

Management Strategy for Cougar Control to Protect Desert Bighorn Sheep
New Mexico Department of Game and Fish
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OBJECTIVE

The objective of this document is to delineate a tiered approach for decreasing levels of cougar control in desert bighorn range as desert bighorn populations increase.

NOTE: No desert bighorn populations in New Mexico are currently large enough to warrant decreasing the level of cougar control. Once that occurs, the management strategy at the end of the document shall be analyzed to evaluate its efficacy, and modifications should be made as appropriate.

BACKGROUND

Desert bighorn sheep management program

Desert bighorn were listed as a state-endangered species in 1980, with cougar predation the predominant factor limiting desert bighorn recovery. Data gathered from radiocollared desert bighorn in multiple ranges in the 1990s demonstrated that cougar predation was responsible for 85% of all known-caused mortality on radiocollared desert bighorn. In response to this high predation rate, a cougar control program was successfully implemented in 2001 to remove cougars from delineated desert bighorn range.

Cougar control is one of many management tools used to protect desert bighorn. The following is a partial list of documents summarizing other management tools and data analyses used to evaluate the efficacy of these tools. All documents are available on the Department's website.

- *Plan for Recovery of Desert Bighorn Sheep in New Mexico 2003-2013* summarizes the history of desert bighorn management in New Mexico, defines challenges facing desert bighorn populations, and offers broad management strategies for addressing the challenges.
- *Desert Bighorn Sheep Status, Population Projections, and Proposed Management Actions 2010-2014* provides a more specific outline of management actions anticipated in the next 5 years.
- *Evaluation of an 8-year Mountain Lion Removal Management Action on Endangered Desert Bighorn Sheep Recovery*, and the *Fra Cristobal Mountains: Evaluation of an 8-year Mountain Lion Removal Management Action on Endangered Desert Bighorn Sheep Recovery* details impacts of the cougar control program on desert bighorn and cougars from 1992-2007.
- *Seasonal Survey Reports* are compiled based on the results of seasonal helicopter surveys, and annual population estimates are made from data collected.
- *Fra Cristobal Desert Bighorn Sheep Management Memorandum 2006-2011* details management strategies for the Fra Cristobal herd.

- *The Environmental Assessment: Mountain Lion Management to Protect the State Endangered Desert Bighorn Sheep* details management strategies for the San Andres herd.

Cougar control impacts on desert bighorn

Monitoring data from radiocollared desert bighorn was analyzed using program MARK to estimate average annual mortality rates for desert bighorn herds. The average annual cougar predation rate on desert bighorn declined 71% from 0.17 during years when cougars were not controlled, to 0.05 during years when they were controlled. Concurrently, the average annual mortality rate from all causes of mortality declined 52% from 0.23 to 0.11. The impacts of lower mortality rates are seen in the bighorn sheep population trend, where the population tripled from ~170 bighorn in the wild at the initiation of the cougar control program, to ~500 individuals in 2009. This increase led to downlisting desert bighorn to state threatened in 2008.

Cougar control impacts on cougars

From 2001-2009, an average of 3.1 cougars/ mountain range/ year was removed to protect desert bighorn. This number has been highly variable per mountain range and per year. Cougar sign has been documented in every range during every year, demonstrating that the control program has not extirpated cougars from any mountain range.

CURRENT COUGAR REMOVAL STRATEGIES

Both the Fra Cristobals and San Andres have written descriptions of how cougar control intensity will decrease with increasing desert bighorn population size. Desert bighorn population sizes to date have not grown large enough to operate in the least intensive category, therefore it is unknown if these prescriptions will be effective.

Fra Cristobal Mountains – currently operating in the second tier.

- **≤ 30 ewes in the desert bighorn sheep population**
Any cougar that enters the desert bighorn management area for any length of time will be killed or removed.
- **31-75 ewes in the desert bighorn sheep population**
Any female cougar that enters the desert bighorn management area will be killed or removed. Any male cougar that kills a desert bighorn will be killed or removed. Any radiocollared male cougar remaining in the desert bighorn management area for greater than 96 hours (4 days) will be considered a threat to desert bighorn and will be killed or removed, even if he leaves the management area before he is caught.
- **≥76 ewes in the desert bighorn sheep population**
Only cougars (both male and female) that kill desert bighorn will be killed or removed.

San Andres Mountains – currently operating in the first tier.

- Only offending cougars that have preyed on any one bighorn sheep will be killed as long as cougars are killing less than 5% of the population during any consecutive 12 month period. If that threshold is exceeded, cougar removal would occur for six months, or

through the following May, whichever is longer. At that time, we would return to an offending cougar policy, as described above.

- Offending cougar control only would be implemented once the San Andres desert bighorn population reaches a minimum of 100 animals including at least 75 adult ewes.
- All cougar control would cease with a total of 200 animals including at least 100 adult ewes. Should desert bighorn population numbers fall below the levels described above, the preemptive and offending cougar control policies may take effect until the desert bighorn population numbers increase to the required level.

Peloncillo, Hatchet, Caballo, and Ladron mountains

The current cougar control program in these mountain ranges consists of attempting to remove all cougars in desert bighorn range. Cougar sign has been documented in every range in every year, and in most years there has been at least 1 radiocollared desert bighorn killed by a cougar in each mountain range.

POINTS TO CONSIDER IN ESTABLISHING A COUGAR CONTROL MANAGEMENT PROTOCOL IN DESERT BIGHORN RANGE

Decreasing the level of cougar control as bighorn sheep populations increase

The current management action of removing as many cougars as possible has resulted in an average removal of 3.1 cougars/ mountain range/ year. This aggressive strategy results in removing only a small number of cougars. Therefore, the cougar control strategy cannot be much less aggressive before the number removed is 0.

How much cougar predation is too much?

In 1999, a Population Viability and Habitat Analysis was conducted to model extinction rates and probabilities for desert bighorn populations given demographic conditions at that time. It was predicted that with a cougar predation rate of 0.05, desert bighorn herds had a 53-100% probability of extinction in 65 years, and with a cougar predation rate of 0.10, all herds had a 100% probability of extinction within 27 years. Current populations are larger than the populations modeled at the time which should decrease extinction probabilities. However, population objectives include increasing population numbers, not only preventing extinction. Therefore, managing cougar predation below 0.05 should be a reasonable threshold to promote population growth. With the current aggressive cougar control strategy, bighorn herds average a cougar-predation mortality rate of 0.05 per year.

Efficacy of removing only offending cougars (those that have killed a bighorn sheep)

Offending cougar control is a less aggressive management tool that could be used once bighorn populations have reached a certain size. However, during 9 years of primarily range-wide control, only 19% of offending cougars were culled. The main reasons cougars were not culled were that the desert bighorn kill was not detected and located prior to the cougar departing, and the cougar was present but missed at the kill site. Success when a daily monitor was present was 22% and success without a daily monitor was 16%. Therefore, offending cougar control does not substantially decrease cougar predation on desert bighorn.

Use of wild populations as source herds for transplants

The use of wild herds as transplant sources would greatly enhance desert bighorn restoration in New Mexico. As established in management documents for the Fra Cristobals and the San Andres, a source herd should have no fewer than 50 ewes remaining in the population post-transplant. If a transplant results in decreasing ewe numbers to a lower tier (as defined below), the cougar control strategy for the lower tier will be implemented.

TIERED COUGAR CONTROL MANAGEMENT STRATEGY TO PROTECT DESERT BIGHORN IN THE CABALLO, HATCHET, PELONCILLO, AND LADRON MOUNTAINS

- **≤ 75 ewes in the population**
All cougars entering desert bighorn range may be euthanized.

- **76-99 ewes in the population**
No cougar control will be implemented unless one of the following occurs:
 - If an offending cougar is documented, range-wide cougar control may be implemented for 2 months.
 - If an average mortality rate of 0.05 or greater from cougar predation is observed in any 12 consecutive month period, cougar control can be reinstated for 6 months.

- **≥100 ewes in the population**
No cougar control will be implemented unless one of the following occurs:
 - If an offending cougar is documented, attempts may be made to kill that cougar
 - If an average annual mortality rate of 0.10 or greater from cougar predation is observed in any 12 consecutive month period, cougar control can be reinstated for 6 months.