The National Genomics Center for Fish and Wildlife Conservation offers cost effective and reliable genetic and genomic data to enhance fish and wildlife monitoring. The Center provides cutting edge services and has contributed to our understanding of cougar ecology.

Background
The cougar (Puma concolor), also known as mountain lion, puma, and panther, is a native felid to the Western hemisphere. In the United States, this animal was extirpated from the eastern portion of the United States, with the exception of the Florida Panther population in the Everglades. However, over the past 30 years, due to rebounding prey populations and regulated hunting of cougars, this species has naturally recolonized and established new populations in the Black Hills of South Dakota, the Badlands of North Dakota, and most recently, the Pine Ridge region of Nebraska. Some of this colonization is spread from a centralized population, similar to how smoke fills a room, while other dispersals are due to incredibly long distance movements by individuals.

Since 2005, the Rocky Mountain Research Station has been studying cougars. Station scientists have partnered with over 15 State, Federal, and Tribal partners to understand cougar population sizes, movement patterns, and recolonization of former habitat and ranges. As a result of these extensive partnerships, the Center currently has the largest, most geographically extensive genetic database on mountain lions, focused on the Eastern edge of their expanding distribution. This resource has greatly enhanced forensic applications and the ability to assess the colonization dynamics of this rapidly expanding and recovering species. Similarly, this expertise in genetic monitoring, coupled with the genetic database, is allowing Forest Service and State agency managers to use state-of-the-art genetic tools to monitor cougar population sizes and to enact conservation measures and harvest regimes consistent with local population dynamics.

Collection of cougar genetic samples is not an easy task. Station scientists and their partners employ novel approaches to collect samples, including working with houndsmen to locate cougar tracks and samples, using conservation detection dogs to find hair and scats, and working with state agencies that collect tissues. In all cases, Forest Service scientists aim to provide partners with data that can help managers gain deeper understandings of their cougar populations. In states and areas without established populations, the Center processes non-invasive samples associated with cougar sightings to assist wildlife managers with confirming presence, gender, and in many cases, population origin of dispersing cougars.

Cougars have the largest ecological range of any terrestrial mammal, ranging from the Yukon to the Andes in South America. Credit: Thinkstock
Cougar Investigation No. 1
On June 11, 2011, a male cougar was struck by a vehicle and killed on the Milford Parkway near Milford, Connecticut. This was big news as there are no known cougar populations in the area! A full necropsy was performed, showing the animal was young, not neutered or declawed, had no microchips, and had porcupine quills under the skin. This indicated that it had spent time in the wild with no obvious signs of being a captive animal.

Forest Service scientists received a tissue sample from this male, performed DNA analysis, and compared it with their extensive DNA database. This cougar was already “known” from hair and scat samples collected in Minnesota and Wisconsin a year and a half earlier! This male matched an individual observed numerous times with trail cameras. He traveled around 1,900 km in a year and a half. Further, assignment tests show that genetically this animal is consistent with cougars in the Black Hills breeding population of South Dakota/Wyoming.

Cougar Investigation No. 2
On January 18, 2008, a cougar was observed in a barn in Milton, Wisconsin. Biologists were able to collect blood from this animal in snow for DNA analysis. Over the next 3 months, numerous cougar sightings were reported in southern Wisconsin and northern Illinois. On April 16, 2008, six miles north of downtown Chicago, police shot and killed a male cougar in a residential neighborhood. DNA tests showed the male killed was the same animal that had been in the barn in Milton. Assignment testing also showed this male was genetically consistent with the Black Hills breeding population.

Continued Research
As cougars continue to expand into new habitats, the Genomics Center will continue to use genetic data to help inform about this animal. Just recently, a cougar was shot and killed in southern Arkansas, and wildlife managers are interested in knowing it might have come from. This male was the first cougar killed in Arkansas since 1975.

Selected Research Projects
• Estimating Mountain Lion Density in the Southern Bitterroot Valley of Western Montana (Partner: Montana Fish, Wildlife and Parks)
• Genetic Evaluation of Florida Panther (Felis concolor) (Florida Fish and Wildlife Conservation Commission)
• Charles M. Russell Mountain Lion Ecology Study (U.S. Fish and Wildlife Service)
• Identification of Cougar (Felis concolor) Presence in the State of Nebraska Using Non-invasively Collected Scat Samples (Nebraska Game and Parks Division)
• Continued Genetic Evaluation of Cougars (Felis concolor) in South Dakota (South Dakota Game, Fish and Parks)

Past and Current Cooperators on Cougar Research
• Connecticut Department of Energy and Environmental Protection
• Florida Fish and Wildlife Conservation Commission
• Illinois Department of Natural Resources
• Iowa Department of Natural Resources
• Kansas Department of Wildlife and Parks
• Minnesota Department of Natural Resources
• Missouri Department of Conservation
• Montana Fish, Wildlife and Parks
• Nebraska Game and Parks Division
• New York State Department of Environmental Conservation
• North Dakota Game and Fish Department
• Oklahoma Department of Wildlife Conservation
• South Dakota Game, Fish and Parks
• Vermont Fish and Wildlife Department
• Wisconsin Department of Natural Resources
• Wyoming Game and Fish Commission
• Chippewa Cree Tribe of Rocky Boy Montana
• US Fish and Wildlife Service: Charles M. Russell National Wildlife Refuge
• National Park Service: Yellowstone National Park

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