Senior Thesis Proposal

Black Bear Food Habits in Central Georgia

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Introduction, Justification, and Literature Review

There has been one previous study by Grahl (1985) on the ecology of the central Georgia black bear population. Black bears in Georgia are threatened by habitat destruction as a result of human development and sprawl (Clapp 1990). Because bear movements and reproductive success are related to mast productivity (Powell et al. 1997, Roof 1997) it is important to learn more about their food habits so that wildlife biologists can better manage for and conserve black bear populations in the future.

This study is one component of a larger study being conducted on the black bear (*Ursus americanus*) population in central Georgia (CGP). The main goal of my senior thesis is to evaluate the basic black bear feeding habits around the Oaky Woods and Ocmulgee wildlife management areas (WMAs) to assist in determining the seasonal ecology of this black bear population. Most of the land occupied by these black bears is owned by industrial private landowners, therefore timber management practices may have an impact on this population (Carlock et al. 1999). By determining the species' seasonal ecology, it will be possible to determine the most valuable habitats and better manage them for the black bear in central Georgia.

There are three populations of black bears found in Georgia. The largest and most well-known population is found in the Blue Ridge Mountains. Another population is found around the Okefenokee Swamp of southeastern Georgia. The third population is found in central Georgia around the Ocmulgee River (Grahl 1985). This population is relatively unknown even though it has existed for many years. In 1953 Jenkins estimated the population to be around 40 bears. Grahl (1985) estimated the population to be around 66 bears. Golley (1962) grouped the

central Georgia and the mountain population into subspecies, *Ursus americanus americanus*, and the Okefenokee population into subspecies *Ursus americanus floridanus*.

Black bears have been documented to be opportunistic feeders (Maehr and DeFazio 1985, Kasbohm et al. 1995, Powell et al. 1997, Roof 1997). They vary their diet to coincide with fruiting phenology and food availability (Roof 1997). Popular bear food items in the southeastern U.S. are blackberry (*Rubus* sp.), pokeweed (*Phytolacca americana*), blueberries (*Vaccinium* sp.), saw palmetto (*Serenoa repens*), wild grape (*Vitis* sp.), greenbrier (*Smilax* sp.), oak (*Quercus* sp.) mast, ants (Formicidae), yellow jackets (*Vespula vulgaris*), and white-tailed deer (*Odocoileus virginianus*) (Landers et al. 1979, Maehr and Brady 1984, Maehr and DeFazio 1985, Beeman and Pelton 1977, Roof 1997, Stratman and Pelton 1999). The use of soft mast by black bears is important as they have been documented as important seed dispersers for many plant species (Maehr 1984, Auger et al 2002)

Previous studies have separated black bear diets into four different seasons. Spring is usually dominated by vegetation along with some animal matter (Beeman and Pelton 1977, Hellgren and Vaughn 1988, Clapp 1990, Stratman and Pelton 1999). The duration of the spring season was noted to last from emergence from the den, or decreased winter activity, through June (Beeman and Pelton 1977, Hellgren and Vaughn 1988, Clapp 1990, Stratman and Pelton 1999). Early summer season lasts from June through July and the diet consists of some vegetation shifting initially to soft mast (Hellgren and Vaughn 1988, Clapp 1990, Stratman and Pelton 1999). July through the end of September is considered late summer season and is dominated by soft mast (Beeman and Pelton 1977, Hellgren and Vaughn 1988, Clapp 1990, Stratman and Pelton 1999). In the fall season, which lasts from late September through early December, black bear diets consist of mostly hard mast if it is available and early fall soft mast

(Beeman and Pelton 1977, Landers et al. 1979, Clapp 1990, Stratman and Pelton 1999). Some studies also document a winter, or denning, season that consists of leftover hard mast and some shrub and vine mast (Clapp 1990). Animal matter, mostly insects and some invertebrates, is a small percentage of the diet but is found throughout all seasons (Maehr and Brady 1984, Hellgren and Vaughn 1988).

My senior thesis is a continuation of a similar senior thesis done on the same study site in 2004 by Alessi (2004). Alessi found that blackberries, muscadines (*Vitis rotundifolia*), and persimmons (*Diospyros virginiana*) were the most common foods found in scat. The early summer diet consisted mainly of blackberry and plum (*Prunus* sp.). During late summer, blackberry still made up the majority of the diet. Muscadine replaced plum and blackberry towards the end of the summer. Arthropods, mainly ants and beetles, made up the highest aggregate percentage of non-fruit foods during late summer. Yellow jackets were found in scat from June to November. Even though the fruiting times of muscadine and pokeweed were through late October, they were found with low aggregate percentage in fall diets. Acorns were only found as a trace amount in one scat, as in a study done in Florida by Maehr and Brady (1982). Persimmon was found in every sample during the fall. Alessi states "persimmon may be an important nutritional substitute in years of low hard mast availability."

Objectives

The objectives of this study are to combine my data with data collected by Alessi (2004) to describe the seasonal food habits of black bears in central Georgia. I predict that our data will show similar shifts as shown in previous black bear food habit studies throughout the southeastern U.S. Other hypotheses that I hope to answer are: 1) Will bears switch from one

food source to another even if that food source is still available? 2) Is there in an increase in food density during certain times of the year?

Methods

I studied black bear food habits by analyzing fecal material. Scats were collected from December 2004 through June 2004. They were obtained at trapping sites and opportunistically during radio-tracking positions for a related study. The scats were put into plastic bags marked with the date collected, coordinates, and name of the collector, and were placed in a freezer until they could be examined.

The width of the frozen scat was taken and will be compared to measurements made by Lecount (1986) to ensure they were bear scats. After thawing, the fecal material was pushed to the bottom of the bag and the width of the scat and the length of the bag were measured. The volume of the scat will be determined from these measurements.

The scat was then flushed with water and drained in two screen sieves to separate items of similar size. A .132-inch sieve was used on top and a .0234-inch sieve was used on bottom. The contents of the top sieve were then placed in a pan and enough water was added to the pan to float the contents. A dissecting microscope was used to separate the contents into hard mast, soft mast, vegetation, or animal matter. Forceps were used to extract the different items and to place them in separate Petri dishes. Hard and soft mast items were identified to species; insects and vertebrates were identified to family or genus; and grass and woody materials were not identified beyond those classifications. Next, the volume of each different item was determined using a water displacement technique described by Martin et al. (1946). Any items found with a volume less than 1ml were considered trace amounts.

To measure the contents of the bottom sieve, a 15ml sub-sample was taken because the contents were too small and numerous to extract. The sub-sample was placed in a pan and sufficient water was added until the contents floated. Items were identified as described above and an ocular estimate of the percentage of each item was made. Photographs were taken of varying percentages to be used as a reference to decrease observer bias. The volume of each item was found for the sub-sample, then for the entire bottom sieve. These volumes were summed to the volumes estimated in the top sieve to obtain total volumes and percentages for the entire scat.

Plant phenology of the area will be studied using field notes and samples taken from the area along with the literature. The seasonal shifts in diet and diversity of foods chosen will be determined through graphical analysis.

There are bias to be considered in this study. When using solely scat analysis in determining food habits of black bears, some major food items may go undetected because scat only contains items that have not been fully digested. Collecting scats along roadsides could create another bias in this study.

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