Summary of Final Report, BC-128
September 2001

BLACK BEAR MOVEMENTS AND HABITAT USE RELATIVE TO ROADS IN OCALA NATIONAL FOREST, 1999-2001

PROBLEM STATEMENT

Currently, Florida is home to over 15 million people. Not surprisingly, habitat loss resulting from the residential, commercial, agricultural, and transportation needs of humans is the most significant cause in the decline of many of the state's wildlife populations. The goal of the Florida Fish and Wildlife Conservation Commission (FWC) regarding black bears is to perpetuate the species *(Ursus americanusfioridanus)* in Florida. However, management of Florida black bears to assure their future existence increasingly depends upon accurate biological information.

The Florida black bear once occurred throughout the Florida mainland. However, the rapid conversion of native range to agricultural and urban landscapes, within the last century, has resulted in several geographically isolated sub-populations of bears. Consequently, the State of Florida has listed the bear, throughout most of its range, as an endangered species. Currently, the largest bear populations are concentrated in and around Ocala National Forest (ONF), Osceola National Forest, Apalachicola National Forest, the Big Cypress region, and Eglin Air Force Base.

Because bears in Florida have large home ranges and make extensive movements in response to reproductive activities and nutritional needs, their behavior often puts them in conflict with the state's human population. Wooding and Brady (1987) noted that bear/vehicle collisions had occurred in 27 of Florida's 67 counties. More recent studies have identified collisions with vehicles as the leading cause of mortality among some bear populations in Florida. Efforts to address highway mortality of panthers and bears have been successful when based upon intensive home range, habitat use, and movement studies of the affected populations.

The ONF is one of the largest and most important habitats for bears remaining in the state, but it is located near the heavily populated central Florida area, which continues to develop at a rapid pace. Since the FWC began documenting the numbers of bears killed by vehicles in 1976, the Ocala population has had the highest number of roadkills (381 of 880, or 43.3% of the statewide total) of any area in the state. Furthermore, a study conducted in 2000 found that 8 of 15 chronic roadkill problem areas in Florida are in Lake and Marion counties. Since ONF is divided by State Road 40 (SR 40) and traversed by other roads of varying intensities of use, researchers can there study and assess bear movements relative to a variety of road traffic levels.

OBJECTIVES

The goal of this study was to provide information useful for advancing roadway design, placement, improvement, and maintenance with regard to black bear conservation and management in ONF and other areas with bear populations in Florida. Specific objectives for this research included the following:

- determine the habitat use and movement patterns of bears captured in the vicinity of SR 40
- determine the home-range dynamics of bears captured in the vicinity of SR 40

- determine the productivity and survival of bears captured in the vicinity of SR 40
- provide an abundance estimate of the bear population within the study area
- locate and analyze the characteristics of sites where bears cross SR 40, within the study area
- survey the relative abundance and availability of common bear foods in ONF
- synthesize collected data to provide recommendations for reducing the impacts of roads on bears in ONF

FINDINGS AND CONCLUSIONS

Researchers evaluated the movements, habitat use, and population dynamics of black bears relative to State Road 40 in ONF. They captured 94 bears and placed radio collars on 76 of them. Additionally, they monitored an 18-km disk transect along State Road 40 to document bear crossings by tracks left in the sandy substrate. Researchers found that bears crossed State Road 40 frequently, including 749 documented road crossings along the disk transect and 324 identified crossings from telemetry locations. Bears tended to "avoid" slash pine forest types, particularly the older age classes, and younger age classes of sand pine/scrub oak. Bears tended to "prefer" middle-aged stands of sand pine/scrub oak, upland hardwoods, and wetland hardwoods.

Researchers estimated population size with a mark-recapture methodology on genetic analysis of 1,278 hair samples collected from baited enclosures. Incorporation of these data into the modified Lincoln/Petersen model yielded an abundance estimate of 131 bears, with a 95% confidence interval of 95-168 in 1999, and 153 bears, with a 95% confidence interval of 128-177 bears in 2000. Food availability was estimated from 68 100-meter transects in sand pine/scrub oak and 68 pine flatwoods habitats. These transects indicated a steep decline in the amount of foods available from 1999 through fall 2000.

Researchers documented the production of 40 cubs from 19 litters. Seventy-nine percent of the cubs lived through their first year. The annual mortality rate for bears 1.5 years or older was estimated at 8.6% overall. Collisions with vehicles accounted for 7 of 13 bear mortalities documented during this two year study. Roadkill tended to be clustered toward the eastern half of State Road 40 within the forest, although crossings occurred throughout the study area. Hills, curves, and vegetated road margins seem to increase the probability of bear roadkill, whereas long, flat, straight, and open stretches seem to decrease it. Research findings indicate that roadway design and maintenance could be manipulated to reduce the number of roadkill incurred on two-lane roads.

Researchers have begun a second phase of the study (Contract BD016), which will allow for the collection of two more years of data that will provide more precise parameter estimates and greater insight into the impacts of S.R. 40 on bears in ONF. Analyses of such data will provide highway designers and planners with information that will contribute to the design and improvement of highways in Florida that are of less impact to bears. The second phase of study is scheduled to continue through May 2003.

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