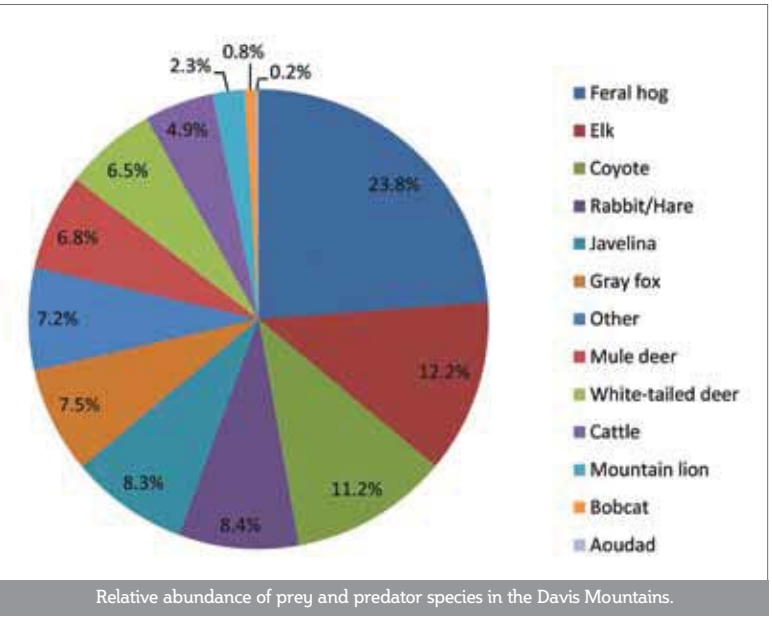
Use of Camera Traps to Determine Prey Availability for Mountain Lions in the Davis Mountains

Article by **CATHERINE DENNISON** *(Research Assistant),* **PATRICIA MOODY HARVESON** *(Research Scientist),* and **LOUIS A. HARVESON** *(Director)* and Photos courtesy of **BRI**

Predator-prey relationships are some of the most difficult aspects in wildlife ecology to understand. Questions like... Do predators regulate prey? Are predators selecting for specific prey? How much prey is lost annually? ...and many others require substantial data to draw conclusions. These questions become increasingly difficult to address when there are multiple predators and prey in the system being studied.

Beginning in 2011, we initiated a large-scale study on the ecology of mountain lions in the Davis Mountains of Texas. (For more information, please read Mary O. Parker's story on page 8 of this issue and visit www.sulross.edu/brinrm.) One of our primary objectives was to evaluate the impact of mountain lion predation on prey populations. To truly address predator-prey dynamics there are five types of data that are needed: (1) density estimates of prey populations; (2) density estimates of predator populations; (3) characteristics of available prey, including reactions to predators, and their nutritional condition; (4) estimates of density and quality of alternative foods available to the predators; and (5) characteristics of the predator, such as its means of attack and food preference.



Relative abundance of prey and predator species in the Davis Mountains.

Our study site was exclusively on private lands in the Davis Mountains and encompassed over 100,000 acres of mountainous terrain. Potential large prey species in our study site included desert mule deer, Carmen Mountain white-tailed deer, elk, aoudad, feral hog, javelina and livestock. Because other studies have shown that up to 33 percent of a mountain lion's diet may include small and medium sized animals, we also predicted that raccoons, ringtails, skunks (three species), coyotes, bobcats, foxes, and a variety of rodents may be included as prey in our study site.

We established 38 grids across our study site and then established one pair of remote cameras in each grid (76 cameras total). Paired cameras were placed facing each other and spaced a short distance off established game trails, saddles, or other areas where prey or predators were most likely to travel within each grid cell. Cameras were checked regularly to download photos.

Since Summer 2012, we have recorded over 7,000 trap-nights (10 trap-nights are equivalent to one trap being "open" for 10 nights or 10 cameras being "open" for one night). We have downloaded almost 200,000 photographs. Each photo was (painstakingly) reviewed on the computer to ascertain if a prey or predator species was visible. As with any photography, not all pictures are good. In fact, only 14,607 had animals in them. We reduced the number of photos further to 3,099 by eliminating repeats (successive pictures of the same animal in a short timeframe or photos of the same animal taken by both cameras at the paired station).

Using remote cameras, mountain lions were observed in 20 of 38 camera stations, indicating they used a variety of habitats throughout the Davis Mountains.






A variety of potential prey species occur in the Davis Mountains including aoudad, elk, mule deer, white-tailed deer, hogs, and javelina.

As seen from the pie chart below, the feral hog was the most common species documented in the camera traps, followed by elk and coyote. Aoudads were prevalent in the area, but we rarely captured them on camera. We believe this is because aoudads preferred drastically different habitats (steep, rocky terrain) than those in which we set our camera stations.

Our data also provides some insights into the distribution of various species. For example, feral hog was the most widespread species occurring in 84 percent of the trap sites. Elk and gray fox had the second highest distribution and were both recorded in 80 percent of trap sites. Coyote, javelina, and mule deer ranked third in distribution where they each occurred in 66 percent of camera stations. Incidentally, our primary prey species, mountain lion, was recorded in 53 percent of the camera stations – suggesting a broad distribution within our study site.

Although our project is still ongoing, our preliminary data suggest that there is a robust predator-prey ecosystem in the Davis Mountains. Our data demonstrates relative abundance but it does not provide absolute abundance (how many animals are in the study site). Density of species will be ascertained in the near future using common survey techniques like spotlight or helicopter counts. We will also be using a combination of genetic and telemetry data to estimate predator abundance for our study.