

# 2016 Archery Deer Hunter Survey

## Wildlife Diversity Program Note 17-4

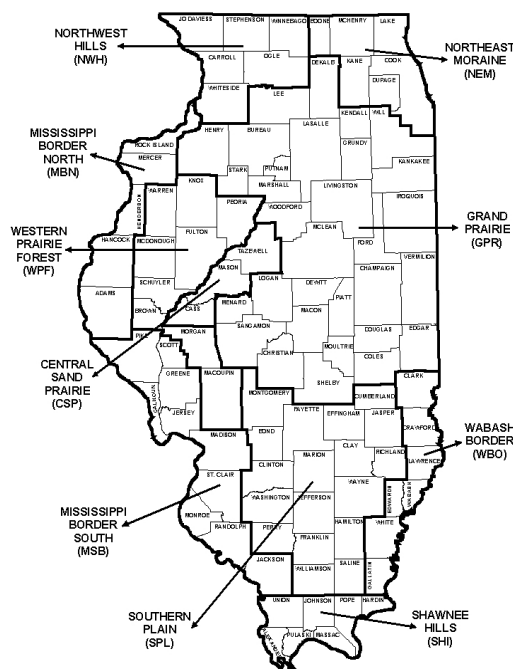
### INTRODUCTION

The Archery Deer Hunter Survey (ADHS) offers an economical and statistically robust means of monitoring the relative abundance of several species of terrestrial mammals (Hamilton et al. 1989). Illinois first administered the ADHS in 1991 as part of a study funded by Federal Aid in Wildlife Restoration (Ver Steeg and Warner 1997). ADHS continues to provide the most reliable, and in some cases, the only information about trends in relative abundance of bobcat, coyote, red fox, and gray fox. It also provides a way to compare trends from ADHS to results of other methods used to monitor squirrel, white-tailed deer, and wild turkey.

### METHODS

Data are collected by archery deer hunters who volunteer to keep standardized daily logs of their efforts (number of hours afield) and wildlife observations from 1 October through 14 November. Wildlife sightings are compiled statewide, by zone, and by Wildlife Management Unit (WMU; Fig 1).

Data are averaged for each hunter-location. Thus, if an archer hunts 20 days (trips) in County A, daily observations are averaged to obtain a single sampling unit. If the same archer hunts one or more days in County B, these data constitute a second sampling unit. Averaging data for each hunter-location decreases sample size and increases variance, but it provides a conservative estimate based on truly independent samples when calculating numbers of sightings per 1,000 hours of observation.



**Figure 1.** Locations of Wildlife Management Units in Illinois.

### RESULTS

During 2016, we received useable surveys from 1,250 hunters who logged 48,601 hours of observations. The number of hunter-locations varied from 56–405 among WMUs and totaled 1,596 statewide (Table 1). Observations of squirrels and wild turkeys decreased during 2016. Indices for other species were similar to the previous year based on comparisons of 95% confidence limits (Table 2).

Long-term (1992–2016) positive trends ( $p < 0.05$ ) occurred for bobcat ( $r = 0.87$ ), white-tailed deer ( $r = 0.46$ ), coyote ( $r = 0.63$ ), squirrel ( $r = 0.63$ ), and wild turkey ( $r = 0.63$ ). Long-term

negative trends occurred for red fox ( $r = -0.68$ ) and gray fox ( $r = -0.73$ ).

**Table 1.** Sampling effort by Wildlife Management Unit for the Archery Deer Hunter Survey in Illinois, 2016.

Unit	No. hunter locations	No. hours observation
Central Sand Prairie	57	1831
Grand Prairie	405	13209
Mississippi Border (N)	74	2438
Mississippi Border (S)	200	5710
Northeast Moraine	58	2150
Northwest Hills	137	4760
Shawnee Hills	75	1979
Southern Plain	353	9546
Wabash Border	56	1721
Western Prairie Forest	181	5257
Statewide	1596	48601

#### DISCUSSION

Results for individual wildlife management units must be interpreted cautiously because of differences in sample sizes (i.e., small units tend to have fewer observers and greater confidence intervals). Differences in land uses also affect the ability of hunters to see animals. For example, detection could be lower in heavily forested parts of the state than those devoted mostly to raising crops. Observations are also likely to be lower when many crops are standing during part of the archery season than years with an early harvest.

An evaluation by the Cooperative Wildlife Research Laboratory at Southern Illinois University (Nielsen et al. 2009) estimated  $\geq 1650$  returns are needed for reliable estimates of trends for coyote and squirrel. Larger numbers of observers are required for species that are observed infrequently (e.g., red fox and gray fox). The study did not attempt to evaluate ADHS for monitoring white-tailed deer and wild turkey.

The ADHS provides valuable information for management activities that fulfill the Department's statutory responsibilities (520 ILCS 5/1.10) and is consistent with its commitment to responsible management of the state's natural resources (IDNR Strategic Plan, Priority IV). The survey should continue, and can be improved by obtaining  $\geq 1650$  useable surveys.

#### LITERATURE CITED

- Hamilton, D.A., T.G. Kulowiac, and D. Erickson. 1989. Archer's index to upland furbearer populations and sign station indices – a comparison. Proceedings of the Seventh Midwest and Third Southeast Furbearer Workshop, Potosi, Missouri, USA.
- Nielsen, C., E. Hellgren, and J. Nawrot. 2009. Cooperative fur-bearing and nongame mammal investigations. Final Report, Federal Aid Project W-135-R-9-10. Cooperative Wildlife Research Laboratory at Southern Illinois University, Carbondale, Illinois, USA.
- Ver Steeg, B., and R.E. Warner. 1997. Red fox studies, 1991–1997. Final P-R Project Report, W-111-R. Illinois Department of Natural Resources, Springfield, Illinois, USA.

#### ACKNOWLEDGMENTS

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Prepared by Bob Bluett – 07/17  
 Illinois Department of Natural Resources  
 Office of Resource Conservation  
 Division of Wildlife Resources

**Table 2.** Number of sightings per 1000 hours of observation during Archery Deer Hunter Survey in Illinois, 1992–2016 (using hunter-location method of analysis).

Year	Species							
	Bobcat	Coyote	Deer	Gray fox	Raccoon	Red fox	Squirrel	Turkey
1992 (1239) <sup>a</sup>	0.5 (0.3) <sup>b</sup>	27.1 (3.2)	655.3 (33.1)	2.5 (1.1)	30.1 (3.5)	9.3 (2.0)	972.7 (34.5)	93.4 (20.3)
1993 (2877)	0.6 (0.3)	29.7 (2.8)	611.2 (17.2)	1.9 (0.4)	49.4 (3.2)	8.1 (1.0)	1017.3 (24.8)	123.8 (16.2)
1994 (1814)	0.4 (0.2)	28.4 (3.3)	586.5 (19.7)	1.7 (0.5)	46.7 (3.6)	5.7 (0.9)	1089.0 (32.4)	146.3 (20.2)
1995 (2278)	0.8 (0.3)	30.6 (2.6)	696.9 (22.0)	1.6 (0.5)	52.5 (3.7)	6.6 (0.9)	995.3 (26.3)	138.2 (16.1)
1996 (1485)	0.8 (0.3)	27.5 (3.2)	662.9 (27.0)	1.2 (0.5)	45.7 (4.0)	4.7 (0.9)	938.5 (31.6)	144.4 (19.6)
1997 (1441)	1.3 (0.8)	26.5 (2.9)	662.0 (27.1)	0.6 (0.3)	47.2 (4.7)	5.5 (1.0)	981.1 (33.6)	139.2 (19.6)
1998 (2052)	1.1 (0.4)	30.8 (2.8)	736.2 (23.5)	0.8 (0.3)	49.2 (3.5)	6.0 (1.2)	929.0 (28.3)	201.5 (20.9)
1999 (1931)	1.4 (0.4)	32.3 (2.8)	729.2 (23.6)	1.4 (1.0)	63.0 (4.5)	3.5 (0.7)	989.0 (28.8)	241.5 (23.3)
2000 (1854)	1.1 (0.4)	30.6 (2.5)	853.6 (26.3)	0.7 (0.3)	65.9 (5.4)	4.1 (0.8)	1087.0 (32.3)	272.6 (34.5)
2001 (1366)	1.6 (0.8)	32.3 (3.4)	918.7 (33.6)	0.8 (0.5)	66.6 (5.9)	4.4 (1.0)	1266.3 (40.6)	311.2 (35.3)
2002 (1780)	2.0 (0.7)	34.5 (3.1)	995.2 (32.7)	0.6 (0.3)	55.1 (4.0)	3.7 (0.6)	1081.1 (35.8)	348.1 (31.7)
2003 (1569)	2.1 (0.6)	29.8 (2.9)	1033.5 (34.5)	0.8 (0.4)	65.7 (5.0)	3.5 (0.7)	1177.4 (34.7)	308.0 (28.6)
2004 (1216)	1.3 (0.5)	35.9 (3.3)	1143.4 (43.0)	0.6 (0.2)	64.1 (5.4)	3.5 (0.7)	1219.5 (43.9)	345.0 (34.5)
2005 (1544)	3.7 (1.8)	32.0 (2.7)	1145.7 (36.7)	0.6 (0.3)	53.1 (4.2)	3.6 (0.7)	1045.1 (32.4)	280.1 (25.5)
2006 ( 791)	3.1 (0.9)	35.5 (4.9)	1104.1 (49.5)	0.5 (0.4)	70.3 (10.5)	3.9 (1.1)	1255.0 (56.0)	342.6 (42.3)
2007 (1075)	2.9 (1.0)	47.6 (7.9)	1104.2 (45.6)	0.8 (0.6)	60.7 (5.5)	4.0 (1.1)	1076.2 (42.2)	332.9 (34.6)
2008 ( 649)	3.4 (1.5)	32.1 (5.6)	930.5 (47.9)	0.3 (0.3)	60.4 (7.5)	2.7 (1.3)	1007.8 (41.3)	267.5 (38.7)
2009 (1067)	2.8 (0.7)	27.4 (2.7)	815.8 (24.6)	0.4 (0.2)	52.3 (4.4)	4.1 (1.0)	1098.0 (29.7)	287.1 (24.9)
2010 ( 700)	3.8 (1.4)	41.0 (4.7)	915.5 (59.7)	1.0 (0.8)	91.9 (9.5)	3.2 (0.9)	1223.8 (51.7)	279.7 (39.3)
2011 ( 936)	4.1 (1.1)	32.5 (3.9)	856.2 (41.1)	1.3 (0.8)	- <sup>c</sup>	3.8 (1.1)	1225.7 (49.4)	273.9 (38.5)
2012 ( 896)	5.9 (1.6)	43.6 (5.4)	940.7 (50.0)	0.7 (0.7)	- <sup>c</sup>	4.1 (1.3)	1173.8 (57.2)	279.1 (33.1)
2013 ( 886)	5.9 (1.7)	31.2 (5.0)	764.5 (40.8)	0.4 (0.4)	- <sup>c</sup>	2.3 (0.7)	1135.5 (51.4)	225.3 (29.5)
2014 (1002)	5.6 (1.9)	34.6 (5.1)	802.6 (50.5)	0.1 (0.1)	- <sup>c</sup>	3.9 (1.2)	1223.3 (60.1)	253.6 (32.4)
2015 (1089)	11.1 (3.8)	44.9 (6.3)	871.7 (53.6)	0.4 (0.5)	- <sup>c</sup>	5.6 (2.2)	1403.7 (78.1)	323.7 (47.6)
2016 (1250)	7.8 (1.8)	38.5 (4.8)	810.8 (33.2)	0.3 (0.2)	- <sup>c</sup>	3.0 (1.3)	1082.9 (44.0)	245.0 (27.0)

<sup>a</sup>Number of observers in parentheses following year.

<sup>b</sup>95% confidence limit in parentheses following the number of sightings per 1000 hours.

<sup>c</sup>Raccoon discontinued in 2011 based on availability of alternate methods.