

Population dynamics and dispersal of bobcats in Iowa

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Goals and Objectives:

- Determine local habitat selection by bobcats, including home range characteristics and dispersal patterns in relation to forest, grassland, and agricultural land and the configuration of these habitats.
 - Evaluate population monitoring techniques that can be reliably and efficiently used to survey bobcats both at the local scale and also across Iowa.
 - Determine demographic rates of bobcats in Iowa, including recruitment and survival.
 - Evaluate genetic similarity of the Iowa population in relation to potential dispersal linkages with other populations.
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Introduction:

In 2003 the Iowa Department of Natural Resources, in cooperation with Iowa State University, initiated a study of the conservation biology of the bobcat (*Lynx rufus*), a species which has become increasingly common in the corn belt of the Midwest. Although we began studying bobcats in southern Iowa 3 years ago, we still have many unanswered questions related to the landscape ecology and population dynamics of bobcats in Iowa. Desires expressed by the public range from complete protection of bobcats to limited harvest, so we must be prepared to define management options based on scientific data. Data collection for Phase I objectives, emphasizing habitat relationships and demography, is essentially completed although final publication is in progress. This project, which is referred to as Phase II, emphasizes estimating statewide distribution, dispersal in relation to landscape features, and population genetics.

Progress:

We have largely completed the data collection to determine habitat selection at the local scale (Objective 1) but we are reanalyzing data collected during the first 3 years before submitting the final publications. We have only recorded detailed dispersal tracks of 3 female and 9 male bobcats. We are redesigning the telemetry tracking scheme to focus less on local habitat selection and more specifically on dispersing individuals. Dispersal movements often last from 1 to 5 months and we have observed one dispersal >150 km into Missouri. Interestingly, we have not observed a single dispersal northward into Iowa and we wish to investigate the landscape configurations that might pose barriers to dispersal along river systems in Iowa. Results from Phase I suggest that the bow hunter survey will be our most successful design for assessing statewide distribution (Objective 2) and we have now collected data for 3 years. But the statistical reliability is such that we can distinguish abundance at the level of 9 climate regions within Iowa but that county-level inference will require new statistical methods. During Phase I we also focused on demography (Objective 3) but we must resolve questions about survival estimates and the rate of increase. Telemetry data indicate very high (82%) survival of adults suggesting mean life span as an adult of >5 years, but age structure based on carcasses reveals only 2% of the population reach that age. In Phase II we are focusing on the role of regional and local population genetics in the recovery of the species (Objective 4). Using a combination of genetic and demographic methods we are investigating whether bobcats in Iowa represent the periphery of the current range into which the regional population is expanding, or alternatively whether the Iowa population at the periphery of the geographic range is self-sustaining and largely isolated. In cooperation with the laboratory of Dr. Anne Bronikowski at Iowa State University we have established procedures and have now extracted DNA from tissue samples of 362 bobcats. With the collaboration of Dr. Warren Johnson at the Laboratory of Genomic Diversity we will next investigate genetic diversity using established microsatellite markers.

Future Plans:

Dawn Reding will begin her Ph.D. courses in January 2007. We will continue to monitor bobcats using the bow survey in 2007, and to mark and track another sample of 25 bobcats in 2007-2008. Genetic sequencing and associated analyses will commence in 2007.