<u>Estimating Occupancy in Beaver Creek Wildlife Management Area</u>

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Introduction

Black bears' (*Ursus americanus*) historic range covered most of North America excluding only the great plains and parts of the southwestern deserts in the United States portion.[1] Unfortunately, their range is only 40-60% of what it used to be due to habitat loss to agriculture and excessive hunting. These same factors extirpated black bears from Kentucky int the early 1900's a state known for its high density of black bears. Recently they have managed to make a small recovery thanks to reintroduction programs near its boarder and 20th century protection efforts.[2,3] Estimating and assessing the population characteristics of the black bears is vital to their management and survival.

Estimating population characteristics for a reclusive animal like the black bear often relies on genetic analysis of hair snare traps or traditional capture-mark-recapture methods. Where these methods can be expensive, non-invasive camera trapping provides a less expensive yet effective solution when paired with occupancy modeling techniques.[4]

The objectives of this study were to estimate the black bear occupancy of Beaver Creek Wildlife Management Area in the Stearns District of the Daniel Boone National Forest and if possible, estimate the male vs. female occupancy in order to determine the stage of recolonization of the population.

Methods

Beaver Creek was divided into 18 grid sections, each 5 square kilometers in area. 18 MP8 convert scouting cameras were placed randomly such that there was exactly one camera in each grid. Cameras were attached to a tree 3 feet off the ground and bait in the form of whole corn kernels was spear 10-15 feet in front of the camera. In addition to the corn, peanut butter was spread on a tree directly across from the camera about 6 feet off the ground. The cameras were set to record pictures every 5 minutes when triggered. Sites were rebaited and cameras were checked every week for 5 weeks. Presence/absence data was recorded, determined by whether a picture of a bear was recorded on a given day. Data is recorded as either a 1 for present or a 0 for absent. Analysis included a dynamic occupancy model run using the package *unmarked* in the statistical software R.

Beaver Creek Wildlife Management Area
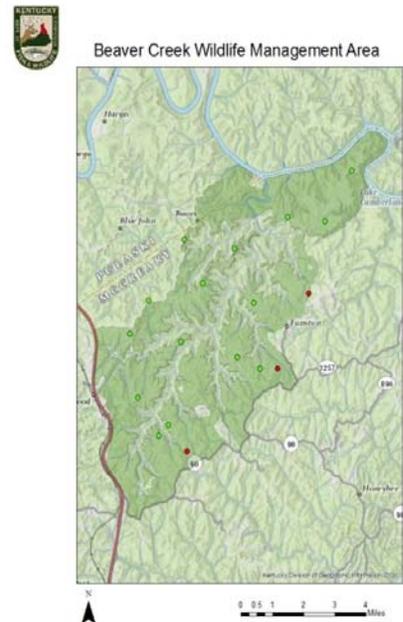
Results

Over the 5-week sampling period 15 of the 18 cameras detected a bear at least once. No covariates were explored in the analysis making the predicted occupancy of Beaver Creek to be 0.778. The detection probability across the study area was 0.3335.

Discussion

A genetic hair snare study done 10 years ago was unable to find any bears in Beaver Creek and had very few captures in areas close to Beaver Creek (Redbird & Kentucky Ridge WMA).[3] Few bears were known to be there due to anecdotal evidence from

either residents or vehicle collisions, but a large population was not likely. Evidence from this study shows that this is no longer the case whatsoever and in fact Beaver Creek is highly occupied. While males and females cannot be confirmed using just the images captured from the cameras it is incredibly unlikely that such a large population of males would inhabit an area for a such a long period of time during the breeding season if it did not contain any females. Findings from this study can be used by the Kentucky Department of Fish and Wildlife Resources and/or the Forest Service when considering the management of Beaver Creek not only because of the biological factors but the possible rise in human-bear interactions as well.

References

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