Researchers call for increased conservation efforts to save black bears

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Coordinated conservation efforts are needed to preserve the genetic diversity of black bears in the Central Interior Highlands. Credit: flickr/peupleloup

Between 1880 and 1920, the Central Interior Highlands (CIH), consisting of Missouri, Oklahoma and Arkansas, saw the height of deforestation that also decreased the habitat for black bears and other forest species. To combat the decline of black bears and repopulate the mountainous region, more than 250 bears from Minnesota and Manitoba were relocated to Arkansas in the 1950s and 1960s. Now, researchers at

the University of Missouri have analyzed genetic diversity in black bears in the CIH and have determined that coordinated conservation management is still needed to maintain healthy populations of black bears in the region.

"The focus of our study was to determine the effects of the reintroduction of black bears in the Ozark and Ouachita Mountains and how that reintroduction affected population genetics in the region," said Emily Puckett, a doctoral candidate in the Division of Biological Sciences at MU. "We also wanted to determine if we could find evidence of the population that was formerly here and whether or not they mated with the reintroduced bears or if they had gone locally extinct following deforestation."

Study results suggested that black bears were present throughout the CIH in the 1920s, contrary to previous beliefs. Current research indicates that the bears had a remnant lineage in the northern Ozarks of Missouri, Puckett said.

Additionally, the team found that current black bears went through a brief "bottleneck," where bears were cut off from each other and genetic diversity was reduced. However, the team also determined that the reintroduction of bears to the CIH in the 1950s and 1960s helped to restore diversity and increase population size in the Ozarks and Ouachitas.

"We observed the genetic signature of the Ozark population from Arkansas in Missouri, meaning that the bears moved north," said Puckett. "These bears bring with them their higher genetic diversity which may help Missouri's bear population in the future. The movement north also indicates that formerly fragmented forests may have regrown thereby connecting Missouri bears to the Ozark subpopulation that was further south."

Puckett and her team including Lori Eggert, associate professor of biological sciences in MU's College of Arts and Science, and Jeff Beringer from the Missouri Department of Conservation, collected and analyzed DNA samples from black bears from five geographical locations. Hair samples from Arkansas, Oklahoma and Missouri were analyzed. Additionally, blood samples from hibernating bears in Minnesota and tissue samples from Manitoba were examined for their genetic signatures.

"This represented one of the largest sample sizes in a study of this type," Eggert said. "By using multiple genetic markers on samples collected from Missouri and Arkansas, hunted bears in Oklahoma and live dens in Manitoba, we were able to conduct genetic and statistical analyses to analyze trends and gain robust conclusions."

Puckett analyzed genetic diversity in black bears in the CIH and determined that coordinated conservation management is still needed to maintain healthy populations of black bears in the region. Credit: Melody Kroll

The team suggests that conservation efforts to promote forest connectivity will help protect bears throughout the region, so that subpopulations are not isolated, as was the case in Missouri, and genetic diversity remains high. State agencies in Arkansas, Oklahoma and Missouri could work together to unify bear management since this study observed populations spanning state borders.

"Geneticists get concerned when populations have low genetic diversity," Puckett said. "Low diversity can be indicative of low population size. When harmful mutations arise in a gene pool with low diversity, they may increase in frequency leading to poor fitness and health in the population. That's why these management suggestions are so important."

The study, "Influence of drift and admixture on population structure of American black bears (Ursus americanus) in the Central Interior Highlands, USA, 50 years after translocation," was published in the journal *Molecular Ecology*. Funding for the project was provided by the Missouri Department of Conservation, Arkansas Game and Fish Commission, U.S. Fish and Wildlife Service, and Safari Club International.

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