Kiawah Island Bobcats: A Keystone Species in a Developing Landscape

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The Mystery and Magic of Bobcats
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People, Deer, & Predators
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The diagram illustrates the concept of carrying capacity in relation to deer population size over time. The curve shows an initial increase in deer population size, followed by a peak and then a decrease, indicating a reduction in carrying capacity due to habitat damage. The graph emphasizes the dynamic nature of deer populations and the environmental factors affecting them.

Miss. State Univ.
Residential Development
Bobcat & Deer Research on Kiawah

1996-1997

- Dense but healthy deer population
- Dense bobcat population (≈30)
- Bobcats eat mostly rodents (>40%), some deer
Bobcat & Deer Research on Kiawah

2000-2001

• Relatively stable bobcat population

• Similar diet

• Bigger home ranges and higher mortality on west end vs east end
Objectives

- Deer survival rates and causes of mortality?
- Differences between east and west ends?
Deer Monitoring

• Collared 30 does each year
  – Radio-collar, eartag, VIT

• Neonatal fawns
  – Expandable radio-collar
  – Monitored year round
Deer Fawn Survival

- 61 fawns monitored during 2002 & 2003
- 51 mortalities (16% survival)
  - 31 bobcat (61%)
  - 8 vehicle
  - 5 alligator
  - 7 other
Bobcat (Lynx rufus)

- Moderately sensitive to habitat fragmentation
- Typically avoid interactions with humans
- *Not usually a major deer predator!*
Bobcat & Deer Research on Kiawah

2004-2005

• Objectives
  - Deer survival and causes of mortality
  - Bobcats ecology
  - Bobcat habitat suitability
Bobcat Monitoring

- Collared 16 bobcats
  - Home range size & overlap
  - Reproduction & survival
  - Habitat use & movements
  - Interactions with deer
Deer Fawn Survival

• 134 fawns radio-collared

• 105 mortalities
  – 70 bobcat (67%)

• Bobcat predation
  – 66% within 2 weeks
  – 97% within 5 weeks

Weeks Since Birth
• Yearly variation
  – Individual bobcat prey selection
    • #795 at 35% (8) in 2002
Deer Fawn Survival

- Yearly variation
  - Diet optimization
  - Rodent abundance
More concentrated fawning habitat = higher chance of bobcat predation
Bobcat Reproduction

- 6 dens located
  - 1.8 kittens/den (range = 1-3)
  - >5 acre patches of forest or shrub
Bobcat Home Ranges

- Males had larger home ranges than females
- Juvenile females had larger home ranges than adult females
- Adult females on the west-end had larger home ranges than those on the east-end
**Bobcat Interactions**

- Typical bobcat behavior
  - Males typically overlap several females
  - Males-males and females-females don’t typically overlap

- Kiawah females overlapped 0-90% of their home range with another female
  - DNA suggested high relatedness for 90% overlap; denned 160 m and 85 m apart
  - Abundant resources?
Day movements depressed, no decrease at night
## Habitat Selection

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Selected</th>
<th>Habitat Ranking</th>
<th>Avoided</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diurnal</strong></td>
<td>Shrub</td>
<td>Dune</td>
<td>Forest</td>
</tr>
<tr>
<td><strong>Nocturnal</strong></td>
<td>Shrub</td>
<td>Develop</td>
<td>Dune</td>
</tr>
</tbody>
</table>

- Selected habitat differently day vs night
- Shrub selected over all other habitats
- Development selected and Altered not avoided during nocturnal
Habitat & Home Range

- Female home ranges ↓ when % Shrub ↑
- EE vs WE differences may be inherent differences in landform & Shrub availability
Bobcat Habitat Suitability

- Habitat Suitability Index
  - Scoring system that is based on biology
  - Modified from Boyle and Fendley (1987)
  - Considered food, cover, and reproductive capability of habitat
Bobcat Habitat Suitability
Research Conclusions

• Kiawah bobcat = keystone species
  – A species on which other species in an ecosystem largely depend, such that if it were removed the ecosystem would change drastically
  – Natural regulation of deer

• Maintenance of bobcat abundance
  – Individual prey selection
Research Conclusions

• Conservation of suitable habitat
  - Shrub, edge
  - Understory – bobcats & rodents

• Local conservation and education efforts are key
Creating Bobcat Habitat

- Backyard habitat
  - Native plantings that provide understory
  - Creation of “soft edges”
Suburban bobcats do not make Kiawah unique
Suburban bobcats do not make Kiawah unique
Your efforts to maintain bobcats at a level where they function as a keystone species DOES!
Thank You!