

MOUNTAIN LION FACT SHEET

Understanding Mountain Lion Management in Arizona

BACKGROUND

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

BEHAVIOR

Mountain lions may breed at any time of the year with kittens born in any month; however, in North America the majority of births occur from June through October (Laundré and Hernández 2007, Jansen and Jenks 2012). Females can first breed around 1.5 years of age while males first breed around their second year (Lindzey et al. 1994, Logan and Sweanor 2001). Litter sizes of 2-4 are common and females may raise kittens in consecutive years (Logan and Sweanor 2001).

Mountain lions are specialized top predators, and consequently, do not normally exist at high densities (Logan and Sweanor 2001). Despite having the broadest geographic distribution of any terrestrial mammal in the Western Hemisphere (Lindzey 1987, Logan and Sweanor 2001), their elusive, solitary, and primarily nocturnal nature makes it rare to observe them in the wild. Mountain lions are stalk and ambush predators that hunt primarily at night and rely on ambush to kill their prey (Murphy and Ruth 2010). Adult mountain lions are primarily solitary and generally avoid each other except during breeding (Logan and Sweanor 2010). Although documented in and around lands and communities adjacent to and surrounded by wildlands, mountain lions tend to avoid human dominated-landscapes and interactions with humans (Kerston et al. 2011, Nicholson et al. 2014), which results in few reported mountain lion sightings (Riley and Decker 2000). While human encounters in Arizona are rare, conflicts can occur when people recreate in mountain lion habitat or when a mountain lion frequently uses human dominated-landscapes. The department is committed to helping people learn how to behave responsibly and coexist safely in mountain lion habitat (<https://www.azgfd.com/wildlife/livingwith/mountainlions/>).

POPULATION

The mountain lion is a successful, far-ranging species that occupies a broad range of habitats in both temperate and tropic environments from the southern tip of Argentina in South America to northern British Columbia in North America (Culver 2010, Hornocker and Negri 2010, Laundré and Hernández 2010, Kerston et al. 2011). Breeding populations of mountain lions are known to occur in at least 16 western states (Larue et al. 2012). Since 1990, 10 additional states east of this range have reported mountain lion sightings, suggesting an eastward range expansion (Larue et al. 2012).

In Arizona, mountain lions are widely distributed and are expanding into previously unoccupied areas or areas where they were once considered to be only transient (Hoffmeister 1986, Germaine et al. 2000, Smythe 2008, Naidu et al. 2011). Before 2001, mountain lions in southwestern Arizona were rare. Now, it is not uncommon to observe mountain lion sign in those mountain ranges. Those mountain lions most likely immigrated from adjacent populations in Mexico and southern Arizona (Germaine et al. 2000,

Smythe 2008, Naidu et al. 2014). In general, the distribution of mountain lions in Arizona corresponds with the distribution of its major prey species, deer.

The Department is always seeking the most current and scientifically robust methods to monitor wildlife populations. Currently, the Department is using a technique that uses age-at-harvest data to back calculate cohort abundance over time and sum across cohorts to estimate annual total abundance. This is the most practical and cost-effective method available to the Department that uses data already collected and will help refine management strategies. The current population estimate range of 2,000-2,700 is based on population reconstruction models and supports previous estimates of 2,500.

DATA COLLECTION

Wildlife managers often use harvest data, specifically the sex and age composition of the annual harvest, to monitor long-term population trends and assure a science-based approach to regulating mountain lion harvest (Anderson and Lindzey 2005, Choate et al. 2006). These data are monitored by managers to ensure that the population maintains an appropriate composition of adults, subadults and juveniles of both sexes necessary for sustainable populations (Beausoleil et al. 2013). To collect harvest data, the department requires hunters who harvest a mountain lion to physically present to the department the skull and hide with proof of sex attached within 10 days of harvest. During this inspection, a premolar tooth is removed from each harvested mountain lion to accurately determine its age using cementum annuli analysis (similar to counting tree rings). Managers also collect tissue samples that may be used to genetically identify individuals, evaluate metapopulations, connectivity, dispersal and for other investigative purposes. The department uses harvest data and adaptive management, along with information acquired through research, to guide hunt management strategies and inform land management decisions such as transportation design, alternative energy projects, and urban and rural development planning.

MANAGEMENT APPROACHES

Zone management is a widely used approach whereby large tracts of land, in this case Game Management Units, are partitioned into zones with different population management objectives. This method incorporates mountain lion biology, and their spatial and social organization at the landscape scale. The department used this approach from 2011-2016, managing mountain lions using two different zones; Standard Management and Minimal Occurrence. Management objectives in each zone were based on historical density and occurrence data for mountain lions and their prey populations. The majority of the state was included in the Standard Management Zone, with a bag limit of 1, where both prey species and mountain lions occur at higher densities and the objectives were to maintain sustainable mountain lion populations.

In the Minimal Occurrence Zone, mainly the southwestern portion of Arizona, mountain lions were managed for lower numbers based on historically low densities of mountain lions and their prey. To maintain a smaller mountain lion population in those parts of the state, bag limits were increased to 3 with daylong hunting hours. Recognizing that this approach was ineffective at influencing harvest, the Minimal Occurrence Zone and increased bag limit were removed from the 2017–18 hunt season.

Although a zone management approach will still be used, beginning with the 2018 season Arizona will be divided into Mountain Lion Management Zones with harvest thresholds that will close the mountain lion season in a particular zone when a predetermined number of mountain lions have been harvested in that zone. A management zone will consist of a single unit or grouping of biologically similar units that

will distribute harvest more evenly across the state and allow for better management of regional mountain lion populations.

Spotted kittens and females accompanied by spotted kittens are illegal to harvest. Beginning with the 2018 season, spotted kittens and females accompanied by spotted kittens will receive additional protections because the season will be closed during the summer months when research shows that mountain lion births are at their peak (Ashman et al. 1983, Lindzey et al. 1994, Laundré and Hernández 2007, Jansen and Jenks 2012, Wakeling et al. 2015).

MONITORING ADULT FEMALE HARVEST

When adult female mountain lion harvest represents a substantial portion of the total harvest (25-42%) a decrease in mountain lion abundance often occurs, suggesting that the proportion of adult females in the harvest may be a useful indicator of trends in hunted populations (Anderson and Lindzey 2005, Stoner et al. 2006). The management objective is to protect the adult female segment of the population. Currently, the department evaluates and manages adult female harvest using 6 zones which encompass multiple game management units (Figure 2). These zones are delineated by landscape features that may present barriers to dispersal, both natural (e.g. rivers, canyons) or manmade (e.g. highways, canals). Because reduced harvest of adult females may be a viable management strategy for sustaining mountain lion populations (Ross et al. 1996, Lambert et al. 2006), statewide harvest trends have been managed to keep adult female harvest < 35% of the total take within the standard management zone (Arizona Game and Fish Department 2009). Should the 2-year mean adult female harvest comprise >35% of the total harvest for a zone, female harvest limits or shortened hunt structures may be established to reduce the overall female harvest in that zone. Although adult female harvest in Arizona has never exceeded 35 percent in any zone since implementation in 2011 (range = 0-30%; Table 1), more recent research suggests the lower end of this percentage range is a more sustainable limit (Laundré et al. 2007). Beginning with the 2018 mountain lion season, adult female harvest will be managed to not exceed 25 percent of the total mountain lion harvest within each of the new Mountain Lion Management Zones.

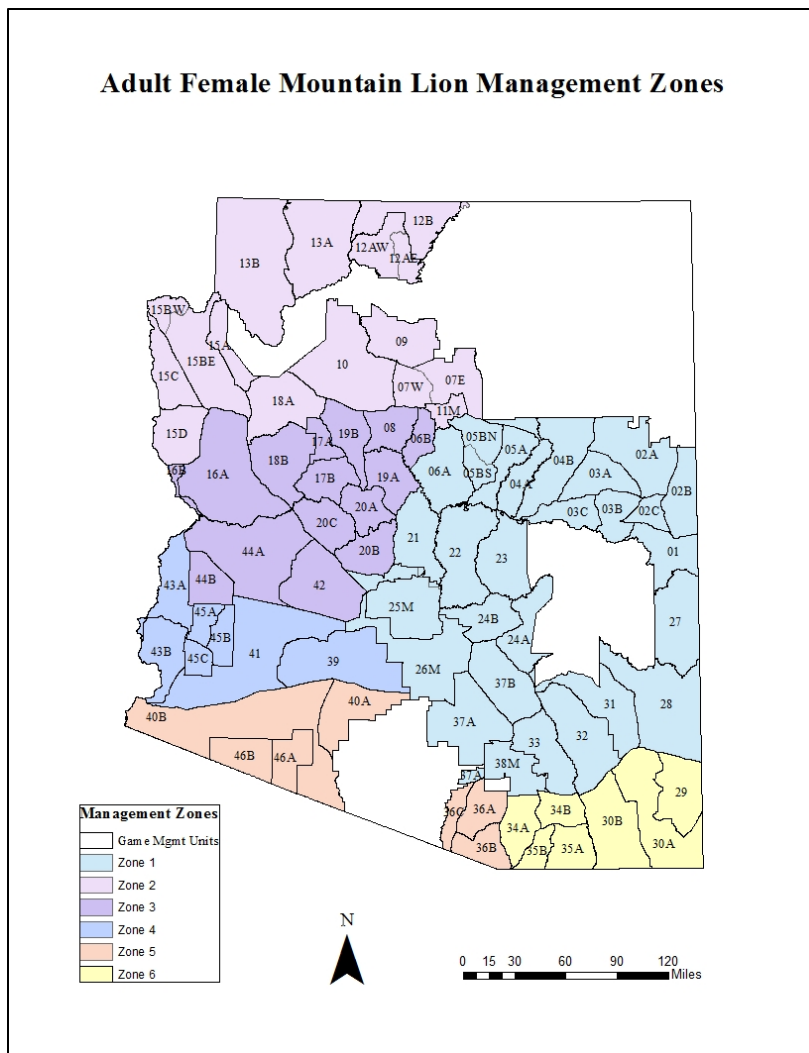


Figure 2. Adult female mountain lion management zones.

Table 1. Two-year mean adult female harvest for the 6 adult female management zones, 2009-2015.

2-Year Mean Adult Female Harvest						
Zone	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015
1	15.58%	20.33%	21.25%	18.06%	19.01%	14.94%
2	23.81%	23.53%	15.48%	14.86%	19.75%	20.45%
3	16.82%	19.23%	29.11%	24.68%	18.67%	19.28%
4	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
5	30.00%	20.00%	18.52%	6.90%	13.16%	23.08%
6	26.32%	26.09%	27.27%	25.00%	21.74%	20.78%

It is legal to use hounds to hunt mountain lions in Arizona, and this hunting method is an effective way to reduce female harvest. Over the past 10 years, Arizona hound hunters were more selective than hunters without hounds, with hound hunters harvesting more males (about 64%) than females while hunters without hounds harvested more females (about 63%) than males. The use of hounds has had a positive impact on harvest selectivity, hunter success, population composition, and ultimately, success of the species.

SUMMARY OF RECENT CHANGES

As part of the agency's adaptive management protocols that dictate the Commission evaluate and establish management guidelines on a periodic basis, department biologists re-evaluated management goals and objectives for mountain lion season structures and proposed significant changes to update "best management practices." Recent management changes adopted by the Arizona Game and Fish Commission that were implemented with the 2017-18 mountain lion season or will be implemented with the 2018-19 mountain lion season include:

- Removal of multiple bag limits
- Removal of minimal occurrence zone
- Removal of daylong hunting hours
- Summer season closure
- Mountain lion management zones with harvest thresholds
- Decrease adult female harvest threshold to 25%

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