

# Status and Distribution of the Bobcat (*Lynx rufus*) in Illinois

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## ABSTRACT

We compiled data from a variety of hunter and trapper surveys and sighting records ( $n = 3,123$ ) to provide a current record of bobcat (*Lynx rufus*) distribution and relative abundance throughout the state. A subset ( $n = 2,212$ ) of these data was used to analyze regional and annual trends in abundance. Bobcats were sighted in 99 of 102 Illinois counties, and trends from multiple types of surveys suggested that abundance increased throughout the state during the 1990s, especially in the 16 southernmost Illinois counties. There were >30 reported sightings of bobcats from each of 17 counties which we defined as indicative of a high resident bobcat population. Counties with the most overall sightings were Union, Jackson, and Johnson. Only DeKalb, Piatt, and Stark counties had no sightings during the study period. We concluded that the bobcat was widely distributed in Illinois and no longer warranted classification as "threatened" as defined by the Illinois Endangered Species Protection Board.

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## INTRODUCTION

Bobcats (*Lynx rufus*) in Illinois were first protected by the Wildlife Code of 1971 (Public Act 77-1781, Illinois Revised Statute 61, Section 2.30) effective 1 July 1972. Further action to protect bobcats was taken when the Illinois Endangered Species Protection Board held a public hearing 12 October 1977. Following this meeting, bobcats were declared threatened in Illinois effective 31 December 1977. These actions to protect bobcats were a response to their perceived scarcity, but in fact, few data were available to critically assess their status and distribution in Illinois. Rhea (1982) made the first attempt to assess the status and distribution of bobcats in Illinois. She only found reports of 89 bobcat sightings from 52 Illinois counties from 1979-82 and concluded that classification as a state threatened species was warranted.

It seemed that nearly a decade of full protection in Illinois did not result in an obvious increase in reported numbers and distribution of bobcats (Woolf and Hubert 1998). By

the early 1990s, it was suspected that bobcats were becoming increasingly abundant because of more frequent sightings, but conclusive evidence was lacking. In response to the need to reassess bobcat status and distribution, we began a study in collaboration with the Illinois Department of Natural Resources (IDNR), Division of Wildlife Resources' Furbearer Program supported by Federal Aid to Wildlife Restoration (Woolf and Nielsen 1999). We incorporated surveys of people participating in various types of outdoor recreation and compiled existing records to address bobcat status on a statewide scale. Our objective was to document distribution and relative abundance of the bobcat to enable assessment of its current status in Illinois.

## METHODS

We reviewed bobcat sightings compiled by Rhea (1982) and added sightings collected by the IDNR and the Cooperative Wildlife Research Laboratory at Southern Illinois University at Carbondale. Sighting reports ( $n$  of total reports = 2,212) from successful hunters during firearm deer (1992-98) and spring turkey (1992-98) seasons, and volunteer deer archery surveys (1992-97) were assessed for temporal and regional trends in abundance and distribution. We statistically tested effects of survey year by region on the number of bobcat reports per county (A. Woolf, unpublished data); however, because of violations of assumptions of independence and lack of random sampling, we simply reported numerical trends in the data.

Sighting reports from successful fall turkey hunters (1992-98), IDNR trapper surveys (1990-97), the IDNR Natural Heritage database (1982-95), a request for sightings contained in the 1995-98 IDNR Digest of Hunting and Fishing Regulations, necropsy records, and miscellaneous sighting information also were collected, but were not evaluated due to extremely low annual numbers of reports and the biases associated with variation in effort to obtain these sighting reports. Survey data are referred to by their source (e.g., firearm deer) and all other records combined in an "other" category.

We analyzed annual sighting data separately for 2 regions (southern Illinois [the 16 counties south of Interstate 64] vs. northern Illinois [the remainder of the state excluding Cook, DuPage, Kane, and Lake counties which were closed for firearm deer harvest]) because preliminary data assessment revealed marked differences in numbers of reports between these regions. This regional division also was logical due to potential differences in quantity of suitable habitat between northern and southern Illinois (Woolf and Nielsen 1999).

## RESULTS

We compiled 3,123 bobcat sighting reports made during 1982-98 (Woolf and Nielsen 1999:59-63). Firearm deer surveys provided the most (46%) sightings; spring turkey and archery surveys yielded 13 and 12% of reports, respectively. The remaining sightings came from "other" (12%), IDNR digest solicitation (10%), trapper (4%) surveys, and fall turkey (3%) surveys. Bobcats were reported from 99 of 102 Illinois counties; 91 counties had  $\geq 3$  sightings which we considered indicative of a potential resident population and 17 counties reported  $>30$  sightings (Figure 1) which we defined as indicative of a high resident population. Counties with the most overall sightings were Union (12%),

Jackson (9%), and Johnson (8%). Only DeKalb, Piatt, and Stark counties had no bobcat sightings during the study period.

### **Overall Regional Sighting Trends**

More bobcats were reported from southern than northern Illinois when years were pooled and in 87% (26 of 30) of comparisons between northern and southern regions for different years and sources (Table 1). The magnitude of cumulative regional differences (Table 1) ranged from 1.5 (archery deer) to 13.6 times ("other") more bobcats observed in the 16 southern Illinois counties compared to the remainder of the state.

At the beginning of the analysis period in 1992, 40% more bobcats (98 vs. 70) were reported from the 16 southern counties compared to the remainder of the state, whereas at the end of the period in 1998 97% more (425 vs. 216) bobcats were reported from the south. Also, there were apparent differences in overall rate of increase within the regions reflected by the composite sighting data (Table 1). In the north, total sightings from 1992 to 1998 increased 209%. Over the same period, total sightings from southern Illinois increased 334%. These data suggest that bobcats increased in abundance throughout Illinois, but the increase was greater in the 16 southern counties compared to the remainder of the state.

### **Regional Annual Sighting Trends**

Sightings/survey year did not apparently differ for spring turkey surveys in northern Illinois. Differences in mean number of sightings/county over years were more apparent for both the firearm and archery deer surveys in the northern region, but the 2 surveys produced different patterns (Figure 2). The archery deer survey pattern was constant to slightly declining in the northern region with fewer bobcats reported successive years after a peak in 1993. In contrast, firearm deer survey results were constant during the first 3 years and then increased except for the marked decline in 1996 (Figure 2). Most sighting reports occurred during 1997 and 1998.

Annual differences in number of sightings in southern Illinois were apparent for the spring turkey, archery deer, and firearm deer surveys (Figure 3). Mean numbers of bobcats sighted/county in the archery deer survey were relatively low and were relatively stable except for 1995, the peak year. Data from the spring turkey survey revealed a steadily increasing trend; however, only 1998 differed from earlier years. The trend revealed by sightings from firearm deer surveys was an increase from 1992 to 1998 except for declines in 1994 and 1996 (Figure 3).

Combined data from hunter surveys reveal similar annual trends in both northern and southern Illinois regions (Table 1). In both zones of the state, numbers of sightings were rather stable during 1992-94 and then increased except for an unexplained decrease in sightings reported from both regions in 1996.

## **DISCUSSION**

Our goal was to update and expand upon a previous study of bobcat sightings (Rhea 1982), and by doing so, assess the animal's status in Illinois. Rhea (1982) compiled bobcat sightings from the late 1800s to 1982 from reports by the Illinois Nature Preserves

Commission, credible wildlife observers, trappers, and other individuals. Although our results are not directly comparable with those of Rhea (1982), distribution and abundance of bobcats have clearly increased in Illinois. Rhea (1982) found sightings from 73 of 102 (72%) Illinois counties; only 28 counties (27%) had  $\geq 3$  reports indicative of a potential resident population and only 1 county had  $>30$  reports indicative of a high resident population (Gibbs 1998). Since 1982, the number of counties with bobcat sightings has increased to 99; there were 91 counties with  $\geq 3$  sightings indicative of a potential resident population, and 17 counties reported  $>30$  sightings which we judged indicative of a high resident population.

We assumed that sampling intensity (i.e., hunter effort) remained relatively constant over survey methods; however, changes in number of survey respondents/year indicated minor violations of this assumption. Firearm deer permits increased from 238,813 to 271,783 and archery deer permits increased from 127,849 to 229,910 during 1992-98 (J. Roseberry, Cooperative Wildlife Research Laboratory, Southern Illinois University at Carbondale, unpublished data). Despite these increases in hunter effort, ratios of number of sightings/1,000 hr of hunter effort indicate an obvious increasing trend of bobcat sightings during 1992-98 (e.g., an increase from 0.24 to 0.55 sightings/1,000 hr of effort for the archery deer survey and an increase from 0.35 to 1.69 sightings/1,000 hr of effort for the firearm deer survey). Further, this increasing trend in hunter effort did not explain any inconsistencies in sighting trends (e.g., the unexplained decrease in firearm deer sightings in 1996 when hunter effort was on the increase).

Southern Illinois has historically contained the largest area of suitable habitat (i.e., wooded cover, Woolf and Nielsen 1999). Early accounts of the bobcat in Illinois (Wood 1910) commented on their presence in the wooded south. Even when bobcats were thought to be extirpated from settled areas and rare in the north, they were still common in the southern counties of Alexander, Gallatin, Jackson, Pope, and Randolph (Cory 1912). Rhea (1982) concluded that even at their lowest population levels in Illinois, bobcats still existed in southern counties; whereas, they were almost extirpated in the northern counties.

Although the region we defined as southern Illinois encompasses only about 11% of the land area of Illinois, we recorded considerably more bobcat sightings from southern compared to northern Illinois in total, and from all surveys. This pattern of bobcat distribution and abundance is not surprising given the regional differences in habitat. Counties north of Interstate 64 are characterized by a matrix of intensive agricultural land; such habitat is of relatively low suitability to bobcats (Rolley 1987). In contrast, the 16 counties south of Interstate 64 are comprised of about 50% forest and grassland (Woolf 1998) which provides more suitable habitat for bobcats than row crop agriculture.

We believe the evidence is clear that bobcats are more abundant now than at the beginning of the study in 1992 and the population trend continues upward. Models we constructed (Woolf and Nielsen 1999) predicted that bobcats occurred in moderate to high numbers in nearly 40% of Illinois, and that 31% of the state offered good to excellent habitat. Combined, these data led to recommendations and subsequent action by the Illinois Endangered Species Protection Board to delist the bobcat in 1998. Woolf and

Hubert (1998) concluded that bobcat populations were secure throughout the United States and our data clearly supports that conclusion in Illinois.

### ACKNOWLEDGMENTS

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Table 1. Regional bobcat sightings by survey type in Illinois, 1992-98.

| Survey        | Year |      |      |      |      |                  |                  | Total |
|---------------|------|------|------|------|------|------------------|------------------|-------|
|               | 1992 | 1993 | 1994 | 1995 | 1996 | 1997             | 1998             |       |
| Firearm Deer  |      |      |      |      |      |                  |                  |       |
| North         | 38   | 47   | 41   | 85   | 11   | 135              | 180              | 537   |
| South         | 45   | 73   | 68   | 135  | 81   | 226              | 282              | 910   |
| Spring Turkey |      |      |      |      |      |                  |                  |       |
| North         | 17   | 31   | 30   | 14   | 18   | 17               | 14               | 141   |
| South         | 18   | 16   | 25   | 37   | 38   | 48               | 72               | 254   |
| Archery Deer  |      |      |      |      |      |                  |                  |       |
| North         | 13   | 42   | 24   | 12   | 8    | --- <sup>a</sup> | --- <sup>b</sup> | 99    |
| South         | 18   | 16   | 22   | 59   | 30   | --- <sup>a</sup> | --- <sup>b</sup> | 145   |
| Grand Total   | 149  | 225  | 210  | 342  | 186  | 426              | 548              | 2,086 |

<sup>a</sup>Total for both regions = 99. At the time of report preparation regional differences were unknown; hence, these sightings do not appear in the total column.

<sup>b</sup>Total for both regions = 126. At the time of report preparation regional differences were unknown; hence, these sightings do not appear in the total column.

Figure 1. Bobcat sighting reports from various sources for Illinois counties, 1982-98.

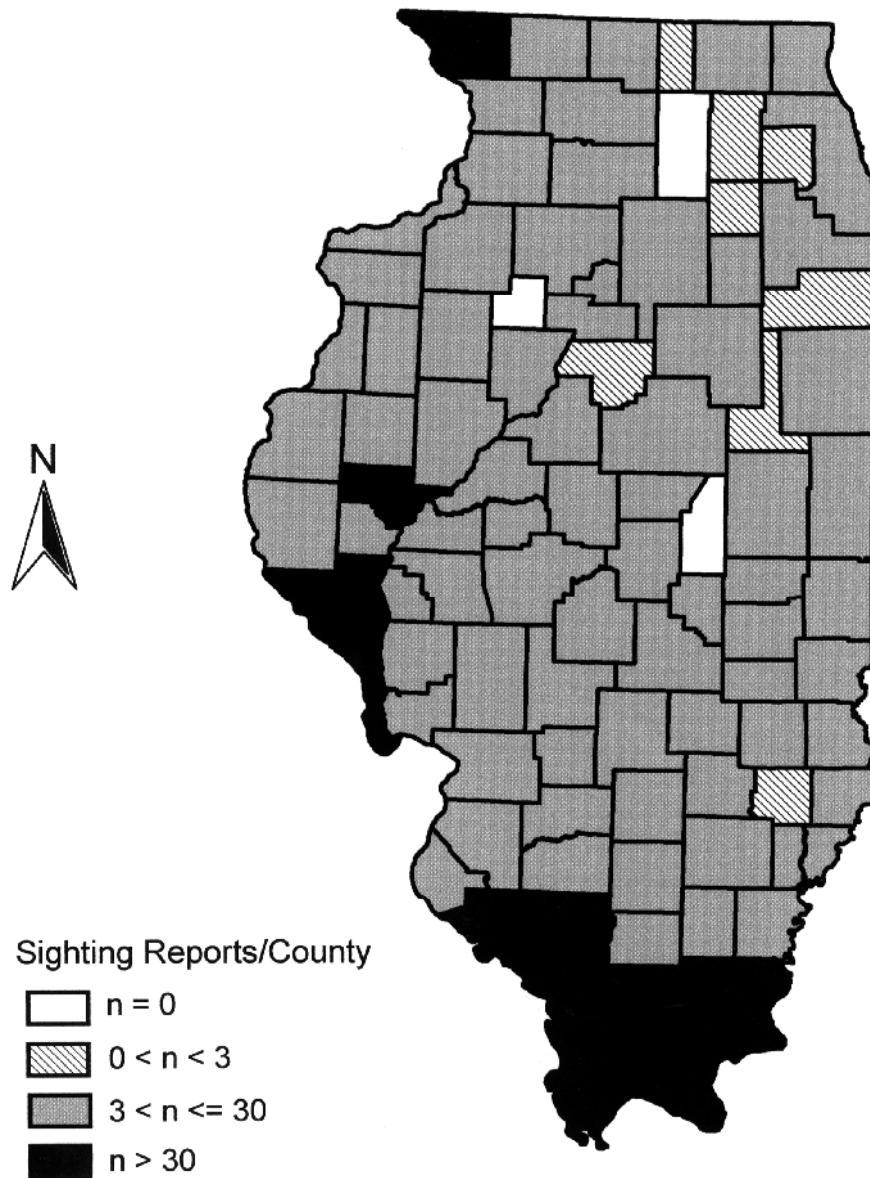


Figure 2. Trends in bobcat sightings from various sources, northern Illinois region, 1992-98. Regional differences were unknown for the 1997 and 1998 archery deer surveys.

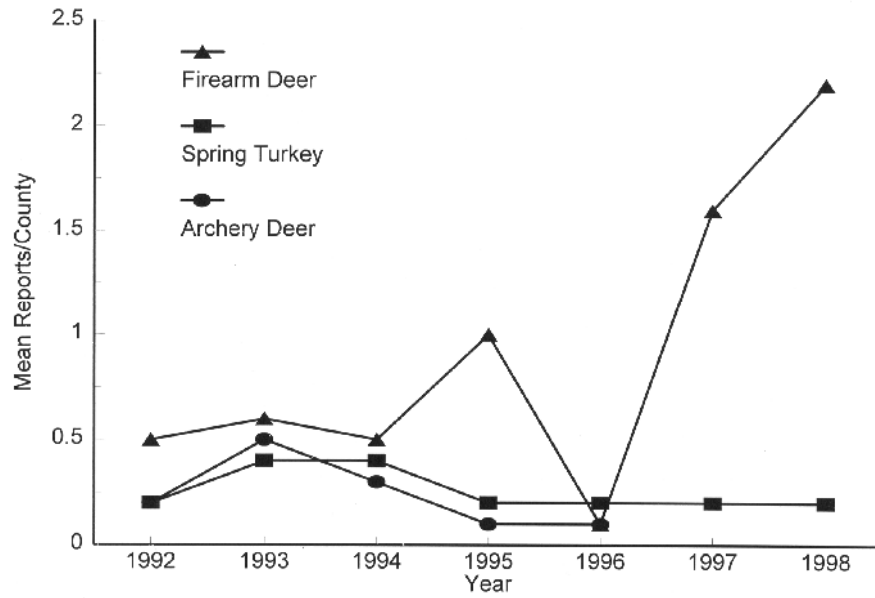




Figure 3. Trends in bobcat sightings from various sources, southern Illinois region, 1992-98. Regional differences were unknown for the 1997 and 1998 archery deer surveys.

