Quantification of Noninvasive Population Sampling: A Comparison of Genetic and Independent Estimates for Cougars in Yellowstone National Park[TWS]

Michael A. Sawaya
Montana State University/ Yellowstone Cougar Project
Wildlife Conservation Society
P.O. Box 927. Gardiner, MT 59030
mikesawaya@hotmail.com

Toni K. Ruth
Yellowstone Cougar Project/Wildlife Conservation Society
P.O. Box 222. Gardiner, MT 59030
truth@montanadsl.net

Scott Creel, and Steve Kalinowski
Ecology Department
Montana State University
Bozeman, MT, 59717
screel@gemini.oscs.montana.edu

Many carnivores, including cougars (*Puma concolor*), are difficult to study due to their low densities and secretive nature. Estimating population size is important to the conservation and management of most carnivore species. Currently, no reliable method of

estimating cougar population size exists other than radio collaring, which is intrusive and expensive. Non-intrusive genetic sampling (NGS) has great potential as a tool for population enumeration and monitoring, but has not been adequately developed to date for cougars. The Yellowstone Cougar Project has radio-marked approximately 87 percent of the resident adult cougar population in the Northern Range of Yellowstone National Park (YNP) and has collected blood from all captured individuals (n = 68 as of winter 2002-2003). Therefore, the YNP Cougar Project provides a unique situation in which to test and develop NGS methods. In January 2003, we initiated a study to test and develop NGS methods. Backtracking was used to find hair at bed sites and scat at kill sites. Hair was also collected through the use of hair-snagging stations. Our study objectives include 1) evaluating the effect of varying sampling intensity for both backtracking and hair-snagging stations on population estimates, 2) quantifying genotyping error rates by comparing non-intrusively collected samples to blood and tissue samples taken during capture, 3) analyze hair and scat (DNA) samples to identify species and individual-specific information on cougars such as gender and relatedness. Currently, we are conducting the second field season in this 3-yr study. No genetic analysis has yet been performed, but we present some preliminary results.