

2015

Recent History of Mountain Lion (*Puma concolor*) Observations in Arkansas, with Notes on the Individual Killed in Bradley County, Arkansas in 2014

R. Tumlison

Henderson State University, tumlison@hsu.edu

M. Barbee

Arkansas Game and Fish Commission

Follow this and additional works at: <http://scholarworks.uark.edu/jaas>

 Part of the [Zoology Commons](#)

Recommended Citation

Tumlison, R. and Barbee, M. (2015) "Recent History of Mountain Lion (*Puma concolor*) Observations in Arkansas, with Notes on the Individual Killed in Bradley County, Arkansas in 2014," *Journal of the Arkansas Academy of Science*: Vol. 69 , Article 31.

Available at: <http://scholarworks.uark.edu/jaas/vol69/iss1/31>

This article is available for use under the Creative Commons license: Attribution-NoDerivatives 4.0 International (CC BY-ND 4.0). Users are able to read, download, copy, print, distribute, search, link to the full texts of these articles, or use them for any other lawful purpose, without asking prior permission from the publisher or the author.

This General Note is brought to you for free and open access by ScholarWorks@UARK. It has been accepted for inclusion in Journal of the Arkansas Academy of Science by an authorized editor of ScholarWorks@UARK. For more information, please contact scholar@uark.edu, ccmiddle@uark.edu.

Recent History of Mountain Lion (*Puma concolor*) Observations in Arkansas, with Notes on the Individual Killed in Bradley County, Arkansas in 2014

R. Tumlison^{1*} and M. Barbee²

¹Department of Biology, Henderson State University, Arkadelphia, AR 71999

²Arkansas Game and Fish Commission, 771 Jordan Drive, Monticello, AR 71655

*Correspondence: tumlison@hsu.edu

Running Title: Recent History of Mountain Lion (*Puma concolor*) Observations in Arkansas

Mountain lions (*Puma concolor*) were common into the 1800s in Arkansas but were believed to have been exterminated by the early 1900s, until an individual was killed in Montgomery County in 1949 (Sealander 1951) and a large male was killed after being treed by hounds near Mena (Polk County) the same year (Lewis 1969). For the next 20 years, numerous unverified sightings were reported around the state (Sealander 1956, Sealander and Gipson 1973) but without tangible support – most were reported as “reliable” observations by “qualified personnel”, but who, and how reliable, those reporters were was not documented. It was left to the reader to accept the statements without scientific credibility – until a specimen was killed in 1969 in Ashley County (Noble 1971). The last reported kill occurred 40 years ago (November 1975) in Logan County (McBride et al. 1993).

In 1978, steroid analysis of a scat confirmed the presence of another mountain lion in western Arkansas (Clark et al. 2002). Despite the numerous reported sightings of mountain lions over the years, field surveys conducted from 1988-1991 were unable to validate the presence of wild, reproducing populations of mountain lions in the state (McBride et al. 1993). Further, McBride et al. (1993) determined that all casts of tracks, scats, and photographs held by the Arkansas Game and Fish Commission (AGFC) were actually from coyotes, dogs, bobcats, or bears, and they argued that data used to identify sign of mountain lions in earlier publications were incorrectly interpreted.

However, based on scats and tracks, Witsell et al. (1999) later reported mountain lion activity along the eastern Ouachita Mountains in Garland, Hot Spring, and Pulaski counties. More recently, images have appeared on the internet purportedly taken by trail cameras set in Arkansas, but those often are of dubious origin or have not been verified.

Still, more scientific evidence has fostered the belief that mountain lions may be recolonizing former

range (Pike et al. 1997, LaRue et al., 2012) including Arkansas and neighboring states of Oklahoma, Missouri, and Louisiana. Williams (2015) noted confirmations of 4 mountain lions in Arkansas during the 5 years preceding the Bradley County kill, from Caney Creek WMA (southwest Arkansas), and the counties of Van Buren, Stone, and Marion in northern Arkansas. Three residents in Bella Vista (Benton County) reported seeing a mountain lion between 5-9 January 2015, but wildlife officers could not find sign or other tangible evidence to validate the observation (article published 16 January 2015 at www.arkansasonline.com/news/).

Even when sightings, images, tracks, or other signs of such wide-ranging mammals can be verified, biologists typically still do not know if the animal might be a transient dispersing from a distant viable population. For example, a subadult male mountain lion is known to have dispersed a straight-line distance of 1,067 km from the Black Hills of South Dakota and Wyoming to east-central Oklahoma (Thompson and Jenks 2005). Another male mountain lion killed near Milford, CT on 11 June 2011 was genetically tied to the Black Hills and matched an animal earlier located in Wisconsin and Minnesota, thus it had travelled about 2,400 km (New York Times, 27 July 2011, p. A17). Further, mountain lions kept as pets may be released or escape from captivity, and sightings of those can be misinterpreted as wild animals. In 1987, the AGFC reported a dead mountain lion in Franklin County (Clark et al. 2002), which likely had been a captive animal because it had been declawed. In 2001, up to 150 pet mountain lions were believed to be present in 20 Arkansas counties, and 8 escapes were known between 1997-2001 (Sasse 2001).

In Arkansas, it is illegal to kill a Mountain Lion unless it poses immediate danger to a person's life. To understand the current, and potentially changing, status of mountain lions in Arkansas, it is important to gain as much information as possible from any tangible

materials that become available. Previous reports of kills mention location of the kill but very little more (typically just length and weight), and only the Ashley County kill appears to be represented by a catalogued museum specimen (Noble 1971). Herein we report observations based on the carcass of the mountain lion killed in Arkansas during 2014.

Location of kill: On 8 November 2014, a deer hunter killed a male mountain lion in a hardwood area about 3.5 km (2.2 mi.) ESE of Hermitage, Bradley County, AR (GPS decimal degrees 33.441678°N, -92.135114°W). This location is only about 48 km (30 mi.) NW of the 1969 kill from 6 mi. (9.5 km) E of Hamburg, Ashley County (Noble 1971), and is near the Saline and Ouachita River bottomlands, considered by Sealander and Gipson (1973) to still be occupied by mountain lions at that time. Further, the area is near Felsenthal National Wildlife Refuge, which is suitable habitat for mountain lions (Thatcher et al. 2006, LaRue and Nielsen 2011), and in a rural area where mountain lions are more likely to occur (Pike et al. 1999).

Measurements and condition: The following measurements are presented in the units originally taken, with conversions added parenthetically to allow comparisons with other reports. The Bradley County male weighed 67 kg (148 lbs). Its total length was 222.3 cm (7 ft, 3.5 in.), tail length 74.9 cm (29.5 in.), head width 16 cm (6.3 in.), head length 28 cm (11.0 in.), and ear length 8 cm (3.2 in.).

Selected measurements (in mm) of the cleaned skull (Figure 1) included: total length, 215 mm (8.5 in.); zygomatic breadth, 150.2 mm (5.9 in.); height of sagittal crest, 9.9 mm (0.4 in.); length of right mandible, 141 mm (5.6 in.); and length of right upper canine, 37 mm (1.5 in.). For comparison, the Ashley County specimen weighed 69 kg (152 lbs) and was measured 210.8 cm (6 ft, 11 in.) in total length. Selected skull measurements were: total length, 212.7 mm (8.4 in.); zygomatic breadth, 144.4 mm (5.7 in.); height of sagittal crest, 9.5 mm (0.4 in.); length of right mandible, 140 mm (5.5 in.); and length of right upper canine, 29.4 mm (1.2 in.; Noble 1971).

The Montgomery County specimen killed in 1949 about 2 mi. (3.2 km) N Sims was 7 ft. long (about 2.1 m) and weighed 134 lbs (60.8 kg; Sealander 1951).

Fusion of epiphyses in all long bones indicated the specimen to be at least subadult. Weight and minimal tooth wear led us to an age estimate of 2-3 years old (Ashman 1983). Appearance of the muscle mass, appreciable deposits of fat in the omentum, and fat

surrounding organs indicated that this individual was in good physical condition.

The right scapula showed irregular osteological repair of old damage along the upper anterior curvature, indicating a likely hard blow to the right shoulder during the growth of the cat.

Reproductive condition: The testes were 35 mm long by 22 mm wide. A smear from the epididymis did not reveal spermatogenic activity, indicating that the specimen may not have achieved sexual maturity.

Foods: The stomach contained chicken bones but no feathers, which means the cat may have scavenged bones of a cooked chicken discarded by humans. However, meat of white-tailed deer (*Odocoileus virginianus*), generally viewed as the favored prey, (Pierce and Bleich 2003), distended the stomach and accounted for a mass of 2.9 kg (6.5 lbs).

Origin: Available evidence indicated that this cat was a dispersing wild animal. The cat had not been declawed, which would be indicative of captivity (though the presence of claws does not completely exclude this possibility). Recent occurrences of



Figure 1. Dorsal, lateral, and ventral views of the skull, and lateral view of the dentary, of the mountain lion killed in Bradley County, 8 November 2014.

Recent History of Mountain Lion (*Puma concolor*) Observations in Arkansas

cougars in the midwestern United States were believed to be largely due to dispersal of subadult males (LaRue et al. 2012), and Biek et al. (2006) and Thompson and Jenks (2010) also inferred male-biased dispersal to avoid inbreeding. The Bradley County specimen was a male, as was the cougar killed in Ashley County (Noble 1971), and the one reported killed near Mena in 1949 (Lewis 1969).

To evaluate genetic origin of the specimen, the AGFC sent a sample to the National Genomics Center for Wildlife and Fish Conservation (NGC), Missoula, MT, for DNA analysis. Historically, the endangered Florida subspecies (*Puma concolor coryi*) was thought to occur in Arkansas (Hall 1981, Sealander and Heidt 1990). That subspecies designation was 1 of 32 named forms based on analysis of osteological and pelage characteristics (Young and Goldman 1946), but recent genetic analysis has supported only 6 subspecies, with the North American form now designated *Puma concolor cougar* (Culver et al. 2000). Taxonomically speaking, the Florida population appears to be a genetically unique and disjunct population within the single North American subspecies (Culver and Schwartz 2011).

The Bradley County cougar had a mitochondrial DNA (mtDNA) haplotype "M" which is the most common North American haplotype (Culver et al. 2000, Culver and Schwartz 2011). A panel of 20 microsatellite loci for nuclear DNA was evaluated and compared to samples from populations in 12 other states. The populations with the highest probability of originating the Bradley County specimen was Wyoming (56.5% probability) and the Black Hills of South Dakota and Wyoming (35.5 % probability). This reflects a 92% probability of origin from populations that became viable in the 1990s and have become a primary source for post-2005 breeding populations (LaRue et al. 2012). Record dispersal distances by males from populations in Wyoming and South Dakota have been documented (Thompson and Jenks 2005, 2010). Importantly, the evidence indicates that this animal was not related to the Florida form, which was believed to have been the form historically present in Arkansas.

Interestingly, the NGC also had on file results of the genetic analysis of a hair sample collected near Pindall (Searcy County) in northern Arkansas on 20 September 2014. A goat had been killed and cached, and a game camera set up at the cache site captured images of a mountain lion on 18 September that apparently had returned to the kill. A search of the cache site revealed some hairs caught on briars, which

were sent to NGC for analysis.

That sample was from the same male mountain lion that was killed in Bradley County (the report stated that the probability of these 2 samples matching by random chance is 5.49×10^{-15} , and the probability that the same genetic profile would exist between siblings is 1.31×10^{-6}). Given the kill date of 8 November 2014 for this individual, it had covered a straight-line distance through Arkansas of 300 km (185 mi.) in 50 days. The genetic data and apparent direction of travel are consistent with the idea of a southeastward dispersing male from the Black Hills area.

In contrast, LaRue and Nielsen (2008) had argued that the most likely dispersal corridor to areas of suitable habitat in Oklahoma, Arkansas, and Missouri was from cougar populations in west Texas. Arkansas was believed to contain the most favorable habitat of several evaluated states for dispersing mountain lions (LaRue and Nielsen 2011). Sweanor et al. (2000) found that males dispersed farther, and that males were more likely to traverse large expanses of noncougar habitat while dispersing. Thompson and Jenks (2010) argued that such long dispersal was best explained by a mate procurement hypothesis in which subadult male cougars cross regions void of extant populations until they encounter a breeding population where they can establish residency.

Other observations: The specimen had been shot previously in the left neck and shoulder. We recovered 18 squirrel shot from just inside the skin. As no hematomas were present with the pellets and no holes were present on the outside of the skin, we conclude that the wound was old.

The skull, paws, and tail were retained by the AGFC for educational purposes. The postcranial skeleton, along with a section of skin, were retained in the Henderson State University collection of vertebrates (HSU 839).

Acknowledgments

We thank M. Means (AGFC), K. Pilgrim (NGC), D. B. Sasse (AGFC) for information, and S. Clark (AGFC) for images of the mountain lion.

Literature Cited

Ashman D, GC Christensen, MC Hess, GK Tsukamoto and MS Wichersham. 1983. The mountain lion in Nevada. Nevada Department of Wildlife Reno (NV). 75 p.

- Biek R, N Akamine, MK Schwartz, TK Ruth, KM Murphy and M Poss.** 2006. Genetic consequences of sex-biased dispersal in a solitary carnivore: Yellowstone cougars. *Biological Letters* 2:312-315.
- Clark DW, SC White, AK Bowers, LD Lucio and GA Heidt.** 2002. A survey of recent accounts of the mountain lion (*Puma concolor*) in Arkansas. *Southeastern Naturalist* 1:269-278.
- Culver M, WE Johnson, J Pecon-Slattery, and SJ O'Brien.** 2000. Genomic ancestry of the American puma (*Puma concolor*). *Journal of Heredity* 91:186-197.
- Culver M and M Schwartz.** 2011. Conservation genetics and cougar management *In* Jenks JA, HS Cooley and MR Conover, editors. *Managing cougars in North America*. Berryman Institute Press Logan (UT). p 91-110.
- Hall ER.** 1981. *The mammals of North America*, 2nd ed. John Wiley and Sons (NY). 1181 p.
- LaRue MA and CK Nielsen.** 2008. Modelling potential dispersal corridors for cougars in Midwestern North America using least-cost paths methods. *Ecological Modelling* 212:372-381.
- LaRue MA and CK Nielsen.** 2011. Modelling potential habitat for cougars in Midwestern North America. *Ecological Modelling* 222:897-900.
- Larue MA, CK Nielsen, M Dowling, K Miller, B Wilson, H Shaw, and CR Anderson Jr.** 2012. Cougars are recolonizing the midwest: analysis of cougar confirmations during 1990–2008. *Journal of Wildlife Management* 76:1364-1369.
- Lewis JC.** 1969. Evidence of mountain lions in the Ozarks and adjacent areas, 1948-1968. *Journal of Mammalogy* 50:371-372.
- McBride RT, RM McBride, JL Cashman, and DS Maehr.** 1993. Do mountain lions exist in Arkansas? *Proceedings of the Annual Conference, Southeastern Fish and Wildlife Agencies* 47:394-402.
- Noble RE.** 1971. A recent record of the puma (*Felis concolor*) in Arkansas. *Southwestern Naturalist* 16:209.
- Pierce BM and VC Bleich.** 2003. Mountain lion *Puma concolor*. *In* Wild mammals of North America: biology, management, and conservation. Feldhamer GA, BC Thompson, and JA Chapman, editors. The Johns Hopkins University Press Baltimore (MD). p 744-757.
- Pike JR, JH Shaw and DM Leslie Jr.** 1997. The mountain lion in Oklahoma and surrounding states. *Proceedings of the Oklahoma Academy of Science* 77:39-42.
- Pike JR, JH Shaw, DM Leslie Jr and MG Shaw.** 1999. A geographic analysis of the status of mountain lions in Oklahoma. *Wildlife Society Bulletin* 27:4-11.
- Sasse DB.** 2001. Status of pet mountain lions (*Puma concolor*) in Arkansas. *Journal of the Arkansas Academy of Science* 55:188.
- Sealander JA.** 1951. Mountain lion in Arkansas. *Journal of Mammalogy* 32:364.
- Sealander JA.** 1956. A provisional check-list and key to the mammals of Arkansas (with annotations). *American Midland Naturalist* 56:257-296.
- Sealander JA and PS Gipson.** 1973. Status of the mountain lion in Arkansas. *Proceedings of the Arkansas Academy of Science* 27:38-41.
- Sealander, JA and GA Heidt.** 1990. *Arkansas mammals: their natural history, classification, and distribution*. University of Arkansas Press Fayetteville. 308 p.
- Sweanor LL, KA Logan, and M Hornocker.** 2000. Cougar dispersal patterns, metapopulation dynamics, and conservation. *Conservation Biology* 14:798-808.
- Thatcher CA, FT Van Manen and JD Clark.** 2006. Identifying suitable sites for Florida panther reintroduction. *Journal of Wildlife Management* 70:752-763.
- Thompson DJ and JA Jenks.** 2005. Research notes: long-distance dispersal by a sub-adult male cougar from the Black Hills, SD. *Journal of Wildlife Management* 69:818–820.
- Thompson DJ and JA Jenks.** 2010. Dispersal movements of subadult cougars from the Black Hills: the notions of range expansion and recolonization. *Ecosphere* 1:1–11.
- Williams J.** 2015. The big cat of Bradley County. *Arkansas Wildlife* 46:6-11.
- Witsell T, GA Heidt, PL Dozhier, T Frothingham, and M Lynn.** 1999. Recent documentation of mountain lion (*Puma concolor*) in Arkansas. *Journal of the Arkansas Academy of Science* 53:157-158.
- Young SP and EA Goldman.** 1946. *The puma, mysterious American cat*. American Wildlife Institute, Washington (DC). 358 p.