Spatially explicit capture-recapture estimates of population abundance and population density of the Florida black bear (*Ursus americanus floridanus*)

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A Brief History: the Florida black bear

- **One of 16 subspecies**
- **Historic range included Florida, Florida keys, Georgia, Alabama, Mississippi** (Hall 1981)
- **State-listed as threatened in 1974** (Brady & Maehr 1985)
- **Not listed by USFWS; no federal protection**
- **Taken off Florida's threatened species list in 2012** (Telesco 2012)

Historic Range
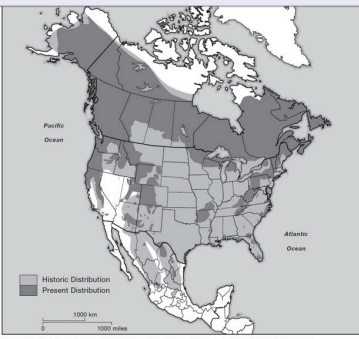
Figure 8.1. Historic and present distribution of black bears (*Ursus americanus*) in North America.

Justification

- **Umbrella species** (FWC bear management plan 2012)
- **Game value**
- **Human-bear conflict** (Simek et al. 2005)
- **Data needed for ten-year management plan**
- **Last statewide assessment: 2003** (Simek et al. 2005)

Objectives

- **Objective 1: Use spatially explicit capture-recapture analysis to estimate abundance and density in six populations of the Florida black bear**
- **Objective 2: Determine extent of genetic interchange among populations**

Methods Outline

- **Study areas**
- **Trapping grid setup/cameras**
- **Hair snare construction/hair collection**
- **Genetic analysis**
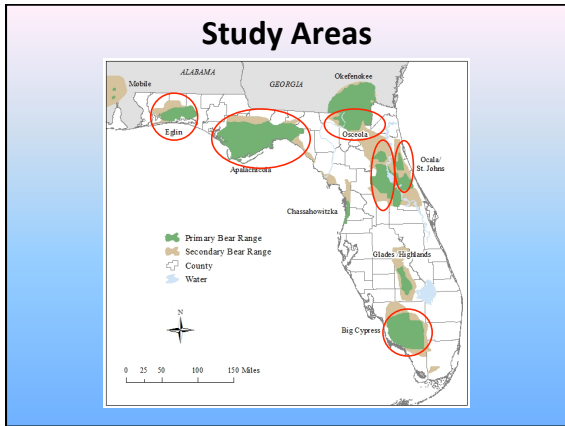- **Spatially explicit capture-recapture analysis**

Study Areas

Grid Structure

- **3X3 grid with 2-km spacing between traps**

- **12-km spacing between grids**

Trail Cameras

- **Estimates time to first detection**

- **Used to validate assumptions about detection, behavioral bias**

Hair Snare

65-70 cm

35-40 cm

Hair Snare

Hair Snare
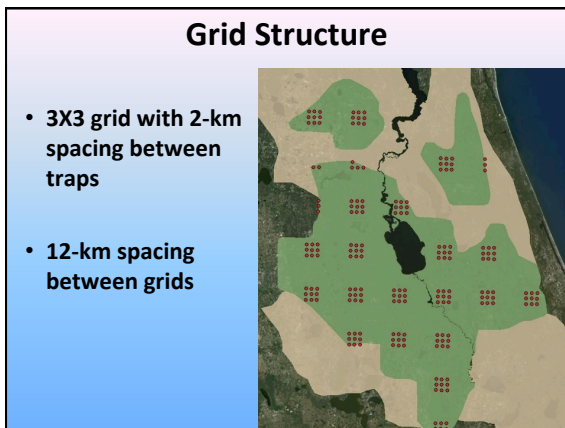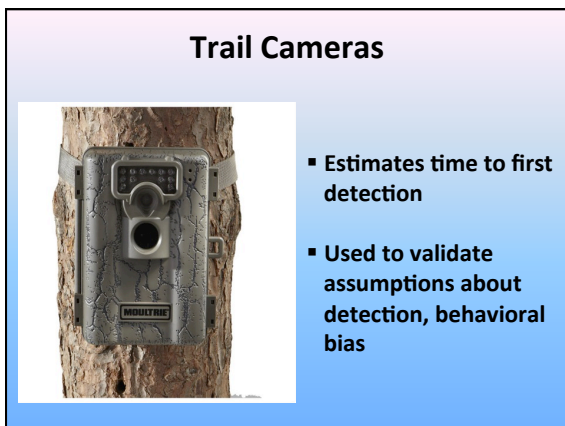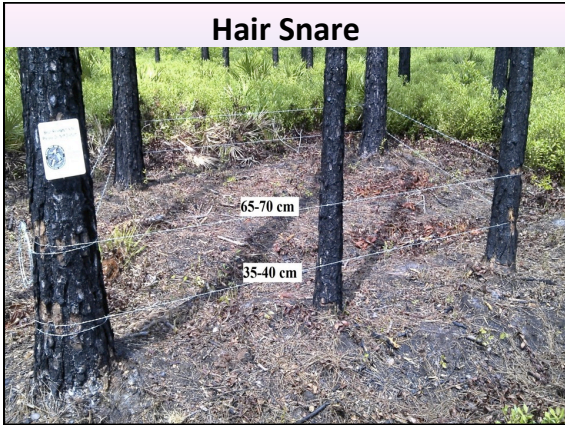
Sample Collection

Genetic analysis

- **Performed by Wildlife Genetics International, Inc.**
- **Genotyping to individual using microsatellite markers**
- **Used to create genetic mark-recapture history**

Genetic analysis

+ PCR

Spatially Explicit Capture-Recapture (SCR)

- **What is it?**

  - **Capture-recapture that accounts for spatial data**
  - **Method originally developed by Efford (2004)**
  - **Two currently accepted frameworks; Bayesian (Royle & Young 2008) and maximum likelihood estimation (MLE) (Borchers & Efford 2008)**

Why use spatially explicit capture-recapture?

-Accounts for heterogeneity in encounter probability due to spatial organization of individuals related to traps

-Allows modeling of trap level effects on encounter history

-Provides well-defined sample area using better methods for estimating N than traditional capture-recapture
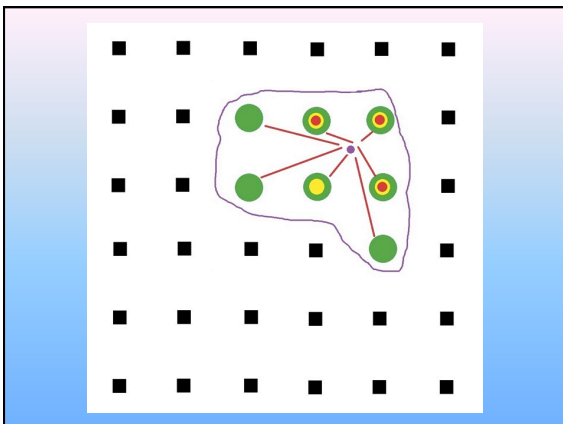
(Royle et al. 2013)
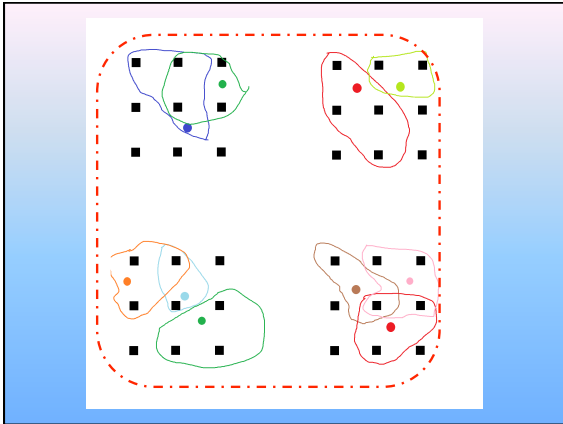
Progress thus far

- **8,282 samples collected**

2015 Sampling Season
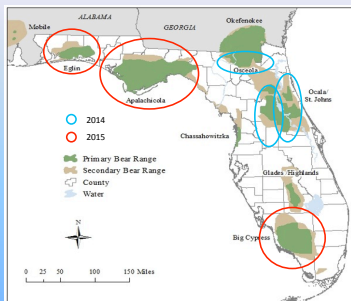
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Photo Credits

- Slide 3: Pelton, M.R., Coley, A.B., Eason, T.H., Doan Martinez, D.L., Pederson, J.A., van Manen, F.T., and Weaver, K.M. 1995. "Figure 8.1. Historic and present distribution of black bears (*Ursus americanus*) in North America." Retrieved 11/12/2014 from "Status Survey and Conservation Action Plan: Bears", IUCN, chapter 8, p.146.
- Slides 7 & 21: Florida Fish and Wildlife Conservation Commission. 2008. Retrieved 11/12/2014 from Brian Scheick (Brian.Scheick@myfwc.gov)
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- **All other images taken from the project or created/owned by Jacob Humm**

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Questions?