



MANAGING FOR AN ELUSIVE SPECIES

By April Howard | Photographs by George Andrejko

You can call mountain lions elusive, solitary and primarily nocturnal, but you can't call them rare in Arizona. Mountain lions are abundant in Arizona and are broadly distributed throughout a variety of habitats across the state. In fact, over the past 20 years, their distribution has expanded into the southwestern part of the state where mountain lion sightings used to be rare.

It is important to understand how the Arizona Game and Fish Department manages this captivating, yet not uncommon, species.

Monitoring an Elusive Species Isn't So Straightforward

The size and density of Arizona's state-wide mountain lion population are difficult to estimate because mountain lions typically are solitary and live in rugged terrain. Their secretive behaviors, nocturnal nature and wide dispersal across the state make them a difficult population to study across large geographical scales. The high cost of long-term research projects, which can exceed \$1 million annually, is another limitation, making efforts to count every mountain lion logistically impractical or economically prohibitive.

To offset these limitations, the department uses several methods to monitor the population and estimate abundance. Methods include harvest numbers, age and sex of the animals harvested, sighting reports, depredation incidents, habitat availability and prey density. The department's recent monitoring results indicate a healthy and robust mountain lion population in Arizona.

The department also does small studies to provide insight on the characteristics of local mountain lion populations in Arizona, such as survival, reproduction, immigration, emigration and diet. These studies contribute to biologists' understanding of local populations and help influence management decisions. As examples, recent research around the cities of Tucson, Payson and Prescott examined mountain lion use of lands and communities adjacent to and surrounded by wildlands and current work in the lower Sonoran Desert should help biologists understand survival, reproduction, movements and prey use in desert environments with multiple prey species.

Managing for Sustainable Populations

Active management is a crucial component of all wildlife conservation, but mountain lion management presents many complex challenges. The department strives to implement management strategies that maintain a sustainable mountain lion population while addressing the diverse needs and views of the public.

Through regulated hunting, hunters fund most wildlife management activities in Arizona and help to maintain the mountain lion population at levels compatible with human activity, various land uses, available habitat and prey density. Mountain lion hunting and harvest are closely monitored to ensure a sustainable population. A hunting license and tag are required to hunt mountain lions, and hunters must report their harvest within 48 hours. They also are required to have their harvest physically inspected by the department within 10 days of take. During the inspection, important biological information is collected, including DNA that has been used to assess potential barriers to dispersal and distribution across the state. A tooth from the mountain lion also is collected to determine its age using "cementum annuli" analysis (similar to counting tree rings).

Using the sex and age composition of the harvest, the department annually evaluates the impact of hunting on the mountain lion population. By closely monitoring the mountain lions taken in the annual harvest, biologists can ensure that the population maintains an appropriate composition of adults, sub-adults and juveniles of both sexes, all of which are necessary for a sustainable population.

One of the department's management strategies is to protect the adult female segment of the population. The proportion of adult females (females 3 years or older) in the annual harvest is a useful indicator of the impact hunting may have on mountain lion populations.

Since 2011, adult female harvest has been monitored in management zones throughout the state, with female harvest limits and/or season closures established if the adult female harvest threshold is ever exceeded. The department has managed for a two-year average adult female harvest to be less than 35 percent of the total take in each zone. This threshold was based on scientific evidence that indicated population declines when adult females make up between 25 percent and 42 percent of the harvest.

Although adult female harvest in Arizona has never exceeded 35 percent in any zone since implementation, more recent research suggests the lower end of this percentage range is a more sustainable limit. For the 2018 mountain lion season, the department will manage for 25 percent of the total take over a three-year average as a parameter to monitor harvest and establish harvest thresholds.

Spotted kittens, and females accompanied by spotted kittens, also are protected by state statutes, and reports of any illegal harvest are investigated thoroughly by wildlife managers.

Mountain lion harvest has remained fairly consistent during the past 20 years, with about 250 to 350 mountain lions harvested annually. A low of 193 mountain lions were harvested in 1984; a high of 384 were harvested in 2001. The steady rate of harvest during the past two decades, along with the consistent number of tags sold, indicates that current harvest levels are sustainable.

Adapting Management to Modern Approaches

The department continually evaluates new and current research and management methods through the hunt guidelines process every five years — which incorporates public comment — and makes changes accordingly. Adapting the best and most effective management strategies

ensures harvest levels (and populations) remain sustainable.

Most recently, department biologists re-evaluated management goals and objectives for the minimal occurrence zone and daylong seasons and made significant changes. These season structures had been designed to maintain historically low mountain lion populations in certain parts of the state or were implemented in units where there are concerns about prey populations. It was determined these approaches were ineffective at influencing harvest, so they were removed from the 2017–18 hunt recommendations. The entire state will now be included in the standard management zone, with a bag limit of one mountain lion per person per year with daylight hunting hours.

Additionally, the department is using other management strategies such as eliminating multiple bag limit season structures; monitoring at a smaller scale using mountain lion management zones based on biogeographical boundaries; establishing harvest thresholds that will close a zone when the threshold is reached; and implementing a season closure during summer months when mountain lion births are at their peak. Furthermore, wildlife managers are using the best scientific approaches for estimating population size, which will help refine management strategies.

As with all other species, management is necessary to satisfy social and ecological goals. Finding balance is the key, as managing some species while leaving other populations unmanaged is detrimental to the ecological balance in the environment. The department is committed to incorporating sound science into mountain lion management and will continue to adapt management to the evolving world of wildlife biology. 🦁

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Frequently Asked Questions

Mountain lions are an important part of Arizona's ecosystem, but over time a number of misconceptions about mountain lions have been perpetuated. Read the FAQ document below to learn the facts about mountain lions and to clear up misconceptions.

What is the status of mountain lions in Arizona?

Mountain lions are not a threatened, endangered or sensitive species in Arizona. In fact, for a large predator, they are abundant throughout the state especially in areas where their major prey species, deer, are present. An independent scientific organization, the International Union of Conservation in Nature, documents that mountain lion populations are expanding in North America and are listed as a species of "Least Concern," a ranking that supports that mountain lions are not at risk in any fashion. In Arizona, mountain lions are expanding into regions where they were once rare, supporting the fact that in this state mountain lions are following the continental pattern of expanding.

If mountain lions are abundant in Arizona, why do we seldom see them?

Despite having one of the most extensive geographic ranges of any land mammal, their elusive, solitary, primarily nocturnal nature, and distribution in rugged terrain makes it rare to observe them in the wild. They typically hunt at night and are adept at using terrain features to remain hidden. Mountain lions tend to avoid humans and human-dominated landscapes, and although they have been documented near urban areas, they typically use those areas during the night to avoid interactions with humans.

How are mountain lions managed in Arizona?

Mountain lions are regulated by several statutes and Commission Order. For example, it is unlawful to harvest a spot-

ted kitten or a female accompanied by a spotted kitten. The Department has implemented several changes to update "best management practices" as part of the agency's adaptive management protocols that dictate the Commission evaluate and establish management guidelines on a periodic basis. An example of these changes is the establishment of several zones in the state with harvest thresholds that would close the season in that zone when a predetermined number of mountain lions have been harvested in that zone.

What data does the Department use to manage mountain lions?

Mountain lions are difficult to survey due to their cryptic behaviors, and similarly to most wildlife agencies, the Department manages this species on data that are derived from harvested animals. Every harvested mountain lion has to be physically inspected by the Department so age and sex data can be collected and analyzed to determine the age distribution of harvested animals. These data are used to create a demographic representation of the population in the wild. In addition, the Department uses harvested female data to adjust season prescriptions if a predetermined percentage of the harvest is adult females. This threshold, which is based on the best available science, has never been met in Arizona.

Is there any indication that mountain lion harvest in Arizona is not sustainable?

No, to the contrary, all of the harvest data that the Department uses to ensure sustainable populations suggests that the population is stable to increasing in many parts of the state. The age of every hunter harvested animal is determined by "cementum aging" techniques, the most commonly accepted method to assess age. The age distribution is "normally distributed," a measure that suggests that based on the best available literature, the population is not being over exploited.

If mountain lion populations are not effectively managed, will there be an increase in human-mountain lion conflicts?

In looking at California, where regulated mountain lion hunting has been banned for decades, there has been an increase in human-mountain lion conflicts. While it is difficult to determine cause and effect, there has been an increase and the same is a potential in Arizona.

What is Arizona's mountain lion population?

Mountain lions are a difficult species to assess population size due to their cryptic nature; however, the Department is using a technique that uses age-at-harvest data to back calculate cohort abundance to estimate annual total abundance. This is a newly employed method for Arizona that applies statistical reconstruction of the population and is the method that is being used by several states to evaluate big game species. This is the most practical and cost-effective method available to the Department. The Department is always seeking the most current and scientifically robust methods to manage wildlife and this method constitutes the best available science. The current population estimate ranges from approximately 2,000 to 2,700 statewide, and based on harvest data analysis, there is no indication of population decline.

Does Arizona have a "trophy" mountain lion hunt?

No, mountain lions are managed as are all hunted wildlife for sustainable harvest in a fashion that does not put the species at risk. To ensure this, physical inspections are mandatory so data on each mountain lion can be collected and population status can be monitored. The term "trophy" has repeatedly been misused to mislead people into a distorted view of mountain lion harvest.