

## Determining the Size of the Florida Panther Population

The Florida panther population has been consistently monitored since 1981. Experts have historically used field observations (e.g., tracks, scat, captures) to count panthers. Population size is used to assess the status of panthers relative to federal recovery criteria; when there are three populations of at least 240 panthers, the population will be considered recovered. The current method used to track panther numbers is the Minimum Annual Count. Field surveys throughout the year collect verified panther sign (photos, tracks, radiocollared panthers, etc.) that are tallied into the Minimum Annual Count.

Two new methods are currently being developed and tested to assess the population size of panthers; one based on panther road kills and another based on remote camera captures. These two methods should each produce a **true population estimate**. A true population estimate incorporates measurements of **sampling effort, detectability, and precision**. Measuring **sampling effort** assures consistency each time the population is counted so that estimates are comparable. Measuring **detectability** is figuring out the chance of detecting a panther if it is present (via sign, trail camera photos, captures). The **precision** of any estimate is affected by the sample size. Small sample sizes typically result in an estimate with a wide margin of error (the “+ or –” often seen in polls). Techniques with low precision (wide margins of error) are not very informative when assessing the current state of a population.

### Minimum Annual Count

The Minimum Annual Count, developed by Roy McBride of Rancher’s Supply, Inc., continues to be the technique we rely on. Field surveys conducted by a team of trained biologists collect data on verified panther sign, photos, captures, mortalities, and those equipped with radio collars to provide a Minimum Annual Count of panthers each year. These data are collected throughout the calendar year primarily on public land in the breeding range, which is restricted to areas south of the Caloosahatchee River. The count data are tallied to produce a minimum number of panthers detected for that year. The Minimum Annual Count, as its name implies, is not a true population estimate, but rather a simple count. This method does not account for sampling effort, imperfect detection of animals, or provide a margin of error. The latest Minimum Annual Count was completed in 2014 and it reported 139 adult, subadult, and juvenile panthers in the surveyed areas.

### Roadkill

This technique generates an estimate of population size based on the proportion of the total number of panthers killed by vehicle collisions that were previously captured and radiocollared. Additional variables used in this model include road density and traffic volume. The roadkill technique estimated a panther population size in the breeding range south of the Caloosahatchee River for 2012 at 269 adults and subadults ( $\geq 1$  year old) but with a margin of error between 143 and 509 meaning that we can only say that the actual population size fell within this range with 95% certainty (or conversely, there is only a 5% chance the actual number was outside this range). This margin of error is

too imprecise to use the estimate to inform recovery planning decisions for Florida panthers.

### **Camera trap-**

This technique uses a grid of 50 motion-triggered cameras in panther habitat where photos of all wildlife are collected over a span of 5 months. Radiocollared panthers are identified on photos and their movements across the camera grid are recorded. Photographs of radiocollared panthers tell us the likelihood of detecting a panther when it is inside the grid and that allows us to estimate the number of unmarked panthers based on how often they are photographed. Combined information on marked and unmarked panthers results in an estimate, with a measure of variance (margin of error), of the density of adult and subadult panthers for the camera grid. In order to estimate the rangewide population size with this method, camera grids need to be set up in different types of habitat. We have completed data collection on two camera grids but need additional grids so that we can see how panther densities vary across their range before we can generate a rangewide population estimate.

FWC currently uses the Minimum Annual Count to generate a panther population range because neither the roadkill nor camera trap techniques have been fully developed and tested. The Minimum Annual Count has been conducted for at least 20 years and has sufficiently documented the rise in panther numbers since the 1980's. The FWC reports the current panther population range as 110-200 panthers. The lower number in this range is based on the number of adults and subadults documented during the most recent Minimum Annual Count (2014). The upper number in this range is calculated by multiplying the density of panthers (panthers/acre) from the areas with the highest densities noted during the most recent Minimum Annual Count (2014) by the total number of acres of occupied panther habitat in South Florida.

Kittens travelling with their mother (juveniles) are not included in FWC's estimate because Federal recovery criteria are based only on the number of adults and subadults. Also, the survival rate of juvenile Florida panthers is very low relative to older panthers. Including these dependent kittens in the population estimate gives a number more reflective of the total number of panthers on the landscape. Taking into account juveniles, this would lead to a current population range of 140-250. In addition, there are four adult male panthers documented north of the Caloosahatchee River.

For more detailed information on Florida panther population estimation see [Panther Net](#).