

CAPITOL ROOM

TUESDAY

ROOM: Capitol

TIME: Tuesday 8:20 AM

TITLE: Bobcat ecology in Illinois: insight from fifteen years of inquiry

AUTHOR(S):

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ABSTRACT: I will summarize 15 years of research into the status and ecology of bobcats (*Lynx rufus*) in Illinois. Bobcats were protected in Illinois as a state-threatened species in 1977. Interest in an updated evaluation of bobcat status in Illinois began in the early 1990s as wildlife biologists noted an increase in bobcat sightings and roadkills statewide. Bobcat research began at the Cooperative Wildlife Research Laboratory at Southern Illinois University Carbondale in 1994 with analyses of sighting data and potential habitat suitability. Bobcat sightings increased substantially during the 1990s and 31% of the state contained suitable bobcat habitat: these analyses resulted in bobcats being de-listed to non-game status in 1999. During 1995-99, 96 individual bobcats were captured in southern Illinois to study population densities, demographic characteristics, and space use. Bobcat survival (0.83) and density (34 individuals/100 km²) were high, which further supported the bobcats de-listing in Illinois. However, the annual rate of vehicle-caused mortality was relatively high at 10%, indicating that roads were the primary factor limiting bobcat populations. Research then focused on bobcat-road interactions, including an assessment of landscape signatures which may allow for bobcats to cross roads safely, as well as large-scale models of mortality risk for bobcats crossing roads. Despite some threat posed by anthropogenic influences, bobcats are currently thriving in Illinois, as indicated by annual population growth rates ranging from 4-8% and a modeled ability to withstand conservative harvests.

KEYWORDS: felid, bobcat,

ROOM: Capitol

TIME: Tuesday 8:40 AM

TITLE: Microhabitat selection by bobcats in the badlands region of South Dakota

AUTHOR(S):

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ABSTRACT: Within the distribution of bobcats (*Lynx rufus*), habitat use at the homerange level has been well studied, particularly in forested landscapes. In contrast, few studies have evaluated microhabitat use of bobcats in the Northern Great Plains. Included in this region are the Badlands of southwestern South Dakota. Our objective was to characterize microhabitat selection by male and female bobcats inhabiting this region. Ten bobcats (6 male, 4 female) were fitted with GPS collars. Twenty variables were measured at 187 bobcat locations to assess (1) bobcat habitat selection and (2) sex specific selection. Data were analyzed using both stepwise logistic regression and a priori modeling to determine the best model. The results of modeling sex specific selection were questionable (p value 0.18). Results of the pooled data showed that bobcats selected for low vertical cover, small shrubs, tree diameter, bare ground, distance to drainages, slope, and distance to badland formations. This model was derived through a stepwise logistic regression process with a p value of 0.2 to enter and/or remain in the model with parameters being: W_i 0.75, negative 2LL 415.965, AIC of 431.965, and a c value of 0.71. Our results were similar to studies of habitat selection of bobcats occupying various ecotypes, with low vertical cover, distance to drainages, and rock outcroppings identified as important features. While no rock outcroppings were found in our study area badlands may play a similar role. These findings, in conjunction with other research, suggest that bobcats are an adaptable species, able to inhabit a variety of landscapes.

KEYWORDS: bobcat, microhabitat, badlands

ROOM: Capitol

TIME: Tuesday 9:00 AM

TITLE: The effect of moon phase on habitat use and movement of bobcats

AUTHOR(S):

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ABSTRACT: For centuries, moon phase has been used to predict movement of animals for increased capture success by hunters and anglers. Recent studies have determined that moon phase may affect predator-prey relationships. Understanding changes in movements and habitat use based on moon phases provides important life history information and may assist biologists in making land management decisions. The objective of this research was to determine the impacts of moon phase on bobcat (*Lynx rufus*) movements and use of roads and open spaces at Bull Neck Swamp Research Forest in eastern North Carolina. Bull Neck Swamp Research Forest is 2,492 hectares and one of the largest remaining tracts of undeveloped private waterfront property on the Albemarle Sound. We analyzed bobcat movement distance and distance to roads or open areas using 3,421 GPS data points acquired March - October 2008. We segregated moon phases into new, half, and full moon periods. Bobcats moved on average 96 meters more during full moon (i.e., high lunar illumination) phases and were closer to roads and open areas during new moon (i.e., low lunar illumination) phases. This research indicates bobcats depended on interior forests for cover during full moon phases and were more likely to use open areas when lunar illumination was low during new moon phases.

KEYWORDS: bobcat, moonphase, habitat

ROOM: Capitol

TIME: Tuesday 9:20 AM

TITLE: The Ohio bobcat: Distribution, abundance, and genetic structure of a recovering population

AUTHOR(S):

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ABSTRACT: Bobcats (*Lynx rufus*), once common throughout Ohio, were extirpated by the mid 1800s and have only recently shown signs of reestablishment. Since 1970, there have been 255 verified reports of bobcats, 246 (96%) of which occurred since 1990, and 227 (89%) since 2000. Our objectives were to determine the distribution, relative abundance, and genetic variability of bobcats in Ohio. We used cameras and hair snares to survey bobcats at 12 randomly selected sites to estimate occupancy. Bobcats were detected at 5 of these and detection rates were positively correlated with verified sightings within a 5-km radius ($r^2 > 0.68$, $P < 0.001$). Consequently, we used verified sightings as a range-wide index to bobcat distribution and relative abundance. Their current range encompasses all or part of 24 southeastern counties. Initial reestablishment occurred in 2 spatially distinct areas. Relative abundance is uneven and remains high around these eastern and southern focal points. Furthermore, the eastern subpopulation increased more rapidly and annually approximately 70% of sightings originate from about 20% of bobcat range. Based on microsatellite DNA data, the 2 subpopulations are genetically distinct, within-population genetic variation is high suggesting limited inbreeding, and the eastern subpopulation was likely recolonized by individuals from a distinct subpopulation including individuals from southern Ohio, Kentucky, West Virginia, and western Pennsylvania. Woodland restoration in southeastern Ohio and increasing bobcat populations in neighboring states allowed for the reestablishment of bobcats in Ohio. Our findings will aid in setting proper management guidelines to ensure their continued recovery.

KEYWORDS: bobcats, endangered, microsatellite

ROOM: Capitol

TIME: Tuesday 9:40 AM

TITLE: Changing status and management of bobcats in Iowa and Missouri

AUTHOR(S):

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ABSTRACT: We review population status and management of bobcats (*Lynx rufus*) in Iowa and Missouri, concentrating on the 1990s to the present. We used harvest data and surveys of archery hunters to document abundance and distribution in both states. We used Iowa telemetry data to assess dispersal and mortality patterns and genetic samples from the Midwest to study linkages in the population. In 1997, bobcats could be legally harvested only south of I-70 in Missouri but became more abundant in northwestern than northeastern Missouri, resulting in a statewide season in 2004. Bobcats were reported with increasing frequency in Iowa in the 2000s. Genetic analyses reveal that populations in Iowa are linked with northern Missouri, eastern Kansas, and Nebraska. Iowa collared bobcats have been recovered in Missouri. In Iowa, more than 90% of the mortality to marked bobcats is human-caused with the majority due to incidental take of other furbearers. Harvest is unrestricted in Missouri with a peak of 4453 pelts registered in 2006-07. In 2007, Iowa implemented a quota-controlled harvest in 21 southern counties that balances harvest opportunity with continued expansion of the population. Neither state directly incorporates estimates of incidental take into harvest management. We speculate on whether the harvest in northern Missouri and southern Iowa will affect the rate of expansion in Iowa. This study provides results that support the concept of regional cooperation among agencies in conservation of these vagile carnivores as they repopulate areas where they have been absent or uncommon for many years.

KEYWORDS: bobcats, population, harvest

ROOM: Capitol

TIME: Tuesday 10:20 AM

TITLE: Bobcat population monitoring and harvest management in Wisconsin

AUTHOR(S):

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ABSTRACT: Bobcats (*Lynx rufus*) are potentially vulnerable to overharvest due to their low reproductive rate and low population density. Sound harvest management requires knowledge of population size and/or trends, but monitoring population status of bobcats in the upper Midwest is challenging due to their low density, wide distribution, and elusive behavior. Bobcat harvest in northern Wisconsin has been regulated with a limited permit system since the early 1990s. Population trends have been monitored primarily through winter-track surveys with supplemental information obtained from hunter/trapper questionnaires and observations by agency personnel. Harvest levels have been documented through mandatory registration. We combined harvest age and sex structure and reproductive data from annual mandatory carcass collections with harvest information in an accounting-style population model to estimate population size. Reproductive rates varied considerably during the past 25 years. Changes in harvest methods and sex and age composition of the harvest during this time period will be discussed. Estimates of bobcat population size in northern Wisconsin increased consistently during the 1990s and early 2000s but have since stabilized and declined slightly. We used modeling to assess effects of variation in harvest rates on rate of population change. Harvest demand and success rates have increased during the past 20 years as bobcats have gained trophy status resulting in pressures to expand harvest opportunities.

KEYWORDS: bobcat, population, management

ROOM: Capitol

TIME: Tuesday 10:40 AM

TITLE: Modeling bobcat habitat distribution in Wisconsin

AUTHOR(S):

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ABSTRACT: Wisconsin currently only harvests bobcats (*Lynx rufus*) in the northern third of the state despite evidence that they occur in other areas. Our objective was to model the statewide distribution of bobcat habitat and assess the accuracy of the model. We developed the predictive model using a multivariate distance statistic (Penrose distance) based on habitat attributes found in bobcat core use areas identified from >1,000 locations of 10 radio-collared females from 3 study sites in northern Wisconsin. The model identified 3 habitat variables that were positively correlated with bobcat habitat use: percent upland forest cover, percent forested wetland cover, and edge density. The model was applied statewide to hexagons of 4.5 sq.km (mean size of a female bobcat core area) which were classified as having high, moderate, or low bobcat suitability. Twenty percent of Wisconsin was identified as highly suitable, 17% moderate, and 63% low. The accuracy of the model was evaluated with 5 independent data sets including bobcat scat obtained by a detector dog, non-invasive hair snares, sighting data, harvest data, and winter track surveys. None of the techniques detected significant relationships between habitat quality and bobcat presence, suggesting either the model performed poorly or small sample sizes did not provide the power to detect the relationships. The only exception were sightings of bobcats south of the harvest zone where highly and moderately suitable habitats comprised 27% of the region but contained 45% of the sightings ($p < 0.001$).

KEYWORDS: bobcat, habitat, Wisconsin

ROOM: Capitol

TIME: Tuesday 11:00 AM

TITLE: Impact of altered harvest limits on misreporting of bobcat captures in Michigan

AUTHOR(S):

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ABSTRACT: Although genetic identification of wildlife is now widely adopted in basic and applied research of natural populations, the approach has yet to be implemented and employed routinely in a regulatory context. This study utilizes genetic assignment tests to examine the influence that harvest regulations have on the frequency of misreported harvest locations for bobcats in Michigan. Bobcats (*Lynx rufus*) are distributed throughout the Michigan Upper Peninsula (UP) and northern portions of the Lower Peninsula (LP). The two peninsulas exist as genetically distinct bobcat populations. Under harvest regulations prior to 2004 harvest was limited to three bobcats with no more than one animal coming from the LP. Previous work showed that 13.7% of bobcats reported as having been harvested in the UP were genetically assigned to the LP, while no bobcats reported as having been harvested in the LP were genetically assigned to the UP under these harvest limits. This result suggested that poaching was occurring in a biased direction as expected based on differing harvest limits. Under current harvest regulations (a limit of two bobcats with only one allowed to come from the LP), we analyzed 167 bobcats at 8 microsatellite loci and found a 16% misassignment rate from the UP to the LP. This study shows that the implementation of new harvest regulations failed to decrease misreporting of individuals harvested in the LP, and may actually be increasing the likelihood of misreporting harvest locations.

KEYWORDS: harvest, poaching, genetics

ROOM: Capitol

TIME: Tuesday 11:20 AM

TITLE: Genetic population structure of bobcats in Iowa and surrounding Midwestern states

AUTHOR(S):

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ABSTRACT: As a result of large scale conversion of forests and grasslands to agriculture, coupled with unregulated harvest, bobcats (*Lynx rufus*) were largely eliminated from the Midwest by the mid-1900s. The species is currently on the rebound and reclaiming parts of its former range, including portions of Iowa, but it remains largely absent from the core of the area. It is not clear where these bobcats in Iowa are coming from and whether they may continue to spread in distribution throughout the state. To help address these questions, we examined the genetic relationships of bobcat populations within Iowa and across the Midwest to assess the connectivity of bobcat populations in this region and to identify potential dispersal barriers. Using a panel of 19 microsatellite markers, we analyzed 1447 bobcat samples collected from 15 states. We used a Bayesian clustering method to infer the number of populations in the sample set and assign individuals to the appropriate cluster. The analysis identified at least 5 putative subpopulations in our sample set, which are separated by both physical and cryptic boundaries. Physical barriers include the distribution gap and the Mackinac Straits, and the two cryptic barriers occur at regions of changing ecotypes. It appears bobcats in Iowa are closely linked with bobcats in northern Missouri and eastern Kansas and Nebraska, but have had little genetic input from populations to the north and east. Results indicate that landscape characteristics are important in structuring populations and may impede dispersal of bobcats across the region.

KEYWORDS: bobcat, genetics, landscape

ROOM: Capitol

TIME: Tuesday 11:40 AM

TITLE: Population history and phylogeography of bobcats – *Lynx rufus* – across North America

AUTHOR(S):

Emily Croteau -- Murray State University, Watershed Studies Institute, Biology Department, Murray, KY 42071. Phone: (270)809-3224 Email: emily.croteau@gmail.com

ABSTRACT: Bobcats (*Lynx rufus*) are mobile, generalist carnivores with a broad distribution ranging from southern Canada to north-central Mexico. Twelve bobcat subspecies have been designated throughout their range based on skeletal and pelage characteristics; however, there has been no previous attempt to determine conservation units or the population processes that have led to partitioning of bobcat genetic diversity using molecular markers. To characterize the geographical distribution of genetic diversity in bobcats across their range, a 464 base pair fragment of the mitochondrial DNA control region was sequenced in 185 individuals representing 19 locations. Estimates of haplotype and nucleotide diversity illustrated that bobcats displayed moderate levels of genetic diversity. Generally, little phylogeographic structure was indicated; however, an analysis of molecular variance, PhiST estimates, median joining network and phylogenetic trees demonstrated strong genetic subdivision between eastern/midwestern populations and western populations. Furthermore, mismatch distributions elucidated that each of these areas appears to have experienced a recent population expansion. It is also likely that a population bottleneck or a series of bottlenecks occurred in the East/Midwest as bobcats colonized this broad region, resulting in lower than average genetic diversity. We conclude that bobcats historically have not experienced regional barriers to dispersal and should be grouped into two Management Units (one for the western populations and one for the eastern/midwestern populations). These classifications will promote maintenance of maximal genetic diversity of the species and will aid in future population management.

KEYWORDS: bobcat, phylogeography, mitochondrial

ROOM: Capitol

TIME: Tuesday 1:00 PM

TITLE: Bobcat in the midwest and the United States: past, present and future

AUTHOR(S):

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ABSTRACT: Bobcat (*Lynx rufus*) populations are thought to be increasing in North America, however there exist little information on the current population status. Management and monitoring of bobcat populations is the responsibility of state wildlife management agencies in the United States of America. We surveyed state wildlife management agencies in each of the 48 contiguous states regarding the current population status, distribution, and monitoring protocols of bobcats within each respective jurisdiction. We also surveyed the governments of Mexico and Canada regarding bobcat population status within their jurisdictions. We received responses from 47 U.S. states, Mexico, and Canada. Responses indicate that bobcats occur in each of the contiguous 48 states except for Delaware. Populations were reported to be increasing in 40 states, with 6 states unable to report population trends and only 1 state (Florida) reporting decreases in bobcat populations. Of the 47 states in which bobcats occur, 41 employ some form of population monitoring. Population density estimates were available for 2,011,518 sq km (33.6%) of the estimated bobcat range in the United States, with population estimates between 1,419,333 and 2,638,738 individuals for this portion of their range. These results indicate that bobcat populations are increasing throughout the majority of their range in North America, and populations within the United States are much higher than previously suggested. Bobcat success in the Midwest can be attributed to a variety of factors. Bobcat management in the US is certainly one of the greater success stories in wildlife management.

KEYWORDS: Bobcat, Restoration, Status

ROOM: Capitol

TIME: Tuesday 1:40 PM

TITLE: Feral cats and *Toxoplasma gondii* infection in terrestrial wildlife in central Illinois

AUTHOR(S):

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ABSTRACT: *Toxoplasma gondii* is a protozoan parasite for which all felids are the definitive host. Humans and wildlife can acquire *T. gondii* by accidentally consuming soil or water containing cat feces contaminated with *T. gondii* oocysts or consuming undercooked meat infected with the cyst form of *T. gondii*. We hypothesize that rural natural areas in close proximity to human buildings have larger populations of feral cats and that an increase in occurrence of felids is associated with an increased risk for *T. gondii* infection in wildlife in the area. Surveys in 2008 and 2009 were conducted to determine the occurrence of medium size mammals in a natural area using live trapping, scent stations and motion cameras. Eight trapping sites within the natural area were selected based on distance to buildings. Our preliminary analysis of all 3 survey methods indicated that sites within 300m of buildings had a larger number of medium size mammals and feral cats. The site with the highest seroprevalence rate (42.9%, 12/28) was located close to human buildings. The second and third highest rates (38.5% and 33.3%, 5/13 and 3/9 respectively) were farther sites. Seroprevalence results indicate greater infection rates (29%, 10/35) in opossums captured close to buildings, compared to opossums captured farther from buildings (12%, 2/17). This research will aid in implementing feral cat management programs to support a healthy ecosystem for Illinois wildlife.

KEYWORDS: Toxoplasma, felids, Illinois

ROOM: Capitol

TIME: Tuesday 2:00 PM

TITLE: Seeing spots: can bobcat pelts be distinguished from other lynx species?

AUTHOR(S):

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ABSTRACT: Bobcats (*Lynx rufus*) are one of four Lynx species. Bobcats are the most abundant wild feline in North America and are found from central Mexico to southern Canada. Currently, bobcats are found in all of the contiguous United States except Delaware. Recent estimates suggest that in the United States alone, there are at least 1.4 to 2.6 million bobcats and the IUCN list the species in the category "Least Concern". Currently, 39 states permit some sort of limited take and this species is utilized in international wild fur markets. Bobcats are listed under Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). This listing is not because of population concerns posed by the regulated trade of the species. Rather, this listing is due to the fact that other spotted cats are threatened. Additional regulations on the international trade of bobcats are intended to assure that other threatened species are not mistaken for the abundant bobcat and traded. The premise of this listing is that bobcat pelts are indistinguishable from the pelts of other lynx species.

We discuss the legitimacy of this "look alike" argument and efforts to demonstrate the clear differences between the lynx species. In addition, we demonstrate a newly developed identification manual for Lynx spp. pelts intended to assist in the enforcement of national and international trade regulations.

KEYWORDS: bobcat, CITES, lynx

ROOM: Capitol

TIME: Tuesday 2:20 PM

TITLE: Characteristics of survival and dispersal of Black Hills cougars

AUTHOR(S):

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ABSTRACT: Cougars were nearly if not entirely extirpated from the Black Hills of South Dakota and Wyoming by the early 1900s, but have naturally recolonized the area. Our objectives were to calculate survival/mortality as well as documenting dispersal movements of Black Hills cougars. We captured 35 independent aged cougars (15 males, 20 females) for survival analyses. Annual survival of adult cougars averaged 0.87 (range: 0.50-1.0 annually), with no difference ($P > 0.05$) between adult males and females. Subadult males had the lowest survival rate (0.62) of any sex/age class. We documented 85 mortality events from 1998-2005. Vehicles (32.9%) and depredation removals (21.2%) accounted for the majority of mortality of Black Hills cougars. Despite the fact this population was not hunted during our phase of research, 85% of mortality was human-induced. Twenty-nine subadult cougars were captured (19 males, 10 females) for dispersal analyses. Independence averaged 13.5 months (range 10-16 months) from parturition, dispersal occurred 1-3 months post independence. Males dispersed (Mean: 320.5 km) farther than females (Mean: 48.5 km), with females exhibiting 40% philopatry. No subadult males were recruited into the population. We documented several (6) long-distance dispersal movements (>200 km) from male cougars and hypothesize that males making long-distance movements were seeking an available mate. Movements suggest that range expansion and habitat recolonization are occurring and furthermore we suggest agencies react proactively to cougar movements and increase public knowledge of cougar ecology in areas where cougars are recolonizing previously occupied habitats.

KEYWORDS: cougar, dispersal, survival

ROOM: Capitol

TIME: Tuesday 2:40 PM

TITLE: History of mountain lion research in the Black Hills of South Dakota

AUTHOR(S):

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ABSTRACT: Since its listing as "state threatened" in 1978, the mountain lion (*Puma concolor*) population in the Black Hills has increased from what was believed to be about 25 transient animals in the mid 1980s to what is recognized as a viable breeding population. We began studying this population in 1998 when it was recolonizing the region and have continuously monitored it through a period of population saturation. During this period, we have radio collared 280 mountain lions of various ages (kittens, subadults, and adults) and sexes. Previous, and on-going, research has estimated population size, dispersal, and survival of lions. Currently, the mountain lion population is estimated at 220 to 280 based on population reconstruction, modeling, and mark recapture. Dispersal is male biased with approximately 90% of subadult males dispersing up to 1067 km. Data collected on this population also indicates that it became saturated in about 2005. Total percent kidney fat of mountain lions declined from average levels documented prior to 2004. In addition, some adults and kittens appeared emaciated and domestic prey has increased in diets since 2004. Information collected on this population was used to justify a harvest of mountain lions in the Black Hills. In 2005, a total of 13 lions (7 females, 6 males) was harvested from the Black Hills. More recently (2009), harvest was increased to a quota of 45 mountain lions or 25 female mountain lions. A history of this research project with associated results will be presented.

KEYWORDS: cougar, population, harvest

ROOM: Capitol

TIME: Tuesday 3:40 PM

TITLE: Forecasting cougar potential in midwestern North America

AUTHOR(S):

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ABSTRACT: Cougar presence has increased in the Midwest during the past 20 years, with >290 confirmations documented since 1990. Cougar increase is likely due to dispersal of subadults from growing western populations, which is suggestive of potential natural recolonization of cougars into a landscape largely devoid of large predators. We discuss research regarding potential habitat, dispersal corridors, population viability, and human dimensions of cougars in the Midwest. We created a habitat model for 13 Midwestern states and 8% of the region contained highly-suitable cougar habitat. We identified 6 large blocks of potential cougar habitat and modeled potential dispersal corridors to these areas. We then developed population models to predict potential cougar recolonization and population viability in the region, assuming dispersal from western source populations to 95 patches of suitable habitat in the Midwest. Local occupancy of patches by cougars ranged from 1-49 years in Minnesota and Nebraska, respectively. Thirty-eight patches (40%) were predicted to be occupied for at least 1 time step after 50 years. We also sent mail-in surveys to residents of urban and rural counties in Kentucky (without breeding cougars) and North Dakota (with breeding cougars), respectively, to assess human attitudes towards cougars. Although generally accepting of cougars, residents of both states would benefit from efforts aimed at educating the public about cougars and their management. Our research provides the first assessment of cougar potential in the Midwest, and provided enough subadult females disperse into the region, habitat conditions and human attitudes are currently receptive to cougar presence.

KEYWORDS: cougar, Midwest, potential

ROOM: Capitol

TIME: Tuesday 4:00 PM

TITLE: Tracking cougars in midwestern North America: clues in claw isotope ratios

AUTHOR(S):

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ABSTRACT: Cougar (*Puma concolor*) presence has increased dramatically in Midwestern North America during the past decade due to dispersal of subadults from western source populations. However, wildlife biologists lack empirical knowledge of dispersal paths of these elusive large carnivores to develop effective conservation strategies. Previous work has demonstrated that stable isotope measurements in migrant or dispersing animals can be used to infer origin. However, this technique has not yet been used to recreate dispersal patterns at local scales for large carnivores. We show that claw tissue integrates dietary and habitat information over a suitable temporal scale to allow the path of dispersing large carnivores to be assessed. We predicted the origin of four western cougars and predicted their dispersal paths (with mortality location as the endpoint) into the Midwest using stable hydrogen isotopic values along their claws. We established isoscapes of white tailed deer (*Odocoileus virginianus*) tissue, the likely primary prey species of cougars in the Midwest, for the region. Various dispersal corridors from potential western sources to each cougar mortality location in the Midwest also were calculated using least cost path methods. We extrapolated deer isotopic ratio for various locations along these routes. Using a Bayesian approach, we then determined the probability that cougars originated from the predicted source areas. Our method correctly predicted the origin of two cougars captured and radiocollared by biologists (and thus with verifiable source locations). Our technique provides a new approach for studying large scale movements of carnivores and quantifying habitat connectivity to promote linkages among populations.

KEYWORDS: dispersal, isotope, cougar