

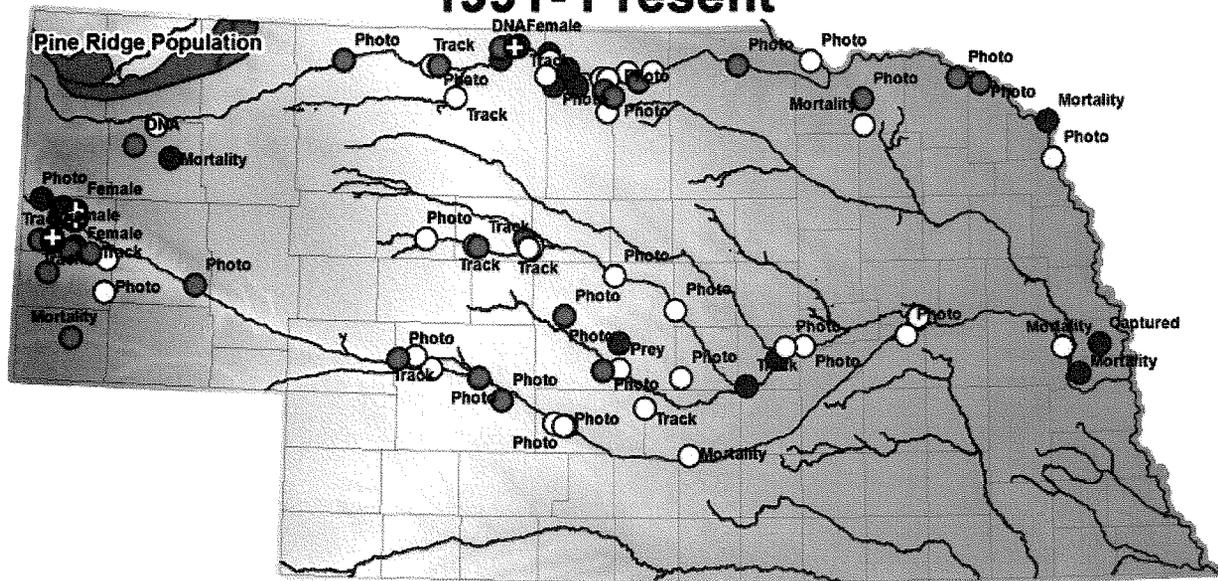
**Mountain Lion Hunting Season Recommendations**  
**May 24, 2013**  
**Chadron, Nebraska**

**Background**

Mountain lions (*Puma concolor*) are native to Nebraska but were extirpated by the early 1900s due to unregulated hunting, trapping, poisoning and decimation of prey species. Prey populations recovered throughout the 20<sup>th</sup> century due to protection offered by game laws. Mountain lion populations recovered throughout the Mountain West over this time period due to the elimination of bounties and management of mountain lions as a big game species. Mountain lion populations expanded in the nearby Black Hills of South Dakota during the 1990s and 2000s. Juvenile male dispersers were documented throughout the Prairie Plains region during this time period. In 1991 mountain lion tracks were found and a female was legally shot in the Pine Ridge region of northwestern Nebraska marking the first documented presence in modern times.

In 1995 the Nebraska Legislature added mountain lions to the statutory list of game animals, thereby affording protection for mountain lions under the Game Law. The Nebraska Game and Parks Commission (hereafter, Commission) began formally investigating observations of mountain lion presence after the original confirmation in 1991. In 2004 the Commission adopted a Mountain Lion Response Plan that detailed the agency's response to various situations regarding mountain lions and identifies criteria for confirming presence of mountain lions in Nebraska. Mountain lion presence was documented on 24 occasions between 1991 and the beginning of 2006. During this timeframe, all mountain lions for which age and gender could be determined were young males that fit the profile of dispersing animals. No evidence of resident animals or females was documented until 2006, when a female ear-tagged in South Dakota was photographed in the Pine Ridge area of northwestern Nebraska. A female mountain lion with a litter of kittens was documented the following year in 2007, which provided the first evidence of a resident population. Based on this evidence, mountain lions appear to have recolonized the Pine Ridge during the mid-2000s. Kittens have been documented in the Pine Ridge every year since 2007. Female mountain lions have also been documented in Scotts Bluff County in 2009, 2010, and 2013, and in Cherry County in 2012 and 2013. Dispersing mountain lions have been found throughout the state and are typically young males. The Commission has documented 92 instances of mountain lion presence outside of the Pine Ridge population since 1991.

# Confirmed Mountain Lion Presence in Nebraska 1991 - Present



## Legend

- ⊕ Female
- 1996 - 2006
- 2007 - 2011
- 2012 - 2013
- Pine Ridge Population

- 1st modern confirmation in Pine Ridge in 1991
- 1st kittens documented in Pine Ridge in 2007
- The Pine Ridge is the only area with evidence of a resident population
- 92 Confirmations outside of Pine Ridge population
- Most outside of Panhandle appear to be dispersing males (not resident)
- \* Individual confirmations are not mapped in Dawes, Sheridan, or Sioux counties where an established population exists

The number of instances of confirmed mountain lion presence in Nebraska has increased each year since 2003. Since confirmations can consist of tracks, DNA evidence, and/or photos, one animal can be responsible for multiple confirmed presences.

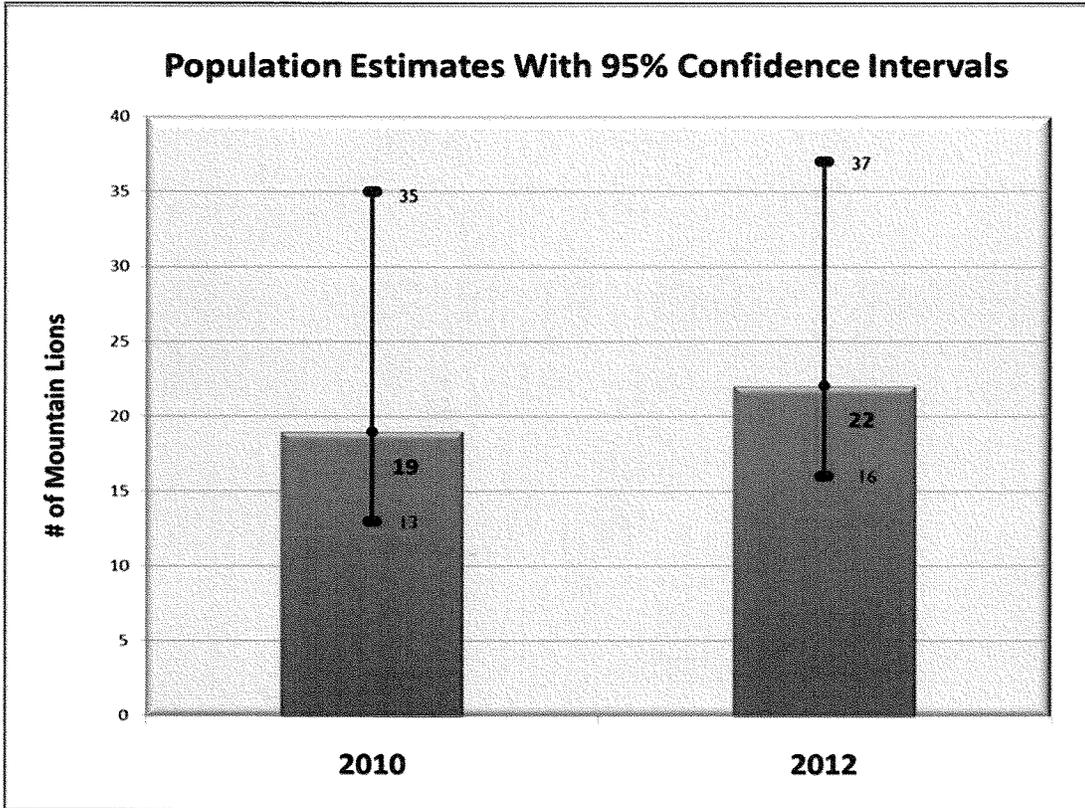
## Mountain Lion Research

Mountain lions have recently recolonized the Pine Ridge in northwest Nebraska and may be recolonizing other areas, such as the Wildcat Hills and Niobrara River Valley. The Commission began conducting research in 2010 to assess the number of mountain lions in the Pine Ridge and to estimate suitable habitat throughout the state.

## Population Estimates

Surveys utilizing scat detector dogs and genetic analyses were conducted in the Pine Ridge in 2010 and 2012. During the 2010 survey, eight males and five females were detected, and during the 2012 survey six males and eight females were detected. The

program CAPWIRE was used to estimate the size of the Pine Ridge mountain lion population, providing maximum likelihood population estimates of 19 and 22, respectively. This model was specifically developed for estimating small populations of elusive species utilizing information gathered through collection of genetic samples (e.g. scat, hair, urine, and blood).

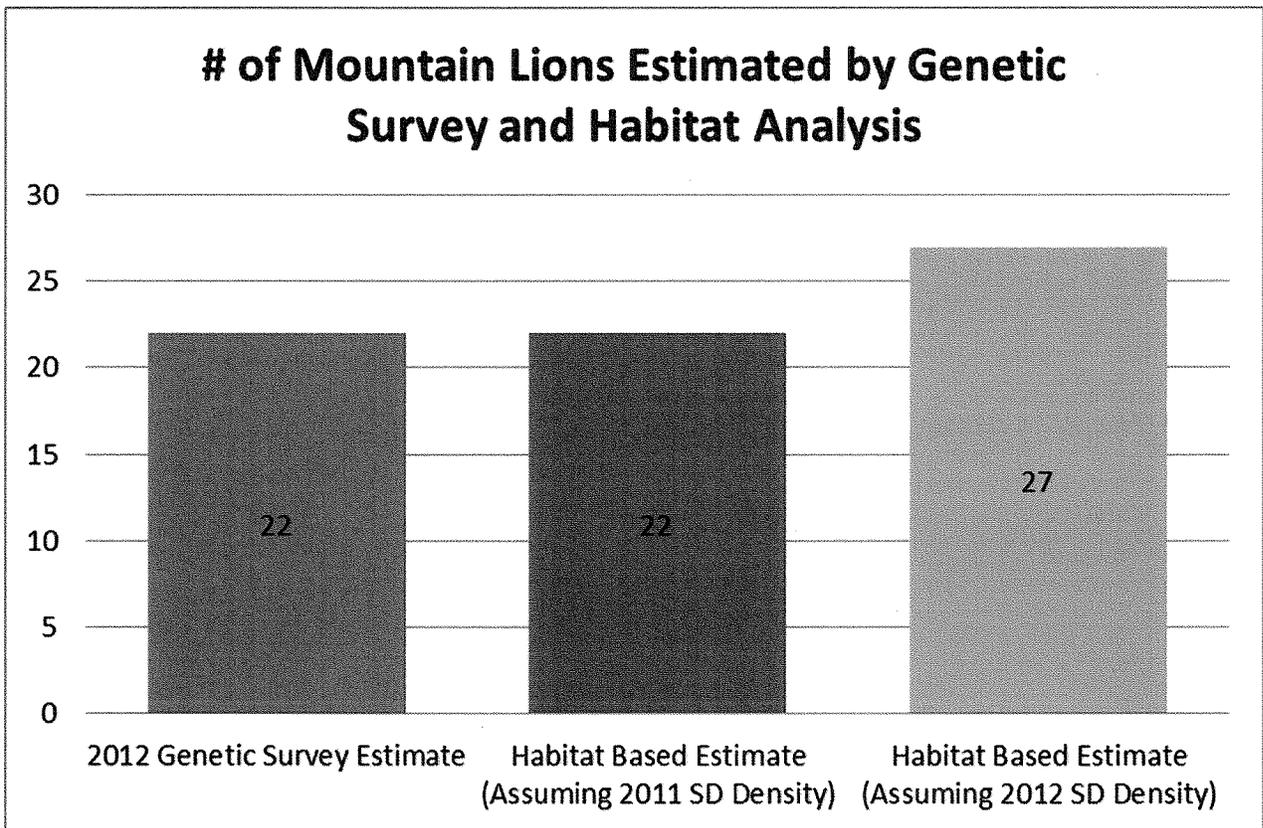


### Suitable Habitat Estimates

The Commission also created a habitat-based estimate of potential population size for mountain lions in the Pine Ridge. The estimate is based on a geographic information system model of habitat suitability developed by the North Dakota Game and Fish Department; model details are available at: [http://www.cougarnet.org/status\\_report\\_of\\_lions\\_in\\_North\\_Dakota.final.606.pdf](http://www.cougarnet.org/status_report_of_lions_in_North_Dakota.final.606.pdf). The model identifies areas of suitable mountain lion habitat using three primary landscape criteria: concealment and stalking cover (woody cover/forest/shrubs), topographic concealment and stalking cover (steep terrain/slopes), and proximity to water. Areas that are steep, forested, and have available water are considered most suitable. The model identified about 96% of Nebraska as unsuitable habitat for mountain lions. The model estimated ~664 km<sup>2</sup> of suitable habitat in the Pine Ridge, which is the largest non-riparian area of suitable habitat in the state. The Niobrara River Valley is the second largest area of contiguous suitable habitat with ~351 km<sup>2</sup>. Some other river

valleys were identified as suitable habitat by the model, but it is unknown if these thin linear strips of habitat can be used as a home range or if they only serve as dispersal corridors.

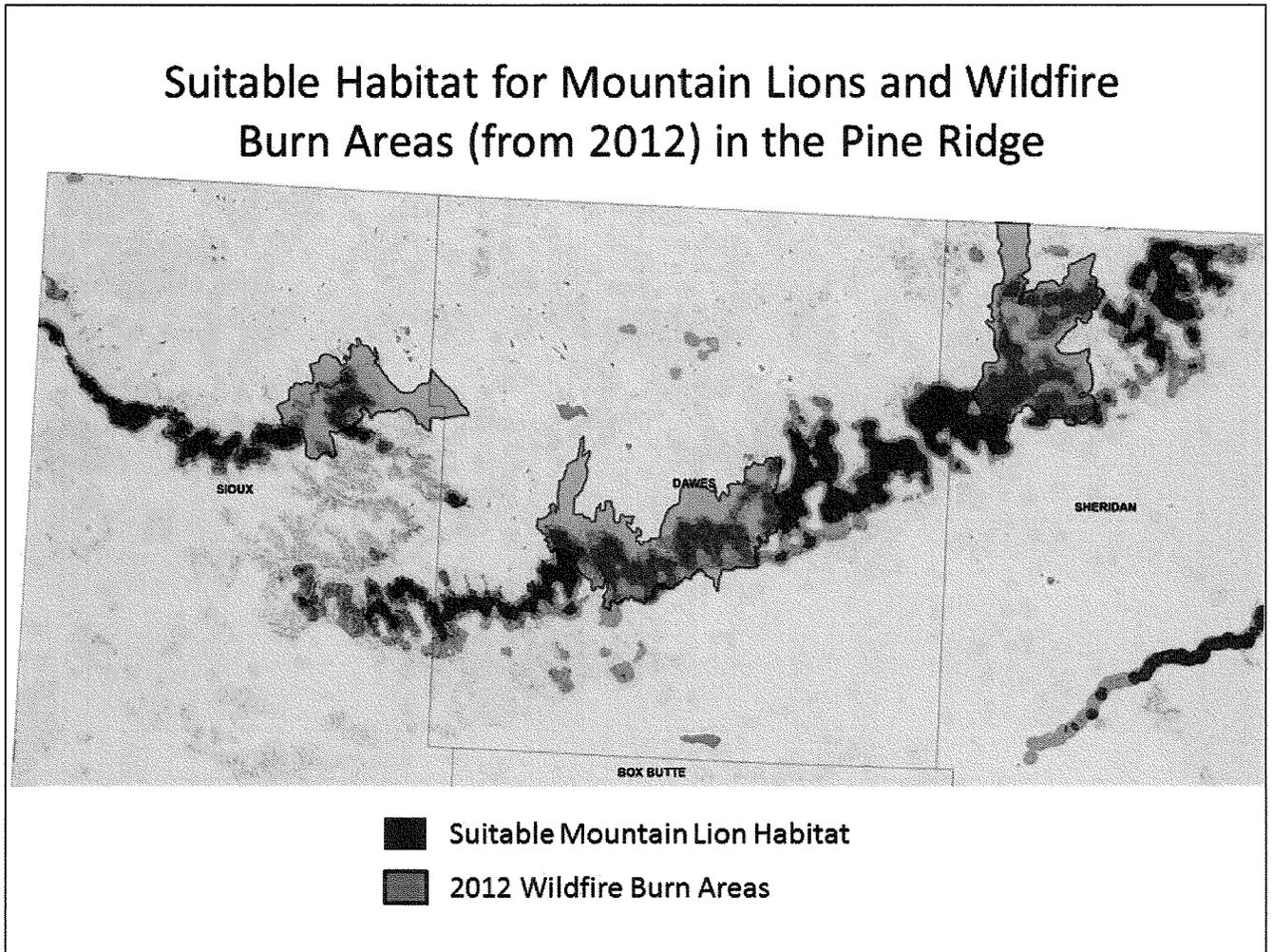
Density estimates from research in the nearby Black Hills of South Dakota were used to estimate the number of mountain lions that would be expected if density of mountain lions in suitable habitat is similar in Nebraska. Using 2011 density estimates from South Dakota and the area of suitable habitat in the Pine Ridge, the expected number of mountain lions would be ~22. Using 2012 density estimates from South Dakota the expected number of mountain lions would be ~27. These habitat-based estimates provided a second measure that was similar to the genetic estimates, thus increasing our confidence that the genetic-based estimates are valid.



### Estimating the Impact of Wildfires

Historic wildfires burned large areas of the Pine Ridge during 2012. In order to estimate the potential effect these fires may have had on habitat and populations, the suitable habitat within the boundaries of the burned areas was subtracted from the total suitable habitat in the Pine Ridge. This provided a lower estimate of 442 km<sup>2</sup> of suitable habitat in the Pine Ridge. Using 2011 and 2012 density estimates from South Dakota and the area of unburned suitable habitat in the Pine Ridge after the fires, the expected number

of mountain lions the unburned habitat would support would be ~15-18. This assumes a worst-case scenario of fire rendering all habitat within the burn perimeter unsuitable; the true area of suitable habitat after the wildfires likely lies between 442-664 km<sup>2</sup>. Future data collection will help ascertain the extent to which lions are using habitat within the burn perimeters.



### Proposed Mountain Lion Harvest

When the Nebraska Legislature classified the mountain lion as a game animal in 1995, it signaled to the Commission that hunting of the species should be allowed if the population was large enough to sustain a harvest. Population information gathered through genetic surveys and habitat estimates in the Pine Ridge indicates the population has reached that level of abundance. In order to provide hunting opportunities for this species in Nebraska, Commission staff recommends a limited hunting season in the Pine Ridge.

The proposed objective of the regional hunting season is to provide a harvest opportunity for mountain lions that is sustainable over time and will allow the population to remain at or near its current level of abundance. Staff recognizes that other population objectives (e.g., increasing or decreasing the population) may have merit and different harvest alternatives would be better suited to meet those goals.

To achieve the proposed objective, staff recommends a quota system for controlling the harvest, with the hunting season ending as soon as the quota is reached or the season closing date occurs, whichever happens first. Research elsewhere in the western U.S. regarding hunting effects on mountain lion populations suggests a harvest rate between 10-20% to maintain a stable population trend (i.e., 10-20% of the population may be removed by hunting each year without driving the population into decline) if immigration from source populations is limited. Given a likely post-fire population size in the Pine Ridge of between 15 and 22 animals, this suggests a quota of three lions is appropriate to meet the management objective and corresponds to a maximum harvest rate of 14-20%.

Staff recommends restricting the number of females that be taken under the quota system to help ensure a stable population size. Small mountain lion populations rely on immigration, particularly by males, and recruitment of female offspring from within the population of resident adult females. Since female mountain lions are more likely to stay in the area they were born and less likely to disperse long distances than males, harvest of females has a greater chance of affecting subsequent population productivity. Female immigration probabilities may be reduced in the future if neighboring states manage for further reductions in mountain lion populations below present levels. Present mountain lion management objectives of South Dakota Game, Fish and Parks include a reduction of the Black Hills population and the reduction of dispersing mountain lions, so a reduction in female immigrants is a realistic possibility.

Assuming population demographics similar to those described by research in South Dakota during 2012, the post-fire Pine Ridge population likely includes 4-6 adult females. Given the harvest objective and considering the estimated population size, area of suitable habitat, and average number of non-hunting human caused mortalities in the Pine Ridge, Commission staff recommends a harvest sub-quota of one female within the overall quota of three total mountain lions.

The proposed harvest season is divided into two periods: (Period 1: January 1 through February 9, and Period 2: February 15 through March 31). The season would close prior to March 31 if either the female sub-quota or the total quota was harvested prior to that date. The season would be held in January – March because this is the time of year females are least likely to have dependant young that may be orphaned if the female is harvested (per research in South Dakota). In order to maximize the harvest

opportunities for hunters, 101 permittees (100 by lottery and 1 by auction) would be allowed to hunt during Period 1 without the aid of dogs. During Period 2 all permittees would be allowed to hunt, with the auction permittee and the first four lottery permittees being allowed to hunt with dogs. The allowance of dogs during Period 2 may provide opportunities for people who prefer to hunt with dogs, as well as increase the chance of harvest success if snow is not available for tracking mountain lions during Period 1. The number of permittees and limited use of dogs is designed to allow the harvest quota to be met before the end of the season, while decreasing the likelihood of exceeding the harvest quota.

## **Harvest Unit**

The proposed harvest unit will have the same boundaries as the Pine Ridge firearm deer unit (i.e. the area north of the Niobrara River and west of Nebraska Highway 27). Other areas of the state such as the Wildcat Hills and Niobrara River Valley downstream from the Pine Ridge possess suitable habitat for mountain lions. These areas have some recent indications of resident populations, including the presence of females and an adult male in the case of the Niobrara River Valley; however, no population information presently exists that can be used to estimate sustainable harvest levels. The Commission presently plans to survey both of these areas and create population estimates as part of the 2014 genetic survey.

## **Summary**

Mountain lions have returned to Nebraska through natural expansion from adjacent states. Commission staff have estimated the size of the mountain lion population and area of suitable habitat in the Pine Ridge and determined that the population could support a harvest of 1-3 mountain lions. A hunting season has been proposed with the objective of providing a harvest opportunity for mountain lions in Nebraska while allowing the population to remain stable. A quota of three mountain lions with a sub-quota of one female is proposed for the hunting season which would begin on January 1, 2014. The sub-quota for female mountain lions provides assurance that this native game species will not be eliminated through hunter harvest. The number of permits issued and use of dogs in Period 2 will allow the harvest quota to be met while decreasing the likelihood of exceeding the harvest quota. The Commission recognizes the Pine Ridge population is connected by immigration and emigration to mountain lion populations in South Dakota and Wyoming. We will continue to communicate with neighboring states to ensure sound management. The Commission intends to manage mountain lion populations over time with consideration given to social acceptance, effects on prey populations, depredation on pets and livestock, and human safety.