The Monongahela Camera Trapping Project
A Survey for the Eastern Cougar

Todd Lester - Eastern Cougar Foundation
Marcella Kelly – Virginia Tech
Presented by: Helen McGinnis – Eastern Cougar Foundation
Outline

Background Information

Methods

Results

Discussion
Background information

• In late 2002, the Eastern Cougar Foundation (ECF) was awarded two grants:
  – Summerlee Foundation and
  – Norcross Wildlife Foundation

• Purpose: to purchase and deploy a set of remote motion-detector cameras to survey for the presence of cougars in Monongahela National Forest in West Virginia.
Background

• This was the first officially endorsed field search for cougars since USF&WS biologist Robert Downing (now retired and on the ECF Board) conducted the only previous search in the early 1980s.
Background

• The ECF officers formed a Field Advisory Committee, composed of:
  – several ECF Board members who had experience with remote camera surveys
  – representatives of all three agencies
    • U.S. Fish & Wildlife Service,
    • U.S. Forest Service, and
    • WV Department of Natural Resources -- who have jurisdiction over any aspect of this work.
Background

• On Feb. 6-7, 2003, in Beckley, WV, this ECF Field Advisory Committee developed detailed Study Design and Field Manual to guide Todd Lester as he conducted the field work.
Personnel

- Chris Bolgiano – ECF and JMU
- Jeff Hajenga – WVDNR
- Marcella Kelly – Virginia Tech
- Todd Lester – ECF
- Dave Maehr – University of Kentucky
- Jay Martin – USFS
- Helen McGinnis – ECF
Background

• A myriad of details were decided, including…
  – application for all appropriate permits,
  – use of a GPS unit to record station locations,
  – layout of a grid pattern for effective coverage of terrain,
  – schedule for monitoring, types of film and development,
  – testing of cameras and film, and
  – all the necessary data sheets for recording information.
Background information

– Field work began at the end of March and continued until mid-September in both 2003 and 2004.

– Todd Lester was the leader for all field work and was accompanied by Jay Martin, Chris Bolgiano, Ralph Bolgiano, and Helen McGinnis on occasion.

– Marcella Kelly compiled results seen in this presentation.
Methods

• A grid consisting of 5km$^2$ blocks was overlaid on topographic maps

• A camera station was placed within each 5km$^2$ block

• Cameras were left in place for 1 month (27 days on average) and then moved to another location for the next month, for 6 months (April – September).
Methods - Study site location

West Virginia
Methods - Study site with camera locations

[Map of Virginia showing West Virginia region]
Camera Stations – within Monongahela National Forest

Bright green areas are federal lands within the Monongahela National Forest. Dark lines denote other areas within the national forest proclamation boundary that are privately owned. The Cranberry Wilderness is federally owned and lies between the yellow and purple dots.
Camera stations

Yellow dots = 2003 camera locations

Pink dots = 2004 camera locations

Number of camera stations established

2003: 100
2004: 97
2003 Camera Stations

Cameras were moved to new locations on a monthly basis from April through September 2003.

To determine survey area, buffers of 1500 meters were placed surrounding each camera location following similar protocol for other large cat surveys.

Survey area = 100.02 km²
2004 Camera Locations

Cameras were moved to new locations on a monthly basis from April through September 2004.

1500 meter buffers surrounding each camera location resulted in:

Survey area = 230.73 km2
For those familiar with these areas...

Areas surveyed (2003 in triangles):
- North Fork of the Cherry River
- Kennison Mountain / Cranberry BackCountry
- Forest Rd 731 & Dogway Fork
- Forest Rd 77 / Mike's Knob
- Forest Rd 99 / Snake Den Mountain
- Forest Rd 76 / Cranberry River

Areas surveyed (2004 in circles):
- Paddy’s Knob & Shock Run
- Gauley Mountain and Sharp’s Knob
- Williams River and Rt. 150 Scenic Highway
- Portion of Cranberry River Drainage
- North Fork of Anthony’s Creek
- Monday Lick Run and Buckley Mountain
Total Survey Area

Survey area 2003 = 100.02 km$^2$
Survey area 2004 = 230.73 km$^2$
Total Survey Area = 330.75 km$^2$
Summary Statistics Calculated

- Number of animals in photographs
- Number of trap nights
- Trap success – number of animals per 100 trap nights
- Trap success on a monthly basis for years 2003 and 2004
### Number of photos, trap nights, and trap success

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| Trap nights                   | 3062  | 2348  |
| Trap success                  | 30.013| 29.259|
| **Total trap nights and Total trap success** | **5410** | **29.686** |
Trap Success by Species Across both years

Trap Success – captures per 100 trap nights

Species: Cougar, Bobcat, Black Bear, Coyote, Red Fox, Raccoon, Skunk, Dog, White-tailed Deer, Squirrels, Eastern Cotton Rat, Eastern Wild Turkey, Grouse, Crow, Opossum, Unknown.
Carnivores “captured” monthly in 2003
Trap nights in parentheses

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Carnivores “captured” monthly in 2004
Trap nights in parentheses

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Carnivore Trap Success per month (2003)

- **Bobcat**
- **Black Bear**
- **Coyote**
- **Red Fox**
- **Raccoon**
- **Dog**

Trap Success – Captures/100 trap nights

- **April**
- **May**
- **June**
- **July**
- **August**
- **September**

Month
Carnivore & White-tailed Deer Trap Success (2003)
Carnivore Trap Success 2004

- Bobcat
- Black Bear
- Coyote
- Red Fox
- Raccoon
- Skunk
- Dog

Trap Success – Captures/100 trap nights

Month:
- April
- May
- June
- July
- August
- September
Monthly trap success for carnivores and white-tailed deer

- Bobcat
- Black Bear
- Coyote
- Red Fox
- Raccoon
- Dog
- White-tailed deer

Trap Success – Captures/100 trap nights

2003

2004
Note: scale is less than 10% trap success. However – we were not targeting these smaller animals as cameras were placed at approximately knee height.
Unknown animal
Other interesting photos
Wolf-Coyote Cross? Red Wolf?
If there was a cougar population - trap success could be between 1-3%
How do you know if an animal is truly absent??

- This is a difficult question to answer when studying elusive species.

- Carbone et al. (2001) used camera trapping rates and computer simulations to estimate the minimum effort required to determine if tigers (or any other species) were present in an area.
Findings

• Carbone et al. (2001) found that camera trapping programs running for 1000 trap nights had a 95% chance of obtaining at least 1 photograph at simulated low tiger densities of 0.4-0.7 individuals per 100 km$^2$.  

• If trapping effort were 10,000 trap nights tigers presence could be determined when cat density was very low 0.05/100km$^2$.  
Our effort was substantial

- We had 5,410 trap nights and, therefore, should have been able to detect cougars at densities of between 0.05 and 0.7 per 100km$^2$.

- Cougar densities in other areas with known intact cougar populations in North America range from

0.3-0.5 per 100km$^2$ in Utah (Hemker et al. 1984)

0.77-1.04 per 100km$^2$ in Idaho (Laundré and Clark 2003)

Highest estimate was 4.9 individuals per 100 km$^2$ (from Anderson’s (1983) summary of North American cougar densities)
• While we can not confirm cougar presence across our study site, it may be that we did not have high enough trap effort if cougar density was extremely low or if only newly dispersing animals are entering the area.
Standardize data collection

• We do hope that others planning to conduct camera trapping studies follow a standardized protocols such as the one we developed (which follows well developed protocols for other large cats such as tigers and jaguars) in order too assess effort and to compare results across sites
Standardize data collection

• Data obtained on other species, such as trap success, is also valuable and informative and can potentially be used as an indicator of abundance.