

# No Old Home Days for NH Bobcats: Today's Cats Roaming in Different Areas than Ancestors

**“Overall, bobcats are much more abundant today than they were in the 1950s and 1960s. If you see a bobcat today, there's a better chance it was born north of you than south of you.” -- Rory Carroll, doctoral candidate**

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# NH BOBCATS

*Bobcats have changed how they roam about Northern New England.*

Areas where bobcats thrived that were historically "net exporters" of bobcats are now "net importers."



*Bobcats and coyotes now are among the region's top predators.*



The large carnivores that used to roam across New Hampshire -- mountain lions and wolves -- have been eliminated. Smaller predators like bobcats and coyotes are now the top predators in the region. Those species have a disproportionately large impact on wildlife communities so it's critical that we keep their populations healthy across the state and region.

*Interaction between human and natural factors often drive bobcat patterns.*

Some highways aligned with barriers to bobcat movement while others did not. For a mobile and adaptable species like bobcats, human land use can play a critical part, but often it's the interaction between human and natural factors that drive ecological patterns.



*Climate change makes Northern New Hampshire more hospitable to bobcats.*



Climate change makes northern latitudes more hospitable now while the greater amount of landscape development in southern New Hampshire makes that area less hospitable.

In the last 60 years, Northern New

England's bobcats have changed how they roam about the region, with bobcats today moving from north to south as areas that once were "net exporters" of these native wild cats are now "net importers," according to new research from the New Hampshire Agricultural Experiment Station at the University of New Hampshire.

"While our results do not currently rise to the level of a crisis, they do highlight the wide-reaching impacts humans have on wildlife populations. As human populations continue to grow and we continue to alter landscapes, the negative effects we have on wildlife species also increase. All signs point to a robust bobcat population right now in New Hampshire, but because they have such large ranges, they are always susceptible to environmental changes brought on by humans," said and Rory Carroll, doctoral candidate in earth and environmental sciences, who conducted the research with experiment station researcher Marian Litvaitis, professor of natural resources and the environment.

Using DNA from bobcat skulls collected by state agencies since the 1950s and 1960s, Litvaitis and Carroll examined decades of the population genetic patterns of bobcats across Northern New England. Though much of the DNA had broken down due to the age and condition of the skulls, researchers relied on a process for effectively extracting reliable DNA samples developed by Sarah Clements, '16. Clements developed the process as an undergraduate when she was a technician in the Litvaitis lab. She now is a doctoral student at the University of Missouri.

Carroll explained that DNA contains a wealth of genetic information, including where bobcats lived. Certain genetic traits might be common in one area and nonexistent in another. By looking at these genetic characteristics and how their frequency changes in different places, scientists can understand how animals move through the landscape and how well populations are connected.

In this study, the genetic data gave researchers two snapshots of bobcat movement and diversity patterns over time. They compared the movement patterns across the landscape and inferred the amount of gene flow -- a proxy for dispersal movement -- exchanged between subpopulations. They found that bobcats, whose numbers have increased over time, have changed how they move across the landscape given the increase in the number of roads and amount of development. Genetic diversity has somewhat decreased, and the population is more divided due to natural and human-built barriers.

Historically, bobcats thrived in southern areas where there were better habitats. Many young cats were born in southern areas. When they then set out to establish their own new home ranges, some had to head north into less optimal habitat. Today, the roaming patterns of bobcats are reversed: cats are thriving in the north and moving south to establish new home ranges. If bobcat habitat across the state was equal, Carroll said researchers would expect gene flow rates between the two areas to be roughly equal. Effectively areas that once were net exporters of bobcats are now net importers.

"We hypothesize that pattern reversed in contemporary times for two reasons. First, there has been a substantial decrease in snowfall in New Hampshire as a result of [climate change](#). Our earlier work showed snow depth limited the distribution of

bobcats. Hence, the northern part of the state is now better habitat than it was historically. Second, the south likely has become less hospitable because that is where the greatest amount of development has occurred between the historic and contemporary times. In addition, hunting practices across the region and a higher abundance of prey in developed areas, such as the squirrels that visit your bird feeder, also are likely impacting the movement of bobcats,” he said.

“Overall, bobcats are much more abundant today than they were in the 1950s and 1960s. If you see a bobcat today, there's a better chance it was born north of you than south of you,” Carroll said.

Researchers also discovered that some highways aligned with barriers to bobcat movement while others did not. Carroll explained that the presence of subpopulations of bobcats suggests that there is less bobcat movement going between subpopulations than there is within subpopulations.

“There is some sort of an ecological or physical barrier between the subpopulations that makes bobcats reluctant to cross. Some borders between subpopulations aligned closely with the location of highways, especially parts of I-89. However, other parts of I-89 didn't appear to be a barrier, and some of the sharpest divisions between subpopulations did not correspond to the presence of a highway or any other obvious physical feature,” he said.

Broadly, Litvaitis and Carroll are investigating how humans can affect wildlife species, using bobcats as a case study. The results of this research will serve as a basis to compare changes in diet and stress levels of bobcats. Scientists currently are combining the results of this study with research into the diet and stress hormones of bobcats across New Hampshire and Vermont. They hypothesize that an abundance of new food sources in human-dominated areas may make bobcats less likely to move away from those areas, even though they can.

“The large carnivores that used to roam across New Hampshire -- mountain lions and wolves -- have been eliminated. Smaller predators like bobcats and coyotes are now the top predators in the region. Those species have a disproportionately large impact on wildlife communities so it's critical that we keep their populations healthy across the state and region. The more knowledge we have about the biology and ecology of bobcat populations, the better we will be able to conserve and coexist with them. The historical perspective we took in this study allowed us to look at the trajectory of the species and will hopefully help us recognize any potential issues in the future,” Carroll said.

This research is presented in the journal *Conservation Genetics* (DOI:[10.1007/s10592-019-01170-8](https://doi.org/10.1007/s10592-019-01170-8)). Preliminary findings were presented at the 2014 Northeast Association of Fish and Wildlife Agencies Conference and the 2015 North American Congress of Conservation Biology. Because this work set the stage for other bobcat research projects, portions of it were discussed at the 2018 Wildlife Society Conference and the 2017 Northeast Natural History Conference.

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Founded in 1887, the [NH Agricultural Experiment Station](#) at the [UNH College of Life Sciences and Agriculture](#) is UNH's original research center and an elemental component of New Hampshire's land-grant university heritage and mission. We steward federal and state funding, including support from the [USDA National Institute of Food and Agriculture](#), to provide unbiased and objective research concerning diverse aspects of sustainable agriculture and foods, aquaculture, forest management, and related wildlife, natural resources and rural community topics. We maintain the Woodman and Kingman agronomy and horticultural research farms, the Macfarlane Research Greenhouses, the Fairchild Dairy Teaching and Research Center, and the Organic Dairy Research Farm. Additional properties also provide forage, forests and woodlands in direct support to research, teaching, and outreach.

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