Wildlife Commission (Commission) in 1987. An updated and revised plan was adopted by the Commission in 1993. In March 2005, the department undertook an update of the 1993 plan which resulted in the 2006 Oregon Cougar Management Plan. The latest Plan updated Oregon's cougar management history and provided strategies for resolution of conflicts with cougars.

The 2006 Cougar Management Plan was developed through an open public process that included two external peer reviews, two focus groups meetings (the Focus Group consisted of representatives of environmental, hunting, non-hunting, livestock, tribal, and land management interests), eight public meetings and a three-month public comment period. A total of 1,182 written and/or email communications with 2,266 comments were received from the public through November 2005 and addressed in the draft plan. The public comment period extended through April 13, 2006, for a total of almost 9 months. A total of 346 persons attended the eight public meetings where the department received 351 additional comments.

The 2006 Cougar Management Plan includes chapters on cougar biology, historical cougar data, discussions of human conflicts, and cougar management goals implemented via an adaptive process.



The status and management of cougars in Oregon has a long and varied history. Three time periods best represent that history: (1) Unprotected Predator, (2) Game Animal Classification, and (3) Current Management.

1800s – 1967 - Unprotected Predator – Cougar population decline

Bounties were placed on cougars and other "predators" as early as 1843. During this time there were no restrictions on how cougars could be killed. By statute cougars were defined as "predators" and were not protected by any laws or regulations. The 1961 statewide cougar population was estimated at approximately 200. In 1967, the Oregon Legislature, at the urging of houndsmen and other concerned sportsmen, classified the cougar as a game animal which gave the Oregon State Game Commission (now the department) management responsibility.

1967- 1994 - Game Animal Classification – Cougar population recovery

Since 1967, the statewide cougar population has made a remarkable recovery. A 1980 statewide wildlife planning update delineated approximately 50 percent of the state as cougar habitat and estimated the population at 1,800 animals. By 1993, the department estimated the statewide population at about 3,000 animals occupying approximately 80 percent of the state. The controlled hunt system was considered appropriate for addressing cougar damage complaints while meeting goals to maintain healthy cougar populations and provide hunting opportunity. The system allowed the department to change harvest rates annually in response to changing conditions, as well as concentrate hunting efforts in areas with excessive damage problems.

Game animal status allowed the department to manage cougars by setting hunting seasons and controlling harvest rates. Primarily in response to livestock damage complaints in northeast Oregon, the department authorized the first controlled cougar season in 1970 (25 tags available). The number of controlled hunt areas and tags available gradually increased through 1994 (588 tags available). The number of controlled cougar seasons, tag numbers, and extent of hunting areas were based on a combination of previous cougar mortality patterns in the area, age and sex composition of the known mortalities, and trend in the number and type of complaints received.

Post-1994 - Management Changes – Current cougar populations

Cougar management changed dramatically in 1994 when Measure 18, a citizen Ballot Initiative, passed making it unlawful for cougar hunters to use dogs (ORS 498.164). With expectations of a marked decline in hunter success rates, the department changed cougar hunting from controlled hunts with a limited number of highly successful hunters (hunter success of 27–64%, typically ~40%) to an unlimited general statewide season with hunter success ~1%.

In 1999, the Oregon Legislature adopted a new statute allowing persons to legally take cougars posing a threat to human safety without a permit (ORS 498.166). In 2003, ORS 498.012 was modified to expand allowable take of wildlife causing damage, including cougars, to also allow take of animals posing a public health risk, or causing a public nuisance. Although the absolute number of cougars harvested has returned to the pre-1994 level, the impacts of harvest before and after 1994 are not directly comparable. Changes in hunting techniques, distribution of the harvest, and age structure of the harvest post-1994 resulted in additional cougar population

growth. Associated with these changes in management goals and cougar populations, there have been changes in public attitudes regarding cougar management in Oregon. Based on what the department heard, the public comments can be broken into two general groups. Those concerned about the impacts of an increasing cougar population on big game herds, damage to livestock and threats to human safety, and those concerned that cougars should be protected from hunting. The department has evaluated all these changes and incorporated them into the development of the 2006 Cougar Management Plan.

RESEARCH AND MODELING

The department has collected data on cougars for over 35 years. Four information sources are used to manage cougars: (1) Biological data, (2) Non-hunting mortality, (3) Cougar complaints, and (4) Research. The department has conducted three long-term research projects on cougars, one with two separate study sites. The three studies include the Catherine Creek Study (northeast Oregon), Jackson Creek Study (southwest Oregon) and the Nutrition-Predation Study (both northeast and southwest Oregon). Research has provided information for many biological parameters needed to model cougar populations. In addition, research results have provided the basis for establishing population density estimates in different management zones.

Cougar Genetics Research: The department collaborated with a PSU Masters student to document cougar genetics in Oregon. The study identified potential barriers to cougar movements. Data from the study suggested moderately high genetic differentiation between cougars in western Oregon and those in northeastern Oregon, indicating low levels of dispersal between groups. This information is useful to develop stochastic population models for cougar management zones, which will also be compared to the primary cougar population model discussed below. This research will also be used to help delineate population connectivity as discussed in the Cougar Management Plan. Information collected is being shared with Idaho State University researchers to evaluate cougar genetics regionally.

NE Oregon Nutrition-Predation Study update: In an effort to understand causes for chronic low recruitment (calves per 100 cows in spring) in elk in northeastern Oregon, the department:

- (1) measured the nutritional condition and reproductive performance of cow elk,
- (2) estimated population size and density of cougar and black bear, and
- (3) estimated survival and causes of mortality in calf elk.

In the Wenaha and Sled Springs Wildlife Management Units, biologists radio-collared 68 cougars and monitored their distributions, survival, and causes of mortality. During the 6 years, annual survival rates of cougars ranged from 69 to 88%, with a mean annual survival of 79%. Biologists measured the nutritional condition and pregnancy status of 97 elk 252 times at the end of winter to ascertain if the nutritional condition of cow elk was the cause of poor recruitment in elk. They also handled 463 newborn elk calves and monitored their survival and causes of mortality. Across all years and both study areas, annual calf survival was 41% (or 41 of every 100 calves survived).

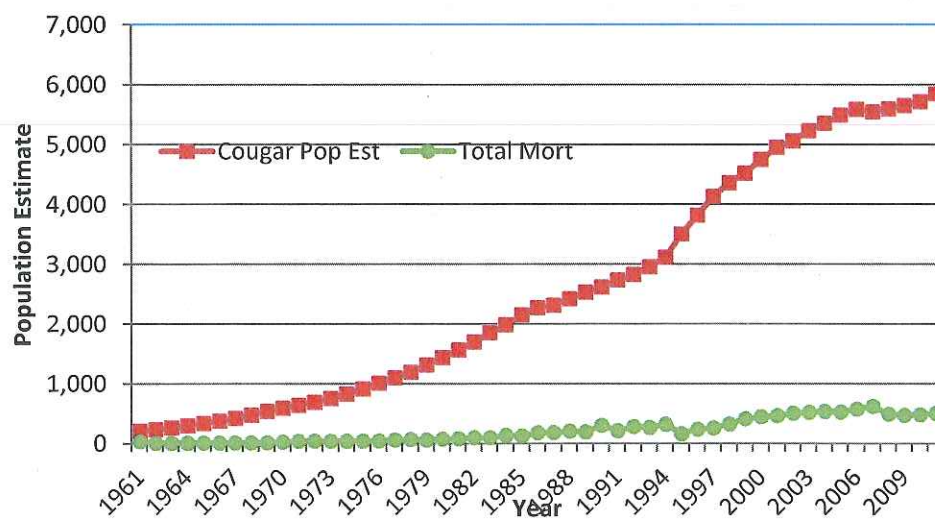
It was determined that cougars killed 73% and bears killed 13% of the 232 carcasses examined. Biologists were unable to identify any link between the nutritional condition of cow elk and the survival of their calves, indicating that nutritional condition of cow elk was above a threshold where nutritional condition was not the cause of low recruitment; however it was identified that cougar density was important in predicting annual survival rates of calf elk.

Because cougars were such an important cause of mortality of elk calves, the Department initiated a study focused on cougar prey selection, kill rates, and population densities from 2009 to April 2012 in the Mt. Emily Wildlife Management Unit. Mule deer comprised 65% and elk 30% of the prey items of cougars throughout the year; however, cougars selected for elk calves and did not select for older elk. Cougars did not select for any specific age class of deer but killed fawns, does, and bucks in proportion to their abundance. Composition of prey of cougars changed throughout the biological year as body size of prey changed. Biologists developed a new method to estimate cougar populations using DNA “fingerprinting” to identify individual cougars from their scat. Results of this body of work will be incorporated in population models for elk that managers can use to evaluate a variety of management actions.

Oregon Cougar Model: Use of population models for wildlife management is common. The department regularly relies on using models to predict populations of fish and wildlife species. All models are built around assumptions; consequently the data used to build the assumptions can be critical to model outputs. The department currently uses one primary model to provide a population trend and estimate. However, other models have been used for comparison purposes.

Cougar population estimates used in the 2006 Cougar Management Plan come from a non-random, density-dependent population model published in 2002 (Keister, G.P. and W.A. Van Dyke, 2002. *A predictive population model for cougars in Oregon*, Northwest Science 76:15–25). The model incorporates measured productivity and observed mortality to calculate changes in the cougar population and is used by the department for evaluating short-term harvest scenarios. The cougar model utilizes extensive, long-term data collected from cougars in Oregon, which provides confidence in the estimates. Since 1995, the model has been used to estimate the cougar population in Oregon (Figure 1) and help determine harvest quotas by zone. Because total mortality (including harvest) has generally been less than quotas, the modeled cougar population in Oregon has continued to increase.

Figure 1. Modeled cougar population and total mortality in Oregon, 1960–2011. Estimates may change as information is updated.



Additional Models: The department continues to validate Oregon's cougar population estimates with, and evaluate, additional models. In addition, the department is continuing research to obtain consistent model parameterization with associated probability distributions to allow incorporation of the random effects typical of wild populations. The department has contracted with a university researcher to develop a contemporary stochastic age-at-harvest population reconstruction model. Once this population model has been evaluated through the scientific peer-review process, a manuscript will be published and the department will also rely on output from this model to help guide cougar management in Oregon.

THE 2006 COUGAR MANAGEMENT PLAN

In accordance with the Wildlife Policy (ORS 496.012), the goal of the 2006 Cougar Management Plan is to maintain cougar populations while managing cougar conflicts with humans, livestock, and other game mammals. To meet the department's statutory obligation, the 2006 Cougar Management Plan establishes five objectives and an Adaptive Management Process in Oregon Administrative Rule. Objective 1 establishes the desire to maintain a statewide population of cougars that is self-sustaining and assures the widespread existence of the species in Oregon. Objectives 2–5 address major types of cougar conflict. The five objectives are intended to be independent of each other. If objectives 2–5 can be achieved, the statewide cougar population can be any number higher than the minimum threshold of 3,000. Objective 1 does not state or infer that the department will remove all cougars in excess of the minimum population threshold.

Objective 1: The department will manage for a cougar population that is at or above the 1994 level of approximately 3,000 cougars statewide.

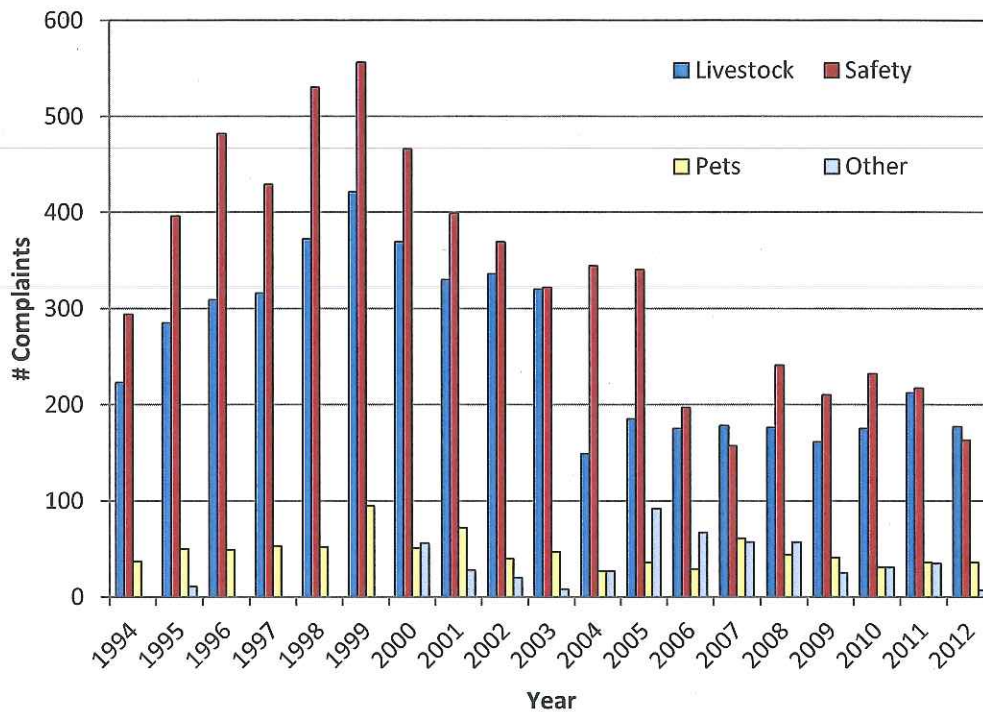
Objective 2: So long as Objective 1 is met (statewide cougar population at or above 3,000 animals) the department will proactively manage cougar-human conflicts as measured by non-hunting mortalities (cougars taken as a result of livestock, and human safety/pet complaints; see Figure 2). The department may take management actions to reduce the cougar population.

Objective 3: So long as Objective 1 is met (statewide cougar population at or above 3,000 animals) the department will proactively manage cougar-human safety/pet conflicts as measured by human safety/pet complaints. The department may take management action to reduce the cougar population.

Objective 4: So long as Objective 1 is met (statewide cougar population at or above 3,000 animals), the department will proactively manage cougar-livestock conflicts as measured by non-hunting mortalities (cougars taken as a result of livestock) and livestock damage complaints. The department may take management actions to reduce the cougar population.

Objective 5: So long as Objective 1 is met (statewide cougar population at or above 3,000 animals), the department will proactively manage cougar populations in a manner compatible and consistent with management objectives for other game mammals outlined in the department management plans.

Figure 2. Number of cougar complaints in Oregon, 1994 – 2012. Data current as of March 19, 2013.



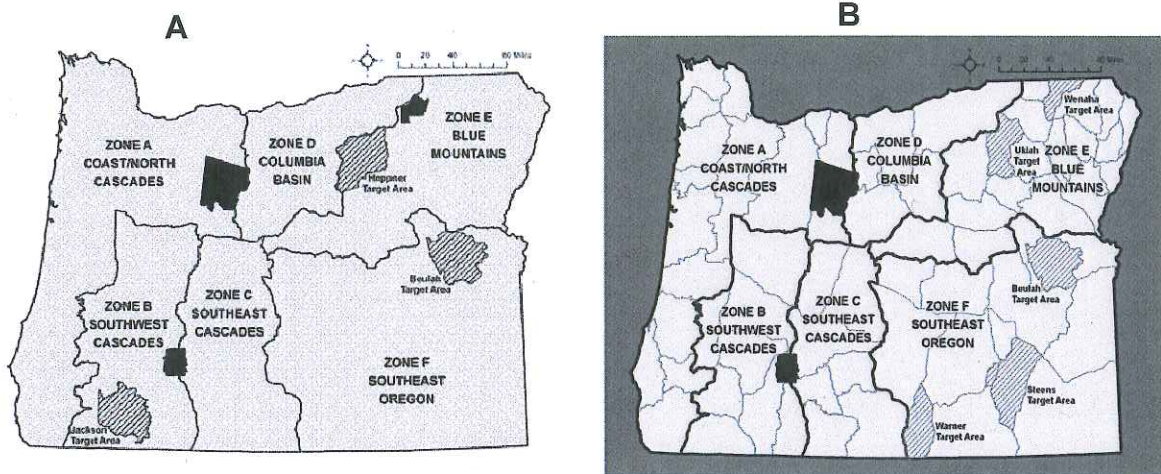
Adaptive Management

Adaptive resource management acknowledges uncertainty in management practices and requires that we learn from our management activities. Adaptive resource management differs from a research experiment in that studies occur at the management scale, and changes in management are used as treatments. Similar to research, adaptive resource management relies on synthesizing existing knowledge, proposing testable hypotheses, implementing treatments, monitoring outcomes of treatments and controls, and adjusting management based on information gained from the study. The 2006 Cougar Management Plan outlined four testable hypotheses:

- 1) Increased cougar mortality near human habitation will reduce cougar-human conflicts to desired levels. Criteria to measure conflict will primarily be non-hunting mortality and secondarily number of complaints received.
- 2) Increased cougar mortality in areas with low ungulate population levels will increase ungulate recruitment or survival and allow population objectives to be met. Criteria to measure elk recruitment will be based on spring calf:cow ratios. Based on elk population modeling and case histories, the department believes 23 calves:100 cows are necessary to maintain an elk herd in the absence of antlerless elk hunting. Trend counts or population modeling will determine attainment of ungulate population objectives.

- 3) Areas with low – medium cougar harvest will act as source populations serving to maintain cougar populations at or above minimum levels. Criteria to measure cougar population status will be based on data from known cougar mortalities (including total mortality, age and sex ratios, average age of adult females), research results, and population modeling.
- 4) Increased cougar mortality near areas of livestock concentrations will reduce cougar-livestock conflicts to desired levels. Criteria to measure conflict will primarily be non-hunting mortality and secondarily number of complaints received.

Figure 3. Maps of past (A) and current (B) cougar target areas.



Cougar Management Plan Implementation

Adaptive management is an important component of the Cougar Management Plan. Similar to research, adaptive resource management relies on synthesizing existing knowledge, proposing testable hypotheses, implementing treatments, monitoring outcomes of treatments and controls, and adjusting management based on information gained from the study. In November 2006, the department selected three areas (target areas) to evaluate the efficacy of administratively removing cougars for human safety/pet concerns, livestock depredation, and elk population recruitment (Figure 3A). The Jackson County Target Area was selected due to a large number of negative interactions related to human safety/pet concerns. The Beulah Target Area was selected due to a high number of cougar-livestock conflicts. The Heppner Target Area was selected due to exceptionally low elk cow-calf ratios believed to be the result of cougar predation.

Utilizing published research, data collected during routine cougar management activities, estimates of cougar density based on zone specific cougar population models, and habitat characteristics of each area, an annual cougar removal objective was established for each target area (Table 1). All administrative removals of cougars involve only lethal methods. Animals were classified into three age classes by gender: juvenile (< 1 yr old), sub-adult (1–2 yr old), and adult (≥ 3 yr old). Administratively removed animals were made available to educational institutions where possible. All known cougar mortality and all reported cougar conflicts within the target area and for the entire

management zone were monitored. Success reducing conflict associated with human safety/pet concerns or livestock depredation was measured primarily using non-hunting mortality resulting from those types of conflicts and secondarily the number of reported complaints received. Success improving elk recruitment was based on spring calf: cow ratios estimated during annual trend counts or population modeling used to determine attainment of established population objectives. Each target area was paired with a control area where no administrative removals occurred. This allowed for an additional comparison of the results from the target areas after removal of cougars.

Cougar populations were monitored primarily using biological data collected within the target area, within the entire management zone, and cougar population modeling for the management zone. Depending on area and year, from zero to 22 cougars were lethally removed primarily during November–April of each year (Table 1). The total cost of implementing administrative cougar removal for three years in three target areas was \$327,709. Initially salary accounted for 78 percent of implementation costs. No state general funds, tax dollars or federal funds were used for implementing cougar removal in target areas. All funds used for target area implementation were ODFW license fee dollars.

Table 1. Information associated with cougar target areas in Oregon, 2006–2010.

Target Area	Purpose	Cougar Removal Objective	Cougars Removed				Cost (\$)
			Winter 06–07	Winter 07–08	Winter 08–09	Winter 09–10	
Jackson County	Reduce human safety/pet concerns	24/year	6	7	11	-	91,099
Heppner	Improve ungulate recruitment	30/year	20	22	11	-	159,370
Beulah	Reduce livestock depredation	12/year	0	12	12	10	77,240
Total		66/year	26	41	34	10	327,709

In Jackson County, non-hunting cougar mortality related to livestock and human safety/pet conflict did not decline as a result of administrative cougar removals. Further, reported conflicts related to human safety, pets/livestock/other concerns ultimately did not decline. However, annual cougar removal objectives were never met due to land ownership patterns in the target area. Thus activity in the Jackson County Target area did not appear to address conflict related to human safety/pet concerns.

In the Beulah Wildlife Management Unit (WMU), non-hunting cougar mortality related to livestock and human safety/pet conflict declined from 13 prior to cougar removals to six during the removal period. Similarly, the number of reported conflicts in the Beulah WMU related to livestock and human safety pet concerns declined from 16 prior to cougar removals to three during the removal period. In the comparison area (Malheur River WMU), both the number of cougars taken for livestock/human safety conflict and number of reported conflicts related to livestock/human safety concerns remained high. The first two years of successful cougar removals in the Beulah Target Area suggested that administrative cougar removal may be reducing cougar conflict associated with livestock.

In the Heppner WMU, the number of elk calves observed per 100 cows increased 76% in 2008 and 2009 compared to the year prior to administrative cougar removal. Comparatively, calf ratios in the Ukiah WMU remained low during the same period. After three years of implementation, administrative cougar removal appears to have had the desired effect on the elk calf ratio.

Cougar populations in respective management zones for target areas were not adversely affected by administrative cougar removals (Figure 4). Population models indicate that the cougar population remained stable in Zone B, and declined slightly in Zones E and F. At the end of 2008 the primary cougar population model estimated 5,681 cougars in the state of Oregon. Further, the proportion of adult females in the total mortality both within the target areas and throughout respective Zones was well below the 40 to 45 percent that would be indicative of heavy exploitation rates.

Based on evaluation of initial target area implementation, evaluation of deer and elk population data for other areas, the department has initiated four new target areas, two for elk and two for mule deer (Table 2; Figure 3B).

Table 2. Information associated with cougar target areas in Oregon, 2010–2012.
Data are current to March 20, 2012.

Target Area	Purpose	Cougar Removal Objective	Cougars Removed ^a				Total for Target Area
			2009-10	2011	2012	2013 ^b	
Steens	Improve mule deer recruitment	20/yr	20	18	15	0	53
Ukiah	Improve elk recruitment	35/yr	35	30	14	7	86
Warner	Improve mule deer recruitment	14/yr	9	4	12	2	27
Wenaha	Improve elk recruitment	20/year	11	19	15	5	50
Total		89/year	75	71	56	14	216

^a 2009-10 includes cougar taken December 2009

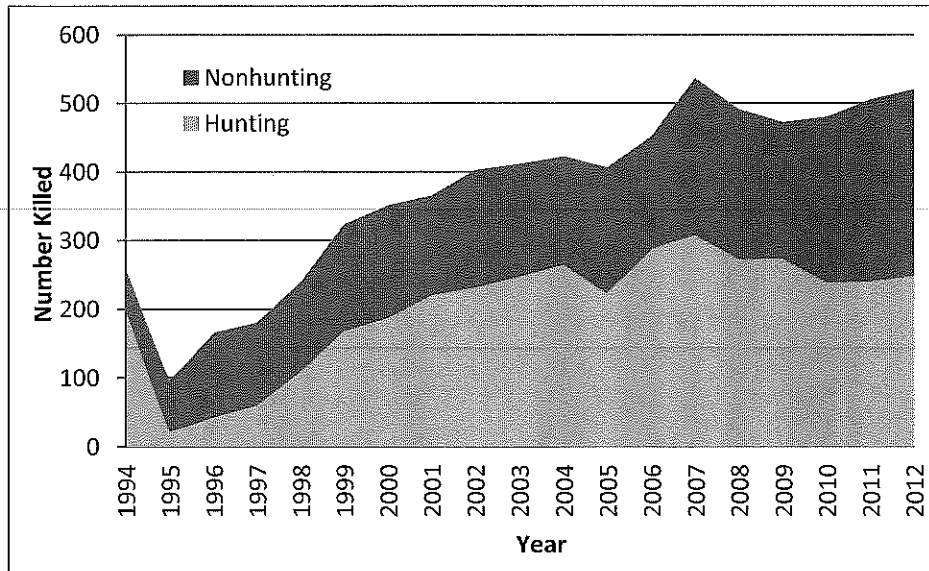
^b Current year, removal ongoing

The Ukiah and Wenaha WMUs were selected as target areas for improving elk populations. The number of calves counted per 100 cows has been below 23:100 for three or more years and elk populations are well below Management Objective (MO). For mule deer, the Steens Mountain and Warner WMUs were selected for target areas. Both units have deer populations that have been in significant decline, and are part of the Mule Deer Initiative.

HARVEST

Hunting and hunters have played a major role in the history of Oregon's cougar management. Cougar harvest by licensed hunters continues to be an important aspect of cougar management in Oregon. Hunter-harvest and total cougar mortality dropped immediately following implementation of Measure 18 but have subsequently increased (Figure 4). Since 2000, licensed hunters have taken an average of 250 cougars per year and account for 50–63% of the total mortality annually. During the 2012 hunting season, licensed hunters harvested 251 cougars in Oregon based on the most current mandatory check-in data. Further, hunters' purchase of licenses and tags has provided all of the funding for cougar management in the state of Oregon.

Figure 4. Hunting and non-hunting cougar mortality, 1994–2012.



SUMMARY

Cougar removal in the Jackson County Target Area did not fully address human safety-related conflict. Cougar removal in the Beulah Target Areas reduced cougar–livestock conflicts. Cougar removal in the Heppner Target Area positively affected elk populations. The department will continue to monitor Cougar Target Areas to determine the effectiveness of administratively removing cougars. The department implemented management actions on four new target areas designed to evaluate the effect on deer and elk populations.

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