BOBCAT RESEARCH

KIAWAH ISLAND, SC

Bobcat Research Projects

- **Deer Ecology Study 1996-1998** (TOKI, UGA (University of Georgia))
  - Bobcat predation on fawns is one ecological force helping to remove deer from the herd
  - Noted that bobcats were more abundant in the less-developed eastern end (EE) of the island than in the more-developed western end (WE)
  - Bobcats ate more deer fawns in the EE versus WE portions of Kiawah Island
  - Rodents made up the majority of prey consumed by bobcats in both portions of the island (approximately 40% of total)
- **Predator Scent Station Index Survey** – (TOKI (Town of Kiawah Island))
  - Conducted – 1997,1998,2000,2001,2003-2005,2007
  - Surveys suggest a stable bobcat population ranging from 26-35 individuals
- **Bobcat Ecology Study 2000-2001** (TOKI and UGA)
  - VHF radio –telemetry (14 collared bobcats/7male/7female) /bobcat scat collection
  - Bobcats play a major role in the regulation of Kiawah's deer population
    - Rodents make up the majority (>40%) of prey consumed
    - Estimates obtained via bobcat scat collection and analysis
  - Reproductive success was equal between the more developed WE versus the less developed EE area of Kiawah Island.
  - Greater bobcat movement and mortality was observed in the more developed areas of the island.
  - Bobcats on the more developed WE portion of the island demonstrated home ranges almost twice as large as those observed on the less developed EE portion of the island, possibly reflecting a behavioral response to human activity or differences in prey availability.
- **Ecology Of White-Tailed Deer And Bobcats On Kiawah Island, South Carolina: Implications For Suburban Habitat Preservation 2002-2005** (TOKI, UGA, KINHC (Kiawah Island Natural Habitat Conservancy))
  - *Survival And Home Ranges Of White-Tailed Deer Fawns And Does On A Developed Southeastern Barrier Island*
    - Bobcats were responsible for 67% of all fawn mortality
      - This is the highest rate of bobcat predation on white-tailed deer fawns documented in the U.S. to date
      - All bobcat predation occurred within the first 12 weeks of birth
      - Fragmented suburban habitat on Kiawah Island may increase the likely hood of an encounter between a hiding fawn and a traveling bobcat, possibly accounting for the very high predation rate.
    - First study to document bobcat predation as the major limiting factor in the population dynamics of a suburban deer herd
  - *Movements, Interactions, And Habitat Use Of Bobcats On A Developed Southeastern Barrier Island*

- VHF radio telemetry study (16 collared bobcats/5 male/5 female/ 3 juvenile male /3 juvenile female)
- In contrast to the 00-01 study, this study suggests a less dramatic relationship between the amount of development and human activity as compared to bobcat home range size.
    - Male home ranges were found to be smaller on the WE vs. EE
    - Female home ranges were similar between the WE and EE
    - Kiawah Island bobcats exhibit the smallest average home range sizes of any bobcat population ever documented in the SE United States
- Bobcats show a high selection for habitat classified as scrub/shrub type habitat
    - This habitat type provides very good cover for bobcats, and is an area of high prey concentration.
- Bobcats generally avoided highly developed areas during the day, but selected these areas during the night, likely exploiting abundant prey resources in these more developed areas of their home range.
- Bobcats are potentially more adaptable to human-altered landscapes than past research has shown.
- Development activities to date have not severely impacted their highly-selected shrub habitats and relatively large patches of these important habitats are intact throughout portions of the island. However, some recent development has removed areas that were consistently used for denning over the past 10 years. Future development of shrub habitat areas may have wide-ranging negative effects on reproductive habitat suitability, prey availability, and daytime concealment cover.

- ***Using Bobcat Habitat Suitability To Focus Habitat Preservation Efforts On Kiawah Island, South Carolina***
    - Modified an existing bobcat habitat suitability index (HSI) model (Boyle and Fendley, 1987), which focuses on the food suitability of habitats, by including components for concealment cover and reproductive habitat
    - Developed a windows-based computer program that calculates and outputs MHSI (modified habitat suitability index) values that can easily be imported into a GIS for display in map form, allowing for frequent re-evaluation of site-specific habitat suitability as land-use patterns change
    - Used locations collected from 16 radio-collared bobcats to assess validity of the MHSI
        - Bobcats used areas identified as highly suitable more than expected and areas of low suitability less than expected
- **Pilot Bobcat GPS Study 2007** (TOKI, KINHC)
    - GPS collar study (5 collared bobcats/3 male/2 female)
    - One of the first ever studies completed using GPS technology to track bobcats
    - The use of GPS technology is an effective and efficient technique on Kiawah Island
        - Collars received an average of 2530 GPS locations
        - Accuracy of <10m
        - Obtained precise home range data
        - Recorded daily movement patterns with accuracy and time intervals which never before had been possible
        - Located specific fine-scale patches of selected daytime cover
        - Noted the same strong preference for scrub/shrub type habitat
        - Observed very unique denning behavior and patterns of the two female bobcats

- Increased daytime movement and decreased nighttime movement
- Den sites relocated approximately weekly during the first 6 weeks
- Some den locations in smaller patches of habitat than observed in previous studies
- Documented the largest home range ever to be recorded for a Kiawah Island bobcat
- Concluded that a long term (1 ½ - 3 yr) full scale (10 GPS collar) study would be beneficial to the future sustainability of Kiawah Island bobcats

- **Gabe Sataloff Masters Research 2007-2008** (College of Charleston, KINHC)
  - Created the Interactive Bobcat Tracker website
  - Allows the public to view and manipulate the Pilot Bobcat GPS Study data online
  - Will include future bobcat GPS Data
  - Update and improve the MHSI (modified habitat suitability index) created in the earlier study, "Using Bobcat Habitat Suitability To Focus Habitat Preservation Efforts On Kiawah Island".
  - Create an interactive computer based habitat rating system for Kiawah Island
  - This will aid in identifying potential high quality habitat, which could serve as bobcat denning and daytime cover
- **Bobcat GPS Study 2008**
  - Trapping/Collaring will begin in February 2008
  - Project Goals:
- To study the denning patterns of female bobcats on Kiawah Island
- To characterize bobcat denning habitat
- To identify important daytime resting areas for bobcats
- To determine selection and usage of specific habitat types by bobcats
- To monitor survival rates of bobcats on Kiawah Island
- To monitor bobcat response to ongoing development on Kiawah Island
- To monitor juvenile survival and dispersal

- **General Information from Studies:**
- Typical litter size was 2-3 kittens. Kittens are almost adult size in 6 months and are on their own in less than a year. Some of these juveniles leave the island.
  Both the male and female are solitary and territorial. The territory size has varied in different parts of the island over the last 10 years but was always larger for the males.

The bobcat has been proven to be an excellent umbrella species for Kiawah Island. For over a decade continuous research has been conducted on the bobcat population of Kiawah Island and with each completed project, we are able to more thoroughly understand the habitat type needs of this top predator. The VHF studies and the development of the MHSI (modified habitat suitability index) determined the major importance of scrub-shrub type habitat for the Kiawah bobcat population. With the advent of GPS tracking technology we are beginning to understand the fine-scale habitat use patterns of Kiawah bobcats. The pilot GPS study gave us a brief look at the capabilities of this technology, and its future potential for identifying necessary habitat, such as specific patches of daytime cover and specific denning habitat. With the

upcoming full scale GPS bobcat study we will begin to understand long term issues such as: year round habitat use, specific denning habitats, bobcat response to ongoing development, and other important bobcat habitat related issues. As Kiawah Island continues to develop, long-term analysis of the effects of development will become critical in the conservation of the islands bobcat population and all other species that are protected under this umbrella.