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Patuxent Wildlife Research Center

Estimation of Population Densities for the Florida Panther

Photo by Connie Bransilver, USFWS

An adult, uncollared female Florida panther carrys one of her cubs to a new den after a heavy rain. Photo: the Florida Panther NWR trail camera.

The Challenge: The Florida panther is currently restricted to the southern peninsula of Florida where it is threatened by continued habitat loss and fragmentation, demographic instability, and erosion of genetic diversity from restricted gene flow and inbreeding. The panther's vulnerability to extirpation and priority conservation status highlight the need for determining reliable, statistically robust methods to estimate abundance, density, and other vital rates and to monitor population changes over time and space. Non-invasive sampling techniques such as camera traps have become popular for sampling rare, secretive carnivores such as the panther, and surveys in southwest Florida were recently completed to determine their effectiveness for monitoring panthers and to estimate density.

The Science: Newly developed spatial, mark-recapture models include the distribution of individuals and their movements in addition to an observation component that depends on the location of individuals during sampling. The method is an improvement of traditional methods where the areal extent cannot be precisely defined. The spatial models use a probabilistic approach to estimating area size, and when combined with auxiliary information, such as telemetry data, can further improve our ability to interpret estimates of population size that translate into density.

The Future: Development of spatial models recently generated the first statistically valid estimate of density for a segment of the Florida panther population. Improvements in sample design, equipment technology, and evaluation of other non-invasive techniques (e.g., camera traps and hair traps) may improve model precision. In addition, further use of data from traditional sampling techniques such as telemetry systems used in different combinations may improve model precision and resulting estimates for rare and hard-to-sample species.

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