

STATUS OF MOUNTAIN LION MANAGEMENT IN NORTH DAKOTA, 2017

North Dakota Game and Fish Department

October 2017

Time Period Covered

1 July 2016 – 30 June 2017

SUMMARY

We used a combination of reports of occurrence, harvest locations, and hunter and trapper questionnaires to determine the distribution of mountain lions in North Dakota. We examined abundance of mountain lions in relation to previous years (i.e. trend information) via these same methods, as well as previous habitat analysis. Additionally, we necropsied mountain lion carcasses to collect demographic, dietary, and genetic information. Necropsies indicate a small, but healthy population of mountain lions occurring in western North Dakota.

INTRODUCTION

Historically, mountain lions (*Puma concolor*) once ranged over most of North Dakota, although they were considered scarce except in the Little Missouri Badlands region (Bailey 1926). Records indicate mountain lions disappeared from North Dakota in the early-1900s (Bailey et al. [1914] in Young and Goldman [1946]) with the last confirmed record of a mountain lion being harvested in 1902 along the Missouri River south of Williston (Bailey 1926). There has never been a bounty on mountain lions in North Dakota (McKenna et al. 2004). In 1961, Adams advised that mountain lions have the potential to show up in North Dakota, particularly the Little Missouri Badlands region. According to Seabloom et al. (1980), there were 10 reports of mountain lions in southwestern North Dakota between 1958 and 1980 and they felt the species should be considered extant in the state. In 1991, after a young female mountain lion was shot near Golva, mountain lions were classified as a “fur-bearer” in the state (North Dakota Century Code 20.1-01). Provisions were made to allow removal of individual mountain lions for protection of property and human safety concerns (North Dakota Century Code 20.1-07-04). Prior to this time, mountain lions were unprotected and could be killed legally (McKenna et al. 2004). By the early-2000s, the number of reports of mountain lion occurrences documented by the North Dakota Game and Fish Department (hereafter, NDGFD) had increased such that it became apparent there was a continued presence of mountain lions in western North Dakota (NDGFD 2006).

Currently, it is recognized that there is a relatively small population of mountain lions occurring in western North Dakota. Occasionally, individual mountain lions are documented in other parts of the state (McKenna et al. 2004, NDGFD 2006, NDGFD 2007). As expected, initial estimates of habitat suitability indicated that the Badlands, Missouri River Breaks, and Killdeer Mountains regions (comprising 6% of total state area) provide suitable habitat for mountain lions (NDGFD 2006).

The first regulated hunting season for mountain lions in North Dakota occurred in 2005-2006 with a harvest limit of 5. This first hunting season was considered experimental with the goal being to acquire biological and distributional information about the population of mountain lions occurring in the state (NDGFD 2006). The second regulated hunting season (2006-2007) was modified to prohibit the harvest of kittens (i.e. mountain lions with visible spots) or females accompanied by kittens. Additionally, hunters were not allowed to use dogs to pursue mountain lions until 4 months later in the season. Changes to the 2007-2008 regulations included dividing the state into 2 management zones (Figure 1; Zone 1 had a harvest limit of 5, Zone 2 had no harvest limit), no longer including incidental or depredation removals against the harvest limit, and Fort Berthold Reservation (hereafter, Reservation) having a separate harvest limit of 5 mountain lions. During the 2008-2009 hunting season, the harvest limit for mountain lions in Zone 1 was increased to 8 while the harvest limit within the Reservation remained 5. The harvest limit in Zone 1 was again increased to 10 in the 2010-2011, 14 in 2011-2012, and 21 in 2012-2013 harvest seasons. In 2015-2016, the harvest limit within the Reservation was increased to 10. In 2016-2017, the harvest limit in Zone 1 was lowered to 15.

METHODS

Reports of mountain lion occurrence (e.g. sightings, tracks, etc.) were recorded by NDGFD personnel, and included reports from the general public, deer hunters, fur hunters and trappers, United States Department of Agriculture-Wildlife Services, Theodore Roosevelt National Park, and Reservation Fish and Wildlife employees (Figure 2). Reports were classified as

- a. Verified – Evidence available, including a carcass or live-captured mountain lion, photograph or video, DNA analysis results, or tracks, scat, kill or attack confirmed as being that of a mountain lion by a qualified wildlife professional.
- b. Probable Unverified – No evidence available, but report, animal description, and/or location are plausible.
- c. Improbable Unverified – No evidence available and report, animal description, and/or location are not plausible.
- d. Unfounded – Evidence available which disproves the claim that it is a mountain lion, including carcass or live-captured animal, photograph or video, DNA analysis results, or tracks, scat, kill or attack disproved as being that of a mountain lion by a qualified wildlife professional.

We required all hunters to turn their mountain lion carcasses over to our Department after the pelts were removed so that we could conduct necropsies and collect biological information. Additionally, if possible, we collected data from mountain lions killed on the Reservation. From the mountain lion carcasses, we estimated age (Anderson and Lindzey 2000) and collected morphological measurements, reproductive tracts, stomachs, and tissue samples. We examined reproductive tracts for placental scars. We extracted an upper premolar and sent them to Matson's Laboratory (Manhattan, Montana, USA) to confirm age via counts of cementum annuli.

In early-April 2017, we mailed a questionnaire to 5,000 individuals who bought either a furbearer or combination license for the 2016-2017 harvest season (Tucker 2017). We asked hunters and trappers to indicate the amount of time spent pursuing mountain lions and number of individual mountain lions they harvested. From this, we estimated mean number of days hunting, total number of mountain lions harvested, and counties of most hunting activity.

In 2017, we included in a survey to a random sample of deer hunters a question asking whether they saw any mountain lions while hunting deer (Stillings et al. 2017). We summarized visual observations of mountain lions by deer hunting unit.

We began a research project on mountain lions in North Dakota in cooperation with South Dakota State University (hereafter, SDSU) in August 2011 (Study No. E-XII). The principal investigator for the project from SDSU was Dr. Jonathan Jenks. Our long term research objectives included 1) acquiring information on movements, home range, and spatial relationships of mountain lions, 2) obtaining estimates of survival, reproduction, and cause-specific mortality of mountain lions, 3) determining overall population health and fitness of the

mountain lion population in North Dakota through examination of live and harvested animals, monitoring disease, and assessing genetic vigor, 4) documenting habitat use and testing a habitat suitability map created for the species, 5) obtaining a density estimate for mountain lions in the Badlands, and 6) evaluating techniques for detecting trends in population size and assessing impacts of annual harvests. For more information, see Report No. C-485 or Johnson 2017.

RESULTS

From 1 July 2016-30 June 2017, we recorded 42 reports of mountain lions (Table 1; Figures 3-4). Of those, 20 reports (48%) were classified as Verified (Table 2, Figures 4-5). The Verified reports consisted of 45% photographs or videos, 40% carcasses (i.e. mountain lions harvested during the regulated hunting season, dispatched for protection of property, or killed by automobiles), and 15% mountain lion signs (i.e. tracks, scat, kills, or scrapes; Table 2). Similar to the past several years, the distribution of Verified mountain lion reports occurred predominantly in western North Dakota, particularly the northern Badlands region (Figure 5).

The hunting season for mountain lions opened on 2 September 2016. Zone 1 had a harvest limit, whereas Zone 2 had no harvest limit and remained open for hunting until 31 March 2017. In Zone 1, the harvest limit was split between consecutive early- (2 September 2016-20 November 2016) and late-seasons (21 November 2016-31 March 2017). Zone 1 early-season harvest limit was 8 and the late-season harvest limit was 7, for an overall harvest limit of 15. Hunters could use dogs to pursue mountain lions only in the late-season. The harvest limit for the early-season was not reached prior to 20 November 2016, therefore 5 days after the late-season harvest limit was reached, a conditional season opened in Zone 1 to allow additional mountain lion harvest until the early-season harvest limit was reached or 31 March 2017, whichever came first.

The early-season in Zone 1 closed on the last day of the season with 3 mountain lion being harvested (Table 3; Figure 7). The late-season in Zone 1 closed on 15 March 2016 after the harvest limit of 7 was reached. A conditional season opened on 21 March 2017, but no more mountain lions were harvested before the season closed on 31 March 2017. Additionally, 1 mountain lion was legally harvested within the Reservation. Therefore, the total legal harvest consisted of 7 females and 4 males. Methods of take included 7 pursued with dogs and shot with firearms, 3 shot with firearms, and 1 called in using a predator call and shot with a firearm.

Majority of mountain lion carcasses we examined were in good nutritional condition; fat content observed during necropsy was at or above expected levels and parasite loads were low.

Results from the questionnaire mailed to furbearer and combination license holders indicated that 1.65% of license holders hunted mountain lions during the 2016-2017 season. Results from the questionnaire also indicated that individual hunters spent an average of 2.70 ± 3.31 ($\bar{x} \pm SD$) days pursuing mountain lions with an estimated statewide harvest of 0 mountain lions during the 2016-2017 hunting season. It is apparent that data obtained from the questionnaire

regarding mountain lion hunting activity is not a reliable estimate of true harvest at this time and mandatory reporting of harvest should continue.

Responses from the deer hunter questionnaire resulted in <1% of people indicating they saw a mountain lion while deer hunting (Figure 6). Only four of the units where mountain lion observations were reported (4A, 4B, 4C, and 4D) contained habitat considered suitable for a breeding population of mountain lions (NDGFD 2006).

DISCUSSION

We monitored mountain lions in North Dakota via reports of occurrence, mandatory carcass check-ins, and harvest surveys. Additionally, we continued an active research project on mountain lions to determine baseline population information (Study No. E-XII). Our knowledge of mountain lion distribution, population demographics, and health has vastly improved over the past 12 years. However, we continue to improve our understanding of vital rates and habitat use for mountain lions in North Dakota. Therefore, until more information is known, mountain lions should continue to be monitored closely.

Although we cannot use Verified reports of mountain lion occurrence to document population trends, these reports provide us with valuable information regarding distribution, habitat use, and travel routes, especially those used for dispersal of mountain lions in North Dakota. We documented reports of mountain lion occurrence in 40% of the counties in North Dakota (Figure 3). However, we verified reports in only 11% of counties (Figure 5). Not surprisingly, we verified the largest number of reports in Billings ($n = 6$), Dunn ($n = 6$) and McKenzie ($n = 3$) counties, which have the highest proportion of suitable habitat for mountain lions (NDGFD 2006). The number of reports of mountain lion occurrence we documented from 1 July 2016-30 June 2017 was similar to the previous fiscal year (Table 2, Figure 4).

Internal examination of mountain lion carcasses indicated mountain lions in North Dakota are generally healthy. The sex ratio of all mountain lion carcasses we have examined to date in North Dakota ($n = 190$) was 0.7 females per male and mean age was 2.6 ± 2.3 ($\bar{x} \pm SD$) years. In comparison, the sex ratio of mountain lion carcasses examined from 1 July 2016-30 June 2017 was 0.6 females per male and age was 3.1 ± 2.2 years. Mean weight for mountain lions ≥ 1 year of age was 87 (range 56, 126) and 121 (range 79, 170) pounds for females and males, respectively.

Report and population trends indicate that the number of mountain lions found in Zone 1 (breeding population) has been on the decline for the past 5 years. This concurs with results from our research over the past 6 years, which suggests that survival rates for radio-collared mountain lions in Zone 1 are below the amount needed to sustain current numbers (Wilckens 2014 and Johnson 2017).

LITERATURE CITED

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Table 1. Number of mountain lion reports recorded by classification in North Dakota, 1 July 2000 through 30 June 2017.

Fiscal year ^a	Verified ^b	Probable unverified ^c	Improbable unverified ^d	Unfounded ^e	Total
2000-2001	4	2	0	0	6
2001-2002	8	6	4	0	18
2002-2003	3	7	10	5	25
2003-2004	4	6	11	4	25
2004-2005	16	36	31	13	96
2005-2006	39	60	40	53	192
2006-2007	52	80	50	57	239
2007-2008	57	71	52	65	245
2008-2009	31	37	39	70	177
2009-2010	22	16	32	64	134
2010-2011	38	17	25	37	117
2011-2012	56	1	23	28	108
2012-2013	35	2	12	21	70
2013-2014	41	5	18	21	85
2014-2015	39	1	13	16	69
2015-2016	30	2	6	6	44
2016-2017	20	2	11	9	42

^aJuly 1 through June 30.

^bEvidence available, including a carcass or live-captured mountain lion, photograph or video, DNA analysis results, or tracks, scat, kill or attack confirmed as being that of a mountain lion by a qualified wildlife professional.

^cNo evidence available and the report, animal description, and/or location are plausible.

^dNo evidence available and the report, animal description, and/or location are not plausible.

^eEvidence available which disproves the claim that it is a mountain lion, including carcass or live-captured animal, photograph or video, DNA analysis results, or tracks, scat, kill or attack disproved as being that of a mountain lion by a qualified wildlife professional.

Table 2. Reports of Verified mountain lion occurrence in North Dakota, 1 July 2000 through 30 June 2017.

Fiscal year ^a	Sign	Carcass	Visual observation	Incidental capture	Photograph/ Video	Total
2000-2001	3	1	0	0	0	4
2001-2002	4	0	3	0	1	8
2002-2003	2	0	0	0	1	3
2003-2004	3	0	0	0	1	4
2004-2005	6	2	4	0	4	16
2005-2006	22	5	11	0	1	39
2006-2007	32	12	6	1	1	52
2007-2008	30	12	8	0	7	57
2008-2009	10	11	4	0	6	31
2009-2010	5	12	3	0	2	22
2010-2011	14	22	0	0	2	38
2011-2012	14	33	3	0	6	56
2012-2013	14	20	0	0	1	35
2013-2014	10	22	0	0	8	41
2014-2015	13	23	1	0	2	38
2015-2016	6	17	0	0	7	30
2016-2017	3	8	0	0	9	20

^aJuly 1 through June 30.

Table 3. Mountain lion mortalities in North Dakota, 1 July 2016 through 30 June 2017.

ID	Cause of death	Date	Sex	Estimated age class (yr) ^a	Weight (lbs)	County
F266	Legal harvest	9/16/2016	F	3-4	66	McKenzie
F267	Legal harvest	10/9/2016	F			McKenzie
F268	Legal harvest	11/6/2016	F	2-3		Dunn
M269	Legal harvest	12/4/2016	M	0-1		McKenzie
M126	Legal harvest	12/4/2016	M	6-7		Billings
F270	Legal harvest	12/14/2016	F	1-2	120	Billings
F271	Legal harvest	12/19/2016	F	6-7	85	Dunn
M272	Legal harvest	2/7/2017	M			Dunn
M273	Legal harvest	2/9/2017	M			Dunn
F274	Legal harvest	3/15/2017	F	9-10		Dunn
F275	Legal harvest (Ft. Berthold)	11/12/2016	F	1-2		Dunn

^aWhen possible, cementum analysis (Matson's Laboratory, Manhattan, Montana, USA) was used to determine age estimates. Otherwise, estimates of age followed that of Anderson and Lindzey (2000).

Figure 1. Harvest zones for mountain lions in North Dakota during the 2016-2017 season.

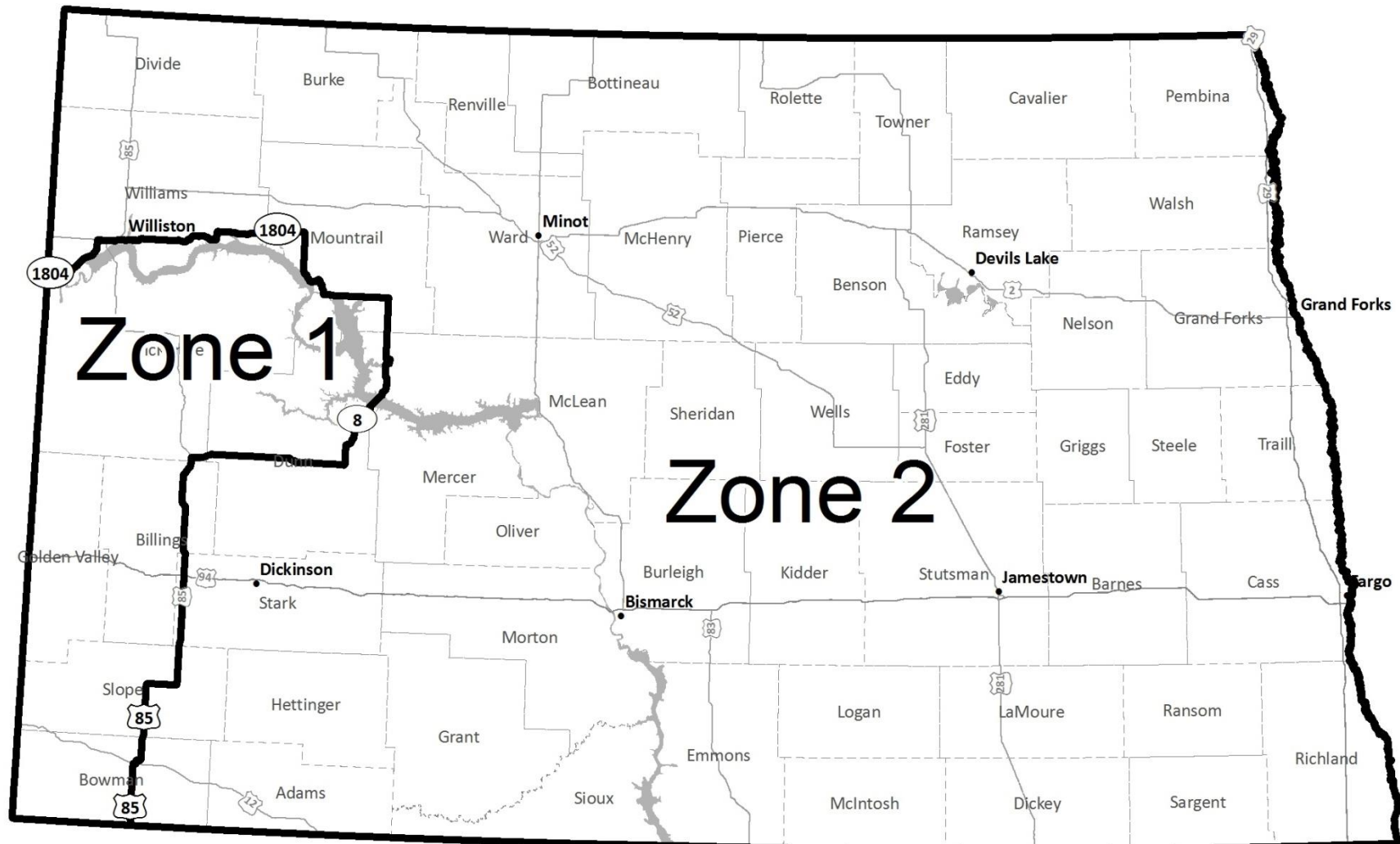


Figure 2. Report form used by North Dakota Game and Fish Department personnel to document the occurrence of mountain lions in the state.

	North Dakota Game and Fish Department Furbearer Report Form	Print Form Submit by Email
OBSERVER INFORMATION		
Last Name:	First Name:	Email:
Address:	Telephone:	Respondent:
GENERAL INFORMATION		
Incident Date:	# of Adults:	# of Young:
Species:	Age:	Sex:
Incident Type (Select One)	☐ Sign ☐ Visual Observation ☐ Close Encounter ☐ GPS/Radio Collar ☐ Carcass ☐ Incidental Capture ☐ Attack on Person ☐ Video/Photo	
Sign Type	☐ Track (Snow/Mud) ☐ Scrape ☐ Wildlife Animal Kill ☐ Dam ☐ Scat ☐ Vocalization ☐ Domestic Animal Kill ☐ Other ☐ Hair ☐ Den ☐ Domestic Animal Attack	
Carcass Type	☐ Shot ☐ Snared ☐ Trapped ☐ Road Kill ☐ Found	
LOCATION INFORMATION		
Section:	Township:	Range:
County:	Quarter:	Latitude:
		Longitude:
General Description:		
COMMENTS		
Please include any correspondence, field action taken, mistaken identity, sighting descriptions, dates and any additional details.		
— For ND Game and Fish Department Use Only — Incident Classification ☐ Unfounded ☐ Improbable Unverified ☐ Probable Unverified ☐ Verified Data Entered in Database: _____ (Initials)		

Figure 3. Number of reports of mountain lion occurrence in North Dakota, 1 July 2016 through 30 June 2017.

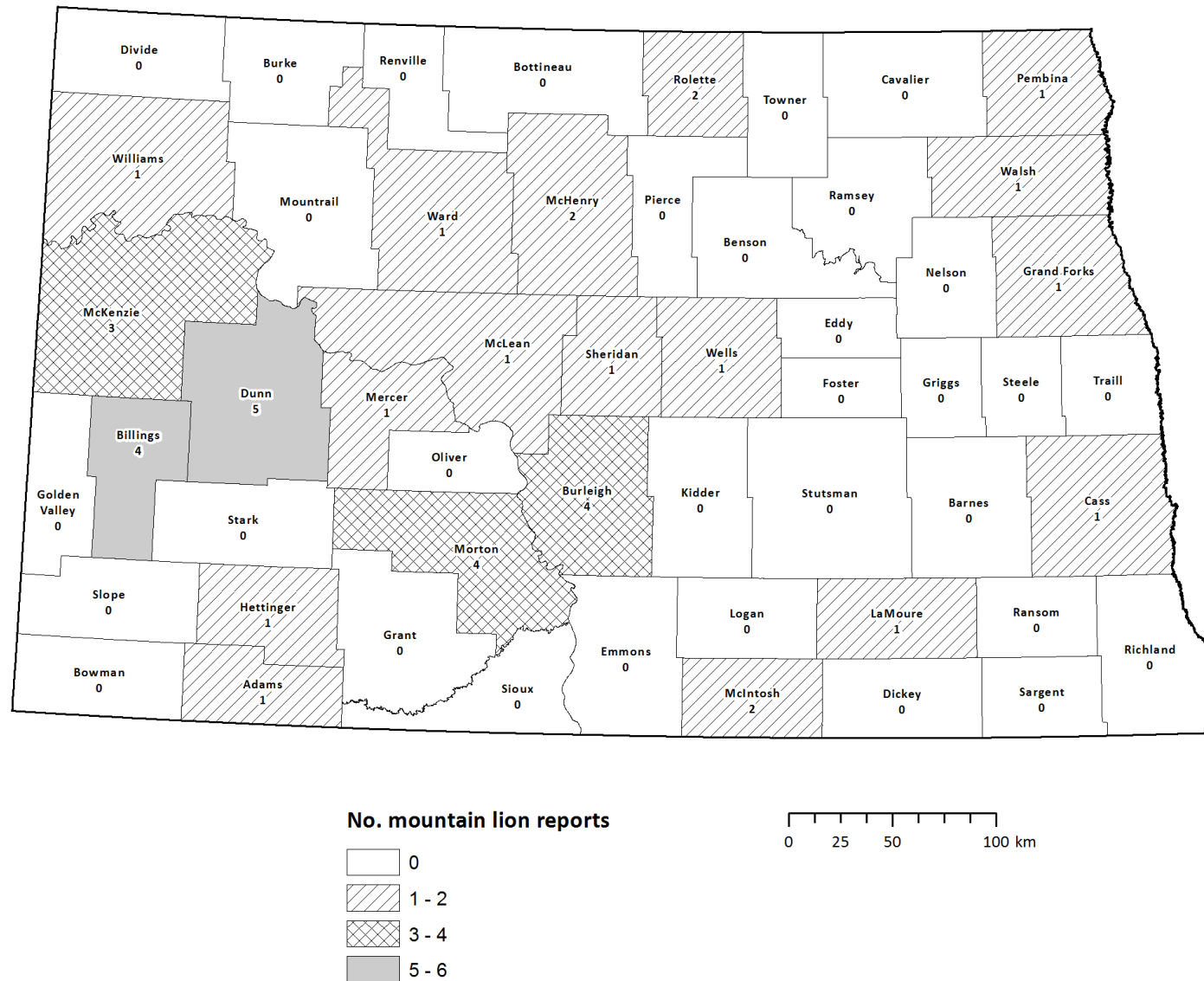


Figure 4. Number of reports of mountain lion occurrence in North Dakota, fiscal years (1 July-30 June) 2000-2001 through 2016-2017. Reports of occurrence were classified as Unfounded (evidence available to disprove the occurrence of a mountain lion), Unverified (no evidence available to prove or disprove the occurrence of a mountain lion), and Verified (evidence available to prove the occurrence of a mountain lion).

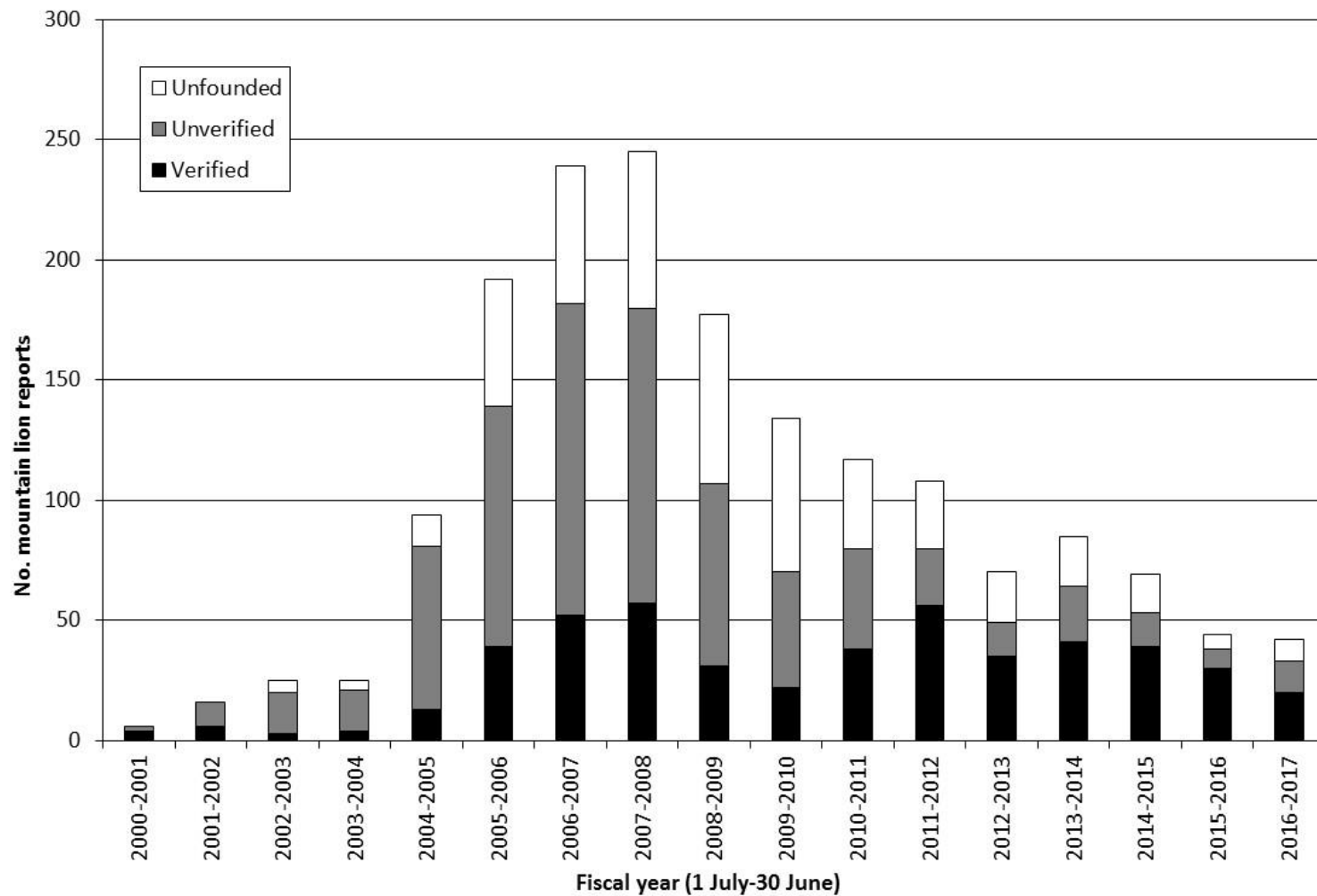


Figure 5. Locations of Verified reports of mountain lion occurrence in North Dakota, 1 July 2016 through 30 June 2017.

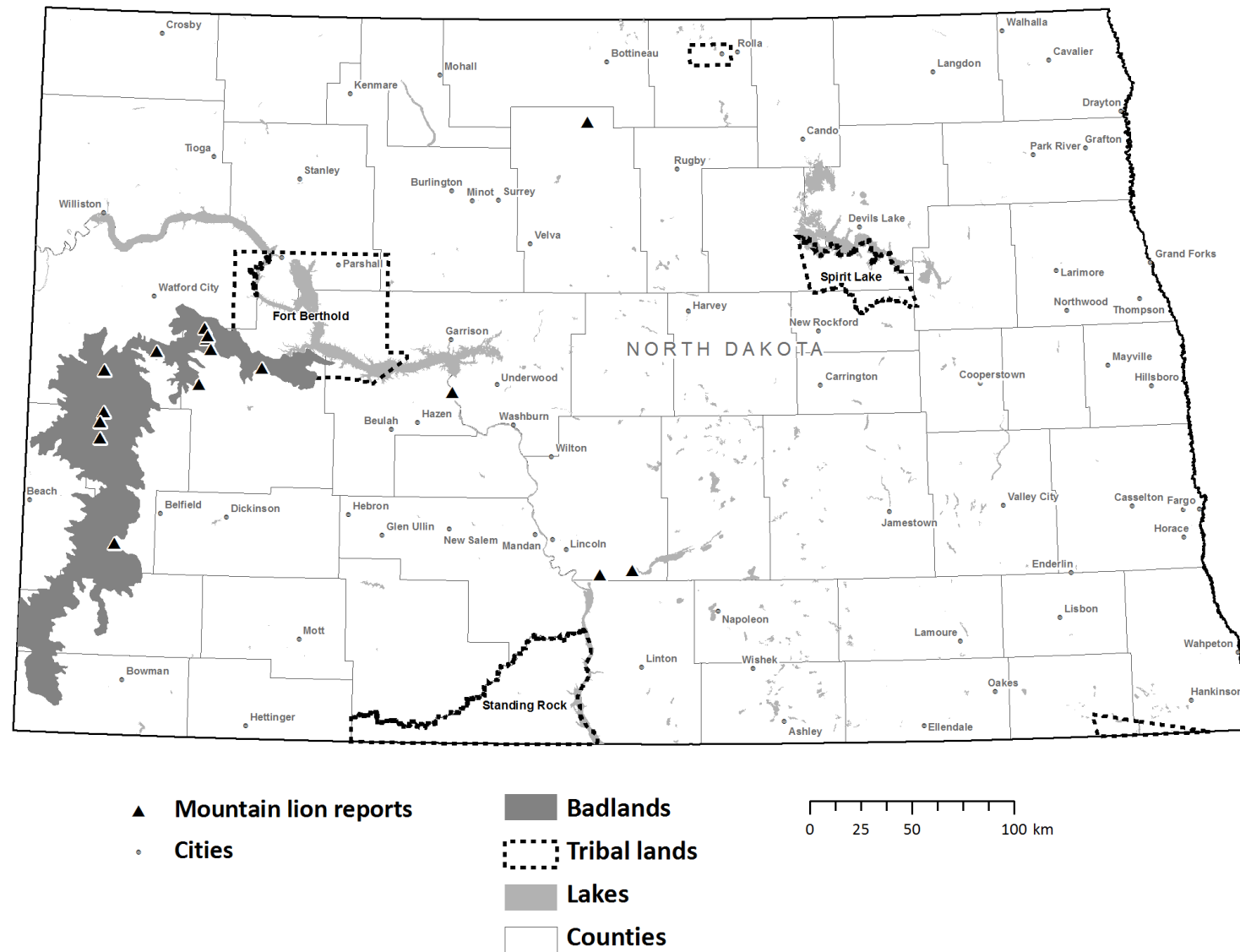


Figure 6. Deer management units where hunters reported observing a mountain lion while deer hunting in North Dakota, 2016.

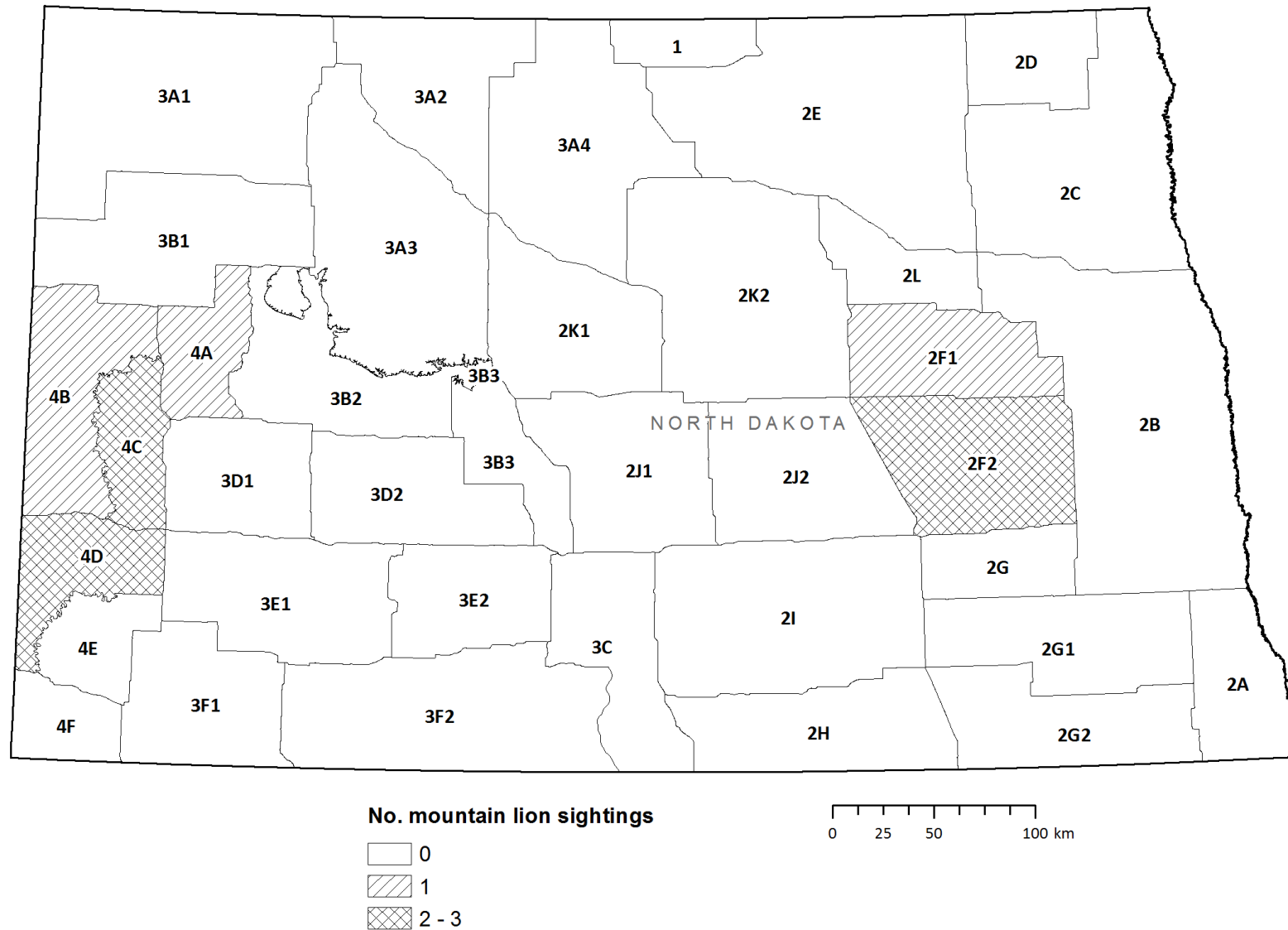


Figure 7. Number of documented mountain lion mortalities due to legal and illegal harvest, protection of property or self, incidental trapping or snaring, other or unknown human causes (automobile collisions, suspected poaching, etc.), and natural causes (predators, disease, etc.) in North Dakota, fiscal years (1 July-30 June) 2005-2006 through 2016-2017.

