White-tailed Deer Home Ranges: A comparison of the three phases of the rut

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Objectives

Purpose:
- To determine the effect of the rut on home range size of female white-tailed deer

Hypothesis:
- \( H_0 \): Home range sizes of female white-tailed deer will not change during the pre, peak, and post rut phases
- \( H_a \): Home range sizes of female white-tailed deer will decrease during the 3 week phase prior to the peak breeding phase of the rut.
Study Area

- Area: 275 acres
  - Includes 24 acre Lake Joanis

- Habitat types include:
  - Mixed hardwoods and conifers
  - Oak Savannah
  - Cattail marshes
Air Photo of Schmeeckle Reserve

[Image of an aerial photo of Schmeeckle Reserve with a red outline highlighting its boundary. The photo shows a mix of natural and urban areas, with a large body of water and trees in the center, surrounded by buildings and streets.]
Methods

- Capture
  - Deer trapped using box traps baited with corn
  - Trapped February 2-23, 2005
  - 7 deer captured
    - 3 yearling does fit with radio collars. 1 mortality (June)
    - Collar frequencies: 151.172, 151.700 mHz
Methods

- **Telemetry**
  - locations found multiple times per day using hand-held receiver
  - a minimum of three telemetry stations
  - Bearings later used to triangulate deer location

- **Dates:** October 17 through December 2, 2005
Analyses

- **Home range size** – estimated by minimum convex polygon
  - Simplest and most common home range estimate
  - Minimum area estimate using outermost locations to form polygon
  - Found using *Locate 3*

- **Paired T-test**
  - Comparing home range size during pre and post-rut to the period of peak rut
  - Before and after measurements on the same sampling unit
  - Small sample size (N<30)
  - Found using *SPSS*
Results: Deer 1.700 Locations

# of locations/deer:
Pre Rut - 20
Rut – 21
Post Rut - 12

Visitor center

- Pre Rut (Oct 17-31)
- Rut (Nov 1-21)
- Post Rut (Nov 22-Dec 2)
Results: Deer 1.172 Locations

- Pre Rut (Oct 17-31)
- Rut (Nov 1-21)
- Post Rut (Nov 22-Dec 2)
Results: 1.700 Home range

- Home range size:
  - Pre Rut: 1,049,969 m²
    *outlier locations
  - Rut: 99,543.5 m²
  - Post Rut: 239,866.5 m²
Results: 1.172 Home range

- Home range size:
  - Pre Rut: 550,930.5 m²
  - Rut: 141,925 m²
  - Post Rut: 270,662.5 m²

*outlier locations
Home range Analysis

- Paired T-test (both deer combined)
- Pre Rut vs Rut (mean area)
  \[ p = 0.00 \quad <0.05 \]
  *Significant

- Rut vs Post Rut
  \[ p = 0.00 \quad <0.05 \]
  *Significant

*Reject Ho

Ho: Female white-tailed deer will show no significant change in home range size before, during and after the rut.

Ha: Female white-tailed deer will show a significant change in home range size before, during and after the rut.
Based on the results, the home range size of the female white-tailed deer we studied decreased during the 3 week phase prior to the breeding phase of the rut.

Assuming peak breeding fell between Nov. 14-21. Thus the 3 week phase we called the “rut” was Nov 1-21

*Exact date of estrous unknown
  - Affected by photoperiod, latitude, health of deer
Discussion

- Female home range sizes change during the phases of the rut
  - Natural or unnatural causes?
    - Does stay within core area during rut to allow bucks to find them easier
    - Pre rut area was influenced by several outlier locations which may not have been within the normal home range
    - Locations were found only during the day
    - Core area was found for only the 8 week period of the project.
Discussion

Sources of Error:

- Telemetry bearings
- Compass readings
- Interference
Scientific Significance

- Many agencies and individuals interested in deer ecology
  - how deer behavior changes during the rut
- Research on species aids in management
- Protection of critical habitat during sensitive times
- Rut phase may be determined by looking at home range size
Future Research

- Larger sample size
- More location data
- Other factors influencing the home range during the rut

- Although there has been extensive research on the whitetail deer, not a lot has been done on during the breeding season
  - Hard to find behavioral research on this period
References


