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Dispersal of Juvenile Male Bobcats (*Lynx rufus*) in Southern Illinois

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ABSTRACT

We characterized dispersal movements of 6 juvenile male bobcats (*Lynx rufus*) in southern Illinois during 1995–2000. Straight-line distance from capture site to final home range establishment was 43±9 km; however, overall known dispersal movements were >100 km for ≥2 bobcats. In a pattern similar to that observed in other studies, bobcats made either rapid, straight-line dispersal movements, or erratic, longer-term dispersal movements. Major highways and relatively high road and human densities were not significant barriers to bobcat dispersal.

INTRODUCTION

Dispersal behavior provides important insight into spatial organization within a population and connectivity of separate populations. Dispersal of juvenile males is common in bobcats (*Lynx rufus*) and influenced by a variety of ecological phenomena (Bailey 1979, Kitchings and Story 1984, Kamler et al. 2000). However, there is a lack of research on juvenile bobcat dispersal in the agricultural Midwest, where bobcat populations are relatively low due to poor habitat suitability.

To address this paucity in the literature, we studied dispersal movements of juvenile male bobcats in southern Illinois. This research represents a subset of our larger study of bobcat status in Illinois, in which we investigated bobcat habitat use at several spatial scales, survival and cause-specific mortality, spatial organization, and genetics (Woolf and Nielsen 1999, Woolf and Nielsen 2002, Woolf et al. 2002*a*). Generally, we found that bobcats are faring well in Illinois with high survival rates and ample suitable habitat where forest cover dominates. Herein, we describe juvenile male bobcat dispersal patterns, directions, and distances in southern Illinois.

METHODS

During December–February 1995–99, we captured 6 juvenile (<1 yr) male bobcats in Jackson, Union, and Pope Counties of southern Illinois. Bobcats were fitted with radiocollars containing a small foam insert to minimize collar loss. We used standard ground and aerial radiotelemetry techniques (White and Garrott 1990) to locate bobcats and calculated 100% minimum convex polygon home ranges (Mohr 1947) when >30 locations were obtained. While individuals were in their natal home ranges, we obtained 2 or 3

locations/week; however, upon dispersal, bobcats were located less frequently. We monitored individuals 448±68 (SE throughout) days and obtained 59±14 locations/bobcat. More details on the southern Illinois study area, bobcat capture, and radiotelemetry are reported elsewhere (Nielsen and Woolf 2001; Nielsen and Woolf 2002*a*, 2002*b*).

RESULTS AND DISCUSSION

We provide the first description of juvenile bobcat dispersal in the agricultural Midwest where bobcat populations have been protected from harvest due to low abundance (i.e., Illinois, Indiana, Iowa, and Ohio). Because we radiotracked only 6 individuals, inferences drawn from our study may be limited. However, published reports of juvenile dispersal behavior of Midwest bobcats are rare and our analysis provides a basis for others interested in bobcat dispersal.

All 6 bobcats initiated dispersal movements from their natal home ranges between March and September. These bobcats were likely 1–2 years old upon dispersal, as reported by most studies (Anderson 1987). Time spent making transient movements (i.e., those erratic and without apparent directionality) was 83±21 days. Straight-line distance from capture site to final home range establishment was 43±9 km (Figure 1); these dispersal distances were similar to other studies (Hamilton 1982, Kitchings and Story 1984). However, overall known dispersal movements were >100 km for ≥2 bobcats. Although a few studies have reported straight-line dispersal distances of >80 km (Knick and Bailey 1986, Kamler et al. 2000), bobcats in our study were constrained by the Ohio and Mississippi rivers to the south, east, and west, and primarily unsuitable agricultural habitat to the immediate north (Woolf et al. 2002*b*). Most bobcats dispersed toward the center of the region within the most suitable habitat (i.e., primarily forest cover; Nielsen and Woolf 2002*a*; Woolf et al. 2002*b*) and away from insurmountable barriers (i.e., rivers and extensive agriculture). Given the relative uniformity of habitat suitability and high dispersal capability of bobcats, the southern Illinois region could be treated as a contiguous population for management purposes.

Although comprised of highly suitable habitat (Nielsen and Woolf 2002*a*, Woolf et al. 2002*b*), southern Illinois contains high human (21.5 persons/km^2) and road densities (1.4 km/km^2) relative to other study areas (e.g., Hamilton 1982, Knick and Bailey 1986). At the outset of our study, we hypothesized these landscape factors may represent significant barriers to bobcat dispersal or cause substantial mortality. Although annual vehicle-caused mortality rates of southern Illinois bobcats were the highest in the scientific literature at 10% (Nielsen and Woolf 2002*b*), major highways and human development did not limit dispersal. Four bobcats survived until their radiocollar batteries reached operational longevity and 2 bobcats died <275 days post-capture; one from unknown causes, and the other from a vehicle collision.

Similar to Kamler et al. (2000), bobcats exhibited 2 types of dispersal: a relatively fast straight-line dispersal pattern (bobcat #29, Figure 2); or a longer, more erratic dispersal pattern (bobcat #4, Figure 2). Three bobcats exhibited the former behavior, traveling <40 km before establishing new, stable home ranges <2 months following dispersal initiation. Dispersal movements of 3 bobcats were highly erratic, of relatively long duration (>6

months), and in one case included establishment of 3 small, temporary home ranges (bobcat #4, Figure 2). Bobcat dispersal patterns are primarily influenced by population voids created via adult mortalities, such that dispersers fill these voids (Hamilton 1982, Litvaitis et al. 1987). However, we were unable to assess the influence of population voids on dispersal patterns because bobcats dispersed away from the area where most individuals were radiocollared. Thus, our knowledge of where voids may have existed was incomplete.

As noted by Kamler et al. (2000), there is little information on social interactions influencing bobcat dispersal. Kamler et al. (2000) reported an agonistic encounter between mother and offspring that may have stimulated dispersal. We provide further evidence that aggressive females may prompt juvenile dispersal in bobcats, as in other species [e.g., white-tailed deer (*Odocoileus virginianus*); Ozoga and Verme 1985, Holzenbein and Marchinton 1992]. Specifically, we recorded an incidence of an adult female traveling with her male offspring 10 km outside of their shared home range. She then immediately returned to her home range, whereas the juvenile male continued dispersal movements for >50 km until settling into a stable home range.

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Figure 1. Straight–line dispersal directions, distances, and endpoints for 6 juvenile male bobcats in southern Illinois, 1995–2000.

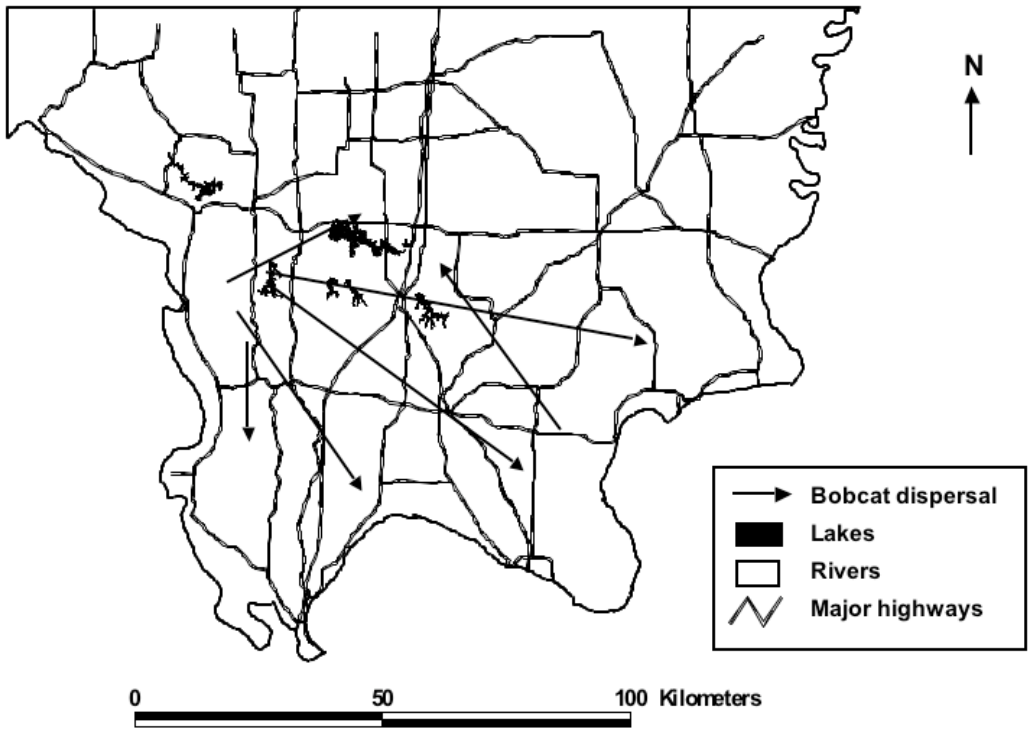

Figure 2. Dispersal movements of 2 juvenile male bobcats in southern Illinois, 1995–2000.