

Conservation and Management of Black Bears in Mississippi



Mississippi Department of Wildlife, Fisheries, and Parks
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JUSTIFICATION

There is little doubt the black bear population is increasing in Mississippi. Over the last three years, reported bear sightings have been on the rise throughout the state. This is likely due to an increase in the numbers of bears inhabiting certain areas of the state combined with efforts by MDWFP and other conservation groups to raise public awareness about black bears in Mississippi through education and outreach. As bear populations continue to grow and repatriation efforts continue to be successful in Arkansas and Louisiana, Mississippi will continue to see more and more bears entering our state including females with the potential to further increase bear populations. As bear numbers continue to increase over time, so too will interactions

between bears and humans. The Mississippi Department of Wildlife, Fisheries and Parks is the lead natural resources agency with regards to black bear conservation and management in Mississippi. For this reason, it is imperative MDWFP personnel be educated about black bears and their management so they might better educate the citizens of Mississippi and be better prepared to handle potential situations and conflicts as they arise. This plan will serve as a basis for information about bears in Mississippi as well as outline protocols and guidelines for dealing with the continued growth of black bear populations in Mississippi.



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INTRODUCTION

The role of the black bear in Mississippi has changed dramatically over time. Bears were once used by Native Americans as a source of subsistence by providing food and clothing. Black bears were treated with respect and often incorporated into religious rituals as objects of worship (Pelton 2000). The arrival of European explorers saw the trading of bear products for items such as guns and fabrics (Shropshire 1996). As more and more land became inhabited by humans, bears were seen as a threat and a nuisance to crops and livestock and were killed at every opportunity. In the Delta region of the state, bear hunting was viewed as a sport, attracting people from all over the United States and Europe (Schullery 1988). Hunting bears from horseback with the aid of dogs in Mississippi gave rise to some of the greatest bear hunting legends in North America as well as the world's most popular children's toy.

Due to over-harvest and continued loss of habitat, black bears were almost eliminated from Mississippi by the early 1900s. A game survey conducted in 1929 reported small populations in Tunica, Tallahatchie and Grenada counties in the Delta and in Hancock County along the Pearl River (Leopold 1929). By the time black bears were given statewide protection in 1932, less than a dozen animals were believed to still exist in the state (Cook 1943). Continued loss of suitable habitat due to increased agricultural land use in the following years continued to isolate the few remaining bears found in Mississippi and prohibited population expansion (Shropshire 1996).

Currently, restoration of black bears to suitable habitats in Mississippi is receiving increased interest from natural resource management agencies and the general public. Habitat for black bears is increasing through governmental reforestation programs in the Delta region of Mississippi where bears were once found in great numbers. Education and outreach activities regarding bears have greatly increased throughout the state and have helped to raise awareness about ecology and management of bears as well as the bear's role in Mississippi's natural and cultural history. Research is being conducted to determine habits of bears in Mississippi as well as to gain a better understanding of the number of bears and their locations throughout the

state. On a larger scale, the conservation and restoration of bears in Mississippi plays a critical role in the recovery of federally threatened subspecies of black bear and in the establishment of a metapopulation of bears throughout the southeastern United States.

Mississippi is currently home to two and potentially three subspecies of black bears (Figure 1). The American black bear (*Ursus americanus americanus*), which occurs in northern Mississippi, was once distributed throughout most of eastern North America, the Great Plains and Canada. The federally threatened Louisiana black bear (*Ursus americanus luteolus*), which occurs in southern Mississippi, once ranged throughout eastern Texas, Louisiana, southern Arkansas and southern Mississippi (Hall 1981). Hall (1981) also showed the range of the Florida black bear (*Ursus americanus floridanus*) as extending into the eastern edge of southern Mississippi although the U.S. Fish and Wildlife Service (USFWS) currently denotes the Florida black bear's range as ending at the Mississippi/Alabama border (U.S. Fish and Wildlife Service 1992).



Roger Larson

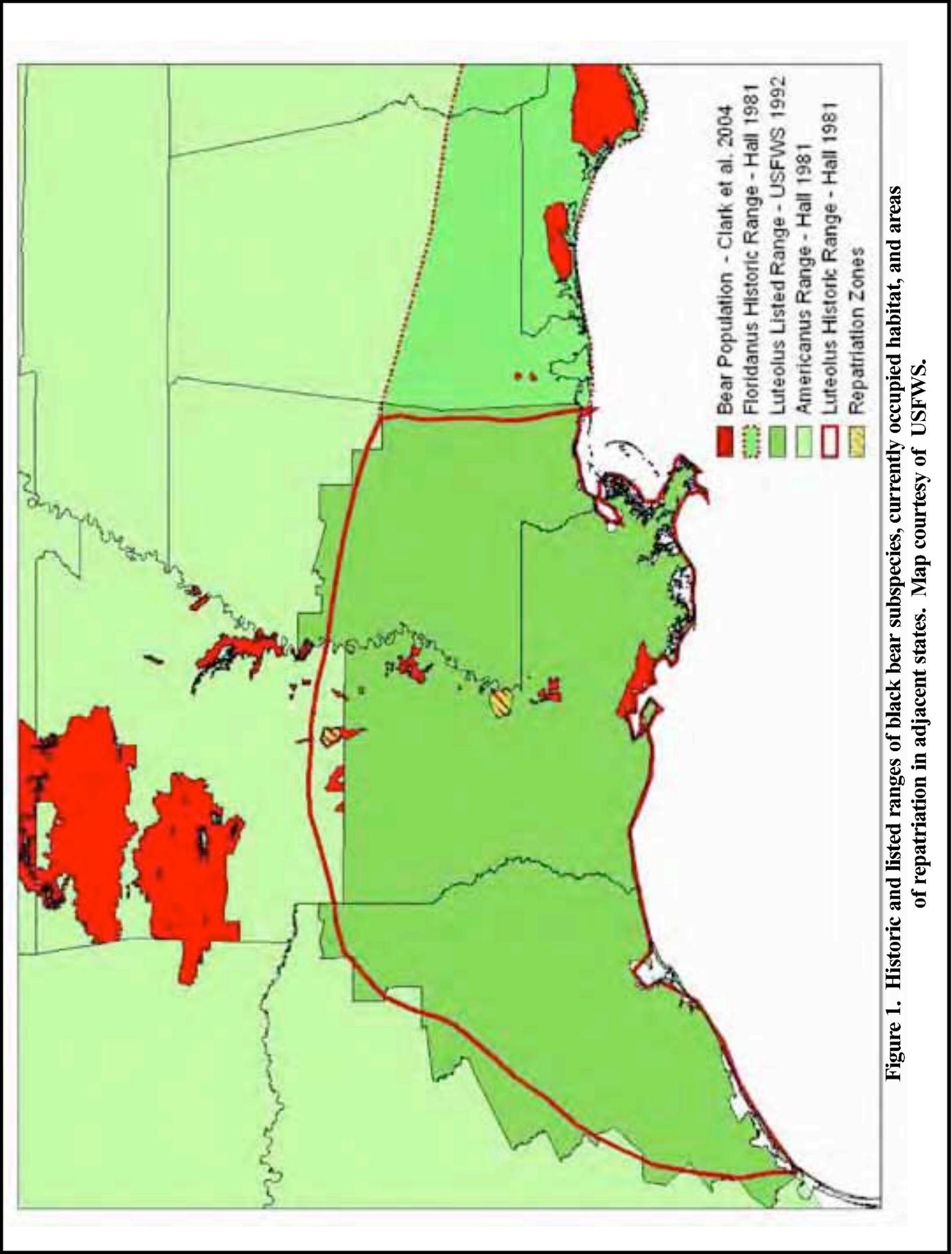


Figure 1. Historic and listed ranges of black bear subspecies, currently occupied habitat, and areas of repatriation in adjacent states. Map courtesy of USFWS.

HISTORICAL PERSPECTIVE

Black bears have long played a vital role in Mississippi's natural heritage. Native Americans relied on the black bear as a source of food, clothing and goods for trade with European explorers and settlers dating back to DeSoto's expedition through Mississippi in 1539 (Swanton 1979). Bear skins were used to make winter clothing while bear oil was used in religious cer-



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emonies as well as cooking (Wailes 1854, Williams 1930, Romans 1962, Usner 1990, Pelton 2000). As trade with European settlers was established, bear products continued to provide a source of currency for Native American tribes throughout the state. Bear oil and pelts were traded to French and English settlers for guns, fabrics and other items previously foreign to Native Americans (McKee 1980). Use of firearms made Native Americans far more efficient at hunting and thus, trade in pelts and other animal products with white settlers steadily increased causing a decline in game found in areas of settlement (Williams 1930).

As settlers began to make their way into Mississippi, more and more land was cleared. Prior to construction of the Mississippi River levee, the Mississippi alluvial plain was a wilderness of dense canebrakes and towering bottomland hardwood forests. Gradually, swamps

were drained and the canebrakes cleared to make way for cash crops, particularly cotton (Owens 1985). In the Piney Woods of the state, fire was used to enhance grass production for livestock (Napier 1985). Despite the continued encroachment, Black bears were still found in great numbers in certain areas that had not yet been cleared, especially in the Delta where the remaining canebrakes still provided refuges for bears (Schullery 1988).

In the mid 1800s, hunting of bears turned from being a source of trade and subsistence to becoming primarily a sport. Planters in the Mississippi Delta owned huge tracts of land that still harbored an abundance of game species, especially black bears. Hunting black bears from horseback with dogs became a social occasion; much like fox hunts of England. Hunting parties could consist of 20 or more people and last for weeks at a time. The growing popularity of the sport combined with the density of bears that still existed in the area created some of the earliest legends of bear hunting in the United States (Schullery 1988).

One of the most famous bear hunters of the era was Wade Hampton III. Hampton was a Confederate General and former governor of South Carolina who retired to his plantation south of Greenville named Bear Garden. Over the course of his life, Hampton was reported to have killed or assisted in the deaths of over 500 bears. It was said he killed 68 bears in a five-month period and once killed four bears in one day. President Theodore Roosevelt wrote that Hampton had "probably killed more black bears than any other man living in the United States". The President was very likely wrong about Hampton killing the most bears as he was probably unaware of the reputations of R.E. Bobo and Holt Collier (Schullery 1988).



University of South Carolina

R.E. Bobo, who owned land in Coahoma County, was another prominent figure in the early days of Mississippi bear hunting. As was the case with all prominent bear hunters of the day, dogs were an integral part of the bear hunt. Like fox hunts of old, involvement of dogs and the ensuing chase was usually far more exciting than the actual kill. In training of his puppies, Bobo would lead a collared pet bear through the woods behind a wagon, thus making an easy trail for the puppies to follow (Schullery 1988). In 1869 Bobo and a friend rented out his farm and spent the year hunting in the swamp. He later reported he had killed 304 bears, 54 deer, 47 wildcats and 9 panthers (Coahoma 1887). Sadly, it was Bobo's celebrity with regard to bear hunting that contributed to the sharp decline in the number of bears in the delta (Shropshire 1996). After an article about hunting bears with Bobo was published, Bobo returned to his land to find it filled with campers who had come to the area hoping to kill a bear (Hough 1895). Bobo reported "they had been shooting at everything that moved, from a squirrel to a deer, and they had tramped and burned the country off, and frightened the game entirely away" (Hough 1896).



Robert Bobo, Jr.

Of all the bear hunts occurring in Mississippi, certainly none are as famous as the Theodore Roosevelt hunt of 1902 which would give rise to the world's most popular children's toy: the Teddy Bear (Schullery 1988). Roosevelt's guide for the hunt, Holt Collier, was nothing short of a bear hunting legend in his own right. Born into slavery on a plantation south of Greenville, Collier learned the art of hunting by providing food for the workers of the plantation and killed his first bear at age ten. Collier would go on to lead an extraordinary life, including being the only black man from Mississippi to serve in the Confederate Army. Collier averaged about 125 bear kills per season and would eventually kill over 3,000 bears in his lifetime (Buchanan 2002).



Willa Johnson

On November 13, 1902, the president traveled by train to Smedes Station in Sharkey County. Collier led the party to a site on the banks of the Little Sunflower River to set up camp. Roosevelt was anxious to see a live bear and Collier jokingly promised the president a bear "if I have to tie one up and bring it to you". The following morning, Collier positioned the president in a location where he thought a bear would likely cross. After hearing the hounds leave the area, Roosevelt gave up hope and returned to camp. Shortly thereafter, the bear crossed at almost the exact position Collier had indicated earlier with the pack in pursuit. Eventually, the bear was bayed in a slough and attacked one of Collier's favorite dogs. To avoid shooting one of his own dogs, Collier jumped from his saddle and slammed the stock of his gun into the bear's skull. Collier then threw a rope around the bear and tied him to the nearest tree. Roosevelt was summoned to find an addled bear tied to a tree. Although the hunting party encour-



Clifford Berryman

aged the president to shoot the bear, Roosevelt politely declined. A political cartoonist popularized the event with a caricature called "Drawing the Line in Mississippi" which showed the president turning away from a small cub that had been lassoed. A store owner named Morris Mitchtom read the account of the president's hunting trip and wrote to ask permission if he could name his stuffed toy bears "Teddy's bears". Permission was granted and the stuffed bears became an overwhelming success (Buchanan 2002).

CONSERVATION STATUS

State Status

In 1932, the newly created Mississippi Game and Fish Commission closed hunting of black bears in Mississippi. At the time, less than a dozen bears were believed to still inhabit the state (Cook 1943). The black bear was included on the first list of rare and threatened vertebrates of Mississippi which was published in 1975 (Rare and Endangered Species Committee 1975). Black bears were classified as endangered in Mississippi when the state's endangered species list was updated in 1984 (Shropshire 1996).

Federal Status

There has been much debate over whether or not morphological variations among bears in different geographical areas warrant listing of a distinct subspecies of bear in eastern Texas, Louisiana and southern Mississippi. In "Carnivora" (1821), Edward Griffith called the bear from Louisiana the "yellow bear". The Latin word *luteolus* means "yellowish" and so the Louisiana bear was given full species rank as *Ursus luteolus*. Merriam (1893) first described the Louisiana black bear using five skulls from Morehouse Parish. Miller and Kellog (1955) later determined differences between American and Louisiana black bears were not sufficient to warrant designation as a separate species. They designated the bear as a subspecies of American black bear, known today as *Ursus americanus luteolus* or the Louisiana black bear. Nowak (1986) noted that the Louisiana subspecies has a skull that is relatively long, narrow and flat when compared to other black bears.

On March 6, 1987, the USFWS was petitioned to list the Louisiana black bear as an endangered species under terms of the Endangered Species Act of 1973 (U.S. Fish and Wildlife Service 1988). Kennedy (1989) analyzed skulls from Louisiana black bears and determined they were sufficiently different from other subspecies to be considered as a separate subspecies. On January 7, 1992, the USFWS published its final rule listing the Louisiana black bear as threatened within its historic range. Other bears occurring within the listed range of *U. a. luteolus* were also designated as threatened due to similarity of appearance. In

Mississippi, listed range of the Louisiana black bear as defined in the final rule identifies counties south of and including Washington, Humphreys, Holmes, Attala, Neshoba and Lauderdale (Figure 2). The final rule also extended protection to den and candidate den trees within Louisiana black bear occupied habitat. Critical habitat has been proposed in Louisiana but has not been designated for the Louisiana black bear (U.S. Fish and Wildlife Service 1992).



Figure 2. Delineation by county between the American black bear (*Ursus americanus*) and the Louisiana black bear (*Ursus americanus luteolus*) in Mississippi.

BLACK BEAR ECOLOGY

Physical Description

Black bears in Mississippi are generally black with a brown muzzle and occasionally exhibit a chest marking called a “blaze” which can vary from a few white hairs to a large white patch or “V”. Body weights of black bears can vary depending on location and food supplies. Average body weights are 150 to 350 pounds for adult males and 120 to 250 pounds for adult females although much larger animals have been documented throughout the southeast. Bears range from 3 to 6 feet from nose to tail and generally stand 2 to 3 feet at the shoulder. Females generally reach full size at five years whereas males won’t reach full potential until eight years of age. Both sexes can continue to increase in body mass as they get older. Black bears have small eyes and have relatively poor eyesight but do have acute near-vision and can see in color. Black bears are plantigrade and have short non-retractable claws on the ends of each of their five toes. They can run at speeds of up to 35 mph and are excellent swimmers (Pelton 2000).

Habitat Requirements

Variations in habitat use of black bears are likely due to differences in habitat types, climate, food availability, topography and other differences across geographic areas. Human-induced changes such as forest management and clearing of land for agriculture and development, may also affect habitat use by bears (Hellgren and Maehr 1992, Mitchell and Powell 2003). Black bears thrive in a wide variety of habitat types with mixtures of forest, shrub and openings. Black bears require diverse natural foods, water, escape cover, dispersal corridors and den sites as key components of their habitat (Pelton 2000). Black bears also prefer relatively large, remote blocks of land that are relatively free from human disturbance (U.S. Fish and Wildlife Service 1995) although they have been found to thrive in smaller, fragmented habitats particularly in agricultural areas (Anderson 1997, Weaver 1999, Benson 2005). Some



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type of relatively impenetrable cover is also a necessary element for good black bear habitat (Pelton 2000). Escape cover is especially critical in areas of fragmented habitat and areas close to human settlement. Black bears are highly adaptable to their surroundings and can thrive if given suitable areas of escape cover (Black Bear Conservation Committee 2005). Black bears are known to inhabit several different forest communities in the southeastern United States but prefer bottomland hardwood forests because of remoteness and habitat productivity (Black Bear Conservation Committee 1997, Hightower et al. 2002).

In Mississippi, confirmed bear sightings are most often found in lower elevation forested areas near rivers or streamside zones. Forested lowlands generally provide suitable cover and have been the areas with greatest concentrations of bears historically (Shropshire 1996). Bowman (1999) compared several Habitat Suitability Index (HSI) models to look at habitat suitability for bears in Mississippi. The model showed soft mast area, hard mast basal area of mature trees, and hard mast canopy cover were significant predictors of bear habitat quality in Mississippi. River corridors of bottomland hardwoods were shown to provide the most suitable habitat based on these factors.

Foods

Although classified as carnivores, black bears are not active predators. They are considered to be opportunistic feeders and will feed on whatever is available at a given time of year (Maehr and Brady 1984). Black bears have simple stomachs and no caecum which creates difficulty when digesting plant materials. As a result, they must consume large quantities of food to make up for their less efficient digestive systems (Pelton 2000). Anderson (1997) showed black bears in Louisiana exhibited diets of 96% plant origin. Black bears spend considerable amounts of time foraging. Movements and habitat usages are often directly related to availability of seasonal foods. Bears exhibit an acute sense of smell and have an excellent memory of food sources (White 1996).

During spring, bears often use fat reserves after den emergence and may be in a state of fasting for some time. Food is generally scarcest during this period and bears will often feed on residual hard mast and green vegetation as it becomes available. Benson (2005) found that blackberries (*Rubus spp.*) were the most important spring food comprising 32.6 percent of scat volume from bears in the Tensas River Basin, Louisiana. White (1996) suggested winter food plots such as wheat (*Triticum aestivum*) may play a role in food availability in spring when other natural foods are scarce. During this time of year, bears in Mississippi are often seen in winter food plots such as wheat, clover (*Trifolium spp.*) and oats (*Avena sativa*).

In summer months, bears consume soft mast fruits such as blackberries, pokeweed (*Phytolacca americana*), elderberry (*Sambucus canadensis*), devil's walking stick (*Aralia spinosa*), red mulberry (*Morus rubra*), muscadine (*Vitis spp.*), and paw paw (*Asimina triloba*) (Weaver et al 1990). Maehr and Brady (1984) found colonial species such as honey bees (*Apis mellifera*), yellow jackets (*Vespula spp.*), bumble bees (*Bombus bimaculatus*) and carpenter ants (*Campanotus spp.*) were among the major species of insects consumed by bears in Florida and were the second most important



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food, accounting for over 15% of stomach volume during spring and summer. Van Why (2003) found female bears in the Red River complex in Louisiana often used areas with abundant debris such as fallen logs and logging slash. Debris provided food resources such as colonial insects and beetle larvae. Females were observed on several occasions during spring and summer months moving logs to locate insects. Rogers (1987) observed that once mating season was over in mid-summer, bears spent the majority of their time foraging for summer fruits.

In fall months, the bear's diet changes from a dominance of soft mast species to hard mast species such as oak (*Quercus spp.*) and hickory (*Carya spp.*) although soft mast species still play a crucial role especially in years of poor hard mast production. Hard mast species are vital during fall as this is the time bears exhibit their most rapid weight gain in preparation for winter (Maehr and Brady 1984, Anderson 1997).



Hard mast is rich in fat and carbohydrates and is vital for fat reserves that will ensure bears enter the denning period in good health (Pelton 2000).

It is well known that agricultural crops also play a supplemental role in diets of black bears in Mississippi. This is especially true in fragmented habitats such as those found in the Mississippi Delta. Bears are routinely observed feeding on grain crops such as corn (*Zea mays*) and sorghum (*Sorghum spp.*) during summer and fall months and winter crops such as wheat and clover in winter and early spring. Anderson (1997) showed spring diets of bears in agricultural landscapes in Louisiana were comprised primarily of wheat and oats (62% of volume) while corn was the primary component of summer diets (56% of volume). Bowman (2001) also documented bears feeding on rice (*Oryza sativa*) crops in Arkansas and Mississippi.



Don Anderson

Movements

Home range of a black bear is influenced by several factors. Habitat type, sex, age, season, environmental conditions, food availability, and population density all play a role in determining size and shape of a bear's range (Black Bear Conservation Committee 1997). Movements within the range of the bear are primarily for meeting habitat needs and finding potential mates. Adult males generally have home ranges three to eight times those of females (Pelton 2000). A study of bears in the Tensas River Basin of Louisiana showed males used areas from 11,000 to 40,000 acres while females covered ranges of 2,500 to 18,000 acres (Weaver 1999). Benson (2005) found that females in a highly fragmented habitat in the Tensas River Basin exhibited home ranges less than one-third of the size of female home ranges in a larger, more contiguous forested habitat. The differences in home range sizes were attributed to the amount of available food due to the predominantly agricultural landscape around the fragmented habitat. Home ranges of males typically increase during the summer mating season and during fall when bears are foraging heavily to build fat reserves for winter. Bears are most active from dusk through dawn and will often use daybeds during daylight hours. Mothers with cubs often rest at the base of trees so, if disturbed, she can send the cubs into the safety of the tree (Pelton 2000, Stewart 2000, Black Bear Conservation Committee 2005).

One significant cause of movement in black bears is dispersal following separation from the family unit. After separation, females will generally establish a home range within or adjacent to their mother's home range. Males, on the other hand, tend to move far from their natal range and establish ranges based on availability of unoccupied territory and other males in the area (Rogers 1987). Mobility of bears, especially dispersing males, puts them at considerable risk. Dispersing males routinely cross roads and highways, increasing chances of a collision and chances of entering areas inhabited by people. Because of the increased



John Peak

risk of human interaction, dispersing males are at much greater risk than other bears (Stewart 2000).

Denning Ecology

Factors influencing when a bear makes its den include photoperiod, climate, food availability, energy balance, age, sex, and reproductive status (Wooding and Hardisky 1992). Black bears are not true hibernators but rather enter a period known as carnivorean lethargy or torpor. The primary purpose of this extended sleep is to survive food shortages and extreme weather during winter months (Johnson and Pelton 1980). During winter dormancy black bears exhibit several physiological changes including a decline in body temperature, a 50% decrease in metabolism, a decline in heart rate of about 30 beats per minute and a 20 to 27% loss of fat reserves. Bears also will not eat, drink or remove waste products from their body during this period of sleep (Stewart 2000).

Denning is not necessary for all bears in milder climates. With the exception of pregnant females, which must den in order to give birth, bears may remain active if sufficient food is available (Graber 1990). Southeastern black bears typically have shorter denning periods and show greater winter activity than in other regions which is believed to be a function of greater food availability during winter months (Johnson and Pelton 1980, Hellgren and Vaughan 1989, Wooding and Hardinsky 1992). Generally, pregnant females are first to den, followed by females with young of the year, solitary females and finally males (Black Bear Conservation Committee 2005). Pregnant females in the Tensas River Basin, Louisiana, entered dens earlier and emerged later than other bears with median dates of entrance and emergence of December 4 and April 24 for an average denning period of 142 days (Weaver and Pelton 1994). It was shown female bears with cubs in the coastal region of Louisiana would leave their cubs for short periods of time while foraging in the area around the den (Hightower et al. 2002). Male bears showed an average denning period of 48 days with median dates of entrance and emergence of January 28 and March 17. Some males only spent a few days or weeks bedding down before moving to the next site (Weaver 1999). In Mississippi, a radio-collared male in Sharkey County appeared to den in a large cypress for approximately 80 days while another male in Washington County denned only

briefly for two periods of 10 and 14 days during the same period in the winter of 2005.

Types of dens used by black bears vary greatly depending on location and sex. Black bears in the southeast have been reported to use a wide variety of den structures including trees, standing snags, ground nests, logs, stumps, piles of woody debris, and excavated areas beneath trees, logs or human structures (Johnson



USFWS

and Pelton 1981, Smith 1985, Hellgren and Vaughan 1989, Weaver and Pelton 1994). Tree dens are typically located along sloughs, lakes, rivers, and bayous and are made in cavities of bald cypress (*Taxodium distichum*), overcup oak (*Quercus lyrata*), nuttall oak (*Quercus texana*), sycamore (*Platanus occidentalis*), and water oak (*Quercus nigra*) (Weaver and Pelton 1994, White 2001, Benson 2005).

Studies in the Tensas River Basin have shown adult females to use tree dens for 80% of all dens (Weaver and Pelton 1994). Tree dens can be very important for seclusion and isolation of bears from human disturbance and can be vital to reproductive success in flood prone areas (Johnson and Pelton 1980, Smith 1985). It is also believed tree dens may allow females more energy for cub rearing by reducing the amount of energy expended for maintaining body temperature (Oli et al.

1997). Benson (2005) found that out of 22 tree dens used by females in the Tensas River Basin in 2003, 7 of those dens were reused in 2004, including three cases of the same individual occupying the same tree. White (1996) also found females primarily used tree dens on the White River NWR, Arkansas. In areas of commercial forestry outside of the NWR, females were found to primarily use ground dens (83%). Use of ground dens was likely due to abundant logging debris in the area as 90% of ground dens were comprised of logging slash resulting from timber harvests. Ground dens at elevations greater than 152-foot mean sea level approximated the level of flood protection afforded by tree dens at lower elevations on White River NWR and resulted in a 90% probability of cub survival. Older females tended to use above-ground dens, suggesting den selection above flood zones was a learned behavior.

Studies have shown tree dens are not necessary for successful reproduction in mild climates if flooding and human disturbance are minimized (Hightower et al. 2002). In Great Dismal Swamp, bears denned almost exclusively on the ground and rejected potentially suitable den trees for ground nests in dense vegetation (Hellgren and Vaughan 1989). Weaver and Pelton (1994) found bears using ground dens in the Tensas River Basin appear to be more vulnerable to human disturbance than those in tree

dens. Linnell et al. (2000) hypothesized bears denning in milder climates may lower their threshold for disturbance because energetic costs of den abandonment were lower

than for bears in harsher climates. Concealment may be the most important factor for black bear den selection in southeastern coastal



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plain populations (Hellgren and Vaughan 1989). Due to frequent use of ground dens throughout the southeast, den sites do not appear to be a limiting factor for black bears (Hightower et al. 2002).

Reproduction

Female black bears typically begin having cubs at three to five years of age. In areas of exceptional habitat, two-year-old females may produce young while in areas of poor habitat quality, female bears may not produce young until seven years of age. Male bears typically reach sexual maturity at three to four years of age (Pelton 2000).

Females come into estrus as early as late May and as late as August with the peak of breeding taking place in July. Females will remain in estrus until they are bred or until ovarian follicles begin to degenerate. Dominant males may mate with several females in an area. A dominance hierarchy determines access to females with older, larger males displacing younger males (Pelton 2000).



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Following mating, the fertilized egg forms a multicellular blastocyst which floats freely in the uterus for approximately 5 months until uterine implantation in late November or December. After implantation, fetal development takes place for 6 to 8 weeks before birth. Length of gestation from time of breeding to parturition is approximately 220 days (Wimsatt 1963). This process of delayed implantation allows the pregnant female to increase fat reserves for winter dormancy without the nutritional drain of a developing fetus (Black Bear Conservation Committee 1997). Poor nutrition resulting in lower fall body mass may result in no implantation of the blastocysts, resorption of implanted fetuses or early death of neonates (Hellgren et al. 1990).

Cubs are born in winter dens during January or February. At time of birth, cubs weigh 7 to 12 ounces and are about 8 inches long. Litter sizes range from one to five with twins being most common. Sex ratios at birth are normally 50:50 (Pelton 2000). Females that are larger and have better nutrition at time of den entrance generally produce larger litters and healthier cubs with a better chance of survival (Rogers 1987). Cubs emerge from their dens in April or May and generally weigh 4 to 8 pounds. Cubs will stay with their mother for the next year and den with their mother the following winter. They emerge together again in spring and stay together until the summer when the family unit dissolves, about the time the mother becomes estrus (Pelton 2000).

In the event a female's litter is lost prior to late summer, she may come into estrus and breed again, producing consecutive year litters. Females may also deviate from the alternate year cycle if they are not of sufficient health or nutrition to come into estrus during a particular year. Years of poor food production can cause reproductive failure within an entire population. This can result in a breeding synchrony among females where all females in the population become pregnant the next summer if provided with ample nutrition (Pelton 2000).

Mortality

Black bears can exhibit life spans of over 25 years in the wild. Because black bears are long-lived animals with low reproductive rates, adult mortalities are especially harmful to growth and persistence of small bear populations like those found in Mississippi (Black Bear Conservation Committee 1997). Mortality of black bears can be attributed to natural and human causes. Causes of natural mortality include disease, cannibalism, drowning, maternal care and climbing accidents. Human-induced causes of mortality include habitat destruction, hunting, trapping, poaching, vehicle collisions, electrocution, disturbance (den abandonment) and deaths associated with research activities (U.S. Fish and Wildlife Service 1995, Black Bear Conservation Committee 1997). The highest mortality within a black bear population occurs from time of dispersal at 16 to 17 months until sexual maturity and establishment of a home range at 3 to 5 years of age (Pelton 2000). Rogers (1987) found the majority (>90%) of mortality in bears 2 years of age and older

tends to be human related. Cub mortality ranged from 12% to 41% and was primarily a function of natural causes. Nutrition appeared to be the primary factor in mortality of young bears with lightweight bears suffering greater mortality than heavier individuals.

A study done by Pace et al. (2000) showed from 1992 to 2000, at least 75 bears died in Louisiana. The 75 losses were the result of road kills (27), unknown causes (15), shootings (12), management takes (8), sugarcane harvesting equipment (5), natural causes (4), research takes (2) and trains (2). Road kills of males (14) were somewhat evenly dispersed throughout the year as opposed to road killed females (13), which were all killed between July and December. The fact that all females killed during the study were killed during fall is likely the result of an expanded home range for food gathering during that time of the year (Pelton 2000). From 1972 to 2005, 13 of 24 bears in the research collections of the Mississippi Museum of Natural Science were killed by vehicular collisions.



John Fox

CURRENT DISTRIBUTION

Black bears once occupied lands throughout North America from Alaska and Canada to Northern Mexico (Hall 1981). Habitat loss, unregulated harvest and lack of management led to a drastic decline in bear abundance throughout their range. In the lower Mississippi Alluvial Valley, land drainage and clearing for agriculture reduced bottomland hardwood forest acreages from 24 million to less than 5 million acres by 1980. Black bears currently occupy 5 to 10 percent of their historic range in the southeastern United States (Black Bear Conservation Committee 2005).

A 1929 Mississippi game survey reported small, isolated populations of bears in Tunica County, on the border between Tallahatchie and Grenada Counties and along the Pearl River in Hancock County (Leopold 1929). By the time black bears were afforded protection by the state in 1932, it was believed less than 12 animals were left in the entire state. A restocking program was attempted in 1934 when three pairs of bears were released in separate locations. Those restocking efforts are believed to be unsuccessful (Cook 1943).

Between 1959 and 1968, both Arkansas and Louisiana released bears that had been translocated from Minnesota and Canada. One of 254 translocated Arkansas bears was eventually killed near Horn Lake, MS some 260 linear miles from its release site (Rogers 1973). Bears released in the Atchafalaya River Basin



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by the Louisiana Wildlife and Fisheries Commission (LWFC) were given ear tags prior to their release. Between 1966 and 1968 more than a dozen bears wearing LWFC ear tags were captured or observed in Mississippi. Four bears were captured in Vicksburg National Military Park (Ray 1966), one near the courthouse in Raymond (Shropshire 1996), one in a ceme-

tery near Canton (Hagedorn 1966), three near Pearl River Reservoir and the remainder in south Mississippi counties (Shropshire 1996). Captured bears were returned to LWFC or donated to the Jackson Zoo. More than a dozen were killed during the same time and the majority were wearing tags as well (Shropshire 1996). Bears were killed illegally in 10 Mississippi counties including Wilkinson, Lincoln, Claiborne, Franklin, Hinds, Yazoo, Madison, Noxubee, Neshoba and Leake (Anonymous 1968). A female with three cubs was also shot by a quail hunter near Ross Barnett Reservoir. The hunter claimed to have shot the bear in self defense and the cubs were raised by the Jackson Zoo (Anonymous 1967).

In 1976, the last documented breeding population of bears was in a wooded area of Issaquena County. The 4,300-acre tract which was known to harbor five bears including two cubs, was subsequently cleared and converted to agriculture (Jones 1984). A statewide survey in 1978 reported black bears as uncommon in 20 counties (Game Division 1978).

Generally speaking, black bears in Mississippi are currently found in three areas within the state: the Gulf Coast, the Loess Bluffs of southwest Mississippi and the Mississippi River Delta. It is believed the majority of bears found in Mississippi are males that have dispersed from populations in other states at some point during their lives. The percentage of males documented by capture or death supports this theory. In recent years, however, females have been documented with greater frequency in several areas



Bryan Peyton

of the state. Biologists currently estimate Mississippi's bear population at around 50 animals based on research captures and sighting reports, though this number can fluctuate annually and seasonally due to such factors as food availability and dispersal from populations in adjacent states. Of the bears believed to currently inhabit the state, approximately 80 percent fall within the listed range of the federally threatened Louisiana subspecies.

The vast majority of bear reports come from sportsmen throughout the state. The largest tracts of forest lands throughout Mississippi are often owned or leased for purposes of hunting. Hunters in these areas have an intimate knowledge of the land and spend a great deal of time hunting and scouting for game. The combination of relatively uninhabited land and quiet observation of wildlife on the property leads to detailed reports of bears in particular areas on a yearly basis. Landowners and sportsmen provide vital information to MDWFP biologists and law enforcement personnel about the existence of bears in certain areas which would be otherwise unknown.

Bear sightings on the Gulf Coast are primarily reported from Stone, George, Harrison and Jackson counties. Most sightings in these counties are based in and around Desoto National Forest and the Pascagoula River and its tributaries. In the summer of 1997, two bears were captured and fitted with radio-collars on private lands within the Red Creek WMA. Both were males weighing 150 and 250 lbs (Kris Godwin, pers. comm.). The present status of both these bears is unknown although yearly sightings in the area of capture are common. In 2005, a trail camera photographed what is likely the larger of the two males captured in 1997. The photograph, which was taken within five miles of the capture site, clearly shows a large bear that is missing a portion of its left ear; a feature noted on a 1997 capture report.

In November 2000, a large male that had been causing damage to local houses was captured in Pearl River County. The bear was collared, fitted with ear tags and released on the Old River WMA along the Pearl River. One year later the bear was recaptured in a residential neighborhood in Mobile County, Alabama after becoming a nuisance by eating pet foods and garbage in the area. The bear was brought back to Mississippi and is currently a resident of the Jackson Zoo. It is not known at this time if bears in the Gulf Coastal region are year-long residents of Mississippi or if they disperse from the Mobile Bay area of Alabama which contains a breeding population of bears. Routine sightings of bears in the Gulf Coast region suggest it is likely a combination of both factors.

The southwest region of the state has routine sightings of bears especially within Wilkinson, Adams and Jefferson counties along the Mississippi River. Stinson



Phillip Brown

and Pace (1995) established bait sites at 100 different locations in Wilkinson County in an attempt to estimate bear numbers in the area. Of those sites, five stations had confirmed visits by a bear, as evidenced by tracks. Cameras at two of the sites photographed bear #177, a 14-year-old female who had been previously captured in April 1994 after raiding several beehives in the area. The female remained in the area continuing to damage apiaries and was recaptured in 1996 and moved to Red Creek WMA in Stone County. Three weeks later she was recaptured in the backyard of a residence in southwest Jackson and relocated to the Clark Creek Natural Area in Wilkinson County.

During the same study by Stinson and Pace (1995), photos were also taken of an adult male which was later captured in July 1995 after raiding watermelon patches and beehives in Wilkinson County. In June 1998, the bear was struck by an automobile just southeast of Liberty in Amite County. The bear was taken to Louisiana State University Veterinary School for surg-

ery to repair a broken jaw. An examination of the 22-year-old bear showed that the bear had been previously shot with buckshot and birdshot pellets, a .22 caliber rifle, had cataracts in both eyes and had previously suffered a broken femur likely from an earlier car collision. The bear was rehabilitated, fitted with a radio collar and released on a private hunting club in Wilkinson County. The present status of both these bears is unknown (Paul Davidson, pers. comm., Don Lewis, pers. comm.).

In the winter of 2004, a radio-collared female originally moved from Tensas River NWR to Lake Ophelia NWR as part of the Louisiana Black Bear Repatriation Project, denned in the southwest corner of Wilkinson County. A den check was performed in March 2005 which revealed the female had given birth to a litter of five cubs. The litter represented the first documented birth of bear cubs in the state in some 30 years. In spring of that year, another female that was relocated as part of the same project, abandoned her cubs in Louisiana, crossed the Mississippi River and established a home range in Wilkinson County (Figure 3). A den check was conducted in March 2006 and found that



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the female had given birth to a litter of three cubs. The 2006 litter is also significant due to the fact that, based on telemetry data gathered throughout the year, the female was bred by a male bear within Mississippi. In addition to the radio-collared females in Wilkinson County, evidence (sightings and photographs) of females and cubs has also been found in Adams and Jefferson Counties within the last three years.

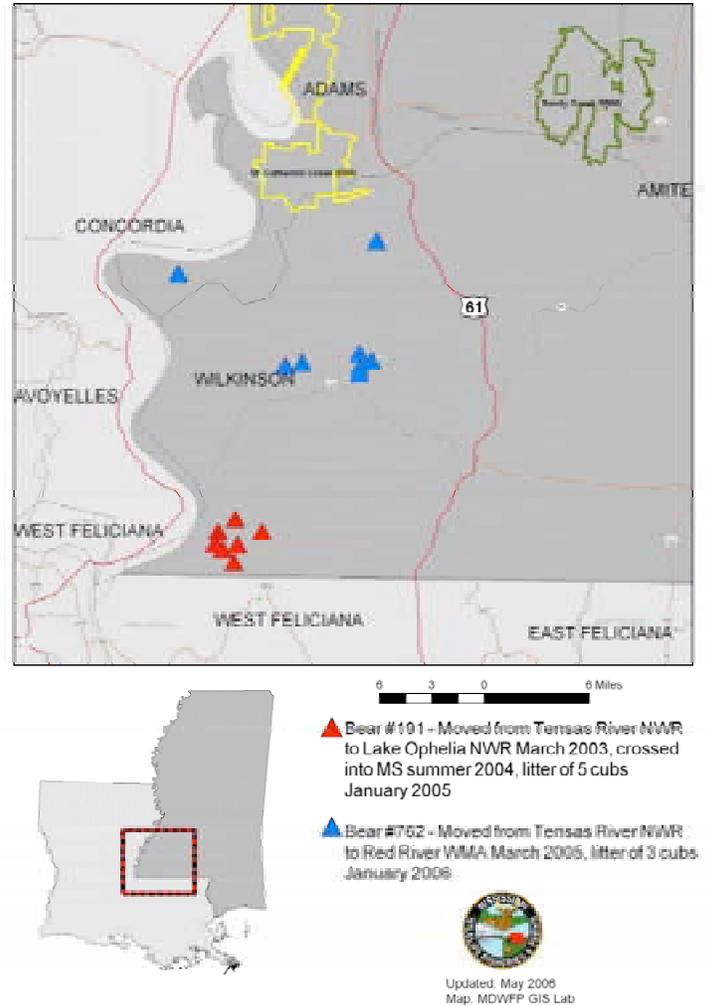


Figure 3. Radio-telemetry locations of repatriation female bears in Mississippi, 2005-2006.

The vast majority of bear sightings within Mississippi occur within the Delta region of the state. Issaquena, Sharkey, Washington, Bolivar, and Coahoma counties all report bear sightings on a yearly basis. As is the case in other areas of the state with frequent bear sightings, it has been difficult to determine whether these bears are residents of Mississippi or are dispersed products of expanding populations across state borders. However, radio telemetry data collected from 2003 to 2006 indicates that at least six bears have established home ranges in the Delta region.

Five male bears were captured and radio-collared between June 2004 and November 2005 in the lower Delta region (Figure 4). The first male was captured on Twin Oaks WMA in Sharkey County in June of 2004. The second and third bears captured were on the Yazoo NWR in Washington County in October 2004 and May

2005, respectively. In July 2005, a large male was accidentally captured in a hog trap on a private hunting club in Warren County. Also in July 2005, a radio-collared female and male cub that had been moved from White River NWR to Felsenthal NWR as part of Arkansas' repatriation efforts, crossed the Mississippi River and took up residence in Issaquena County. Reports indicate that the cub was present with the female during the summer although a den check in March 2006 revealed that the female had denned alone. Another male was also captured on private land adjacent to Twin Oaks WMA in November 2005. Bear sightings in Sharkey County are the most common and are believed to be due to habitat afforded by Delta National Forest, the only bottomland hardwood national forest in the United States.



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Bolivar County also has routine sightings within the batture lands of the county which are likely the products of dispersal from White River NWR and surrounding areas in Arkansas. In the fall of 2000, two females were captured and radio-collared in Bolivar County. One of the captured females had two cubs of the year. The other female was struck by an automobile but rehabilitated and released on Dahomey NWR. During that same time, a large male originally tagged in Arkansas was also captured as well as a yearling bear treed in a residential area. Neither male bears were fitted with radio collars. After remaining in the state for several months, both females crossed back into Arkansas in December of the same year. Many more unmarked bears were sighted in the area during the same period of time (Bo Sloan, pers. comm.).

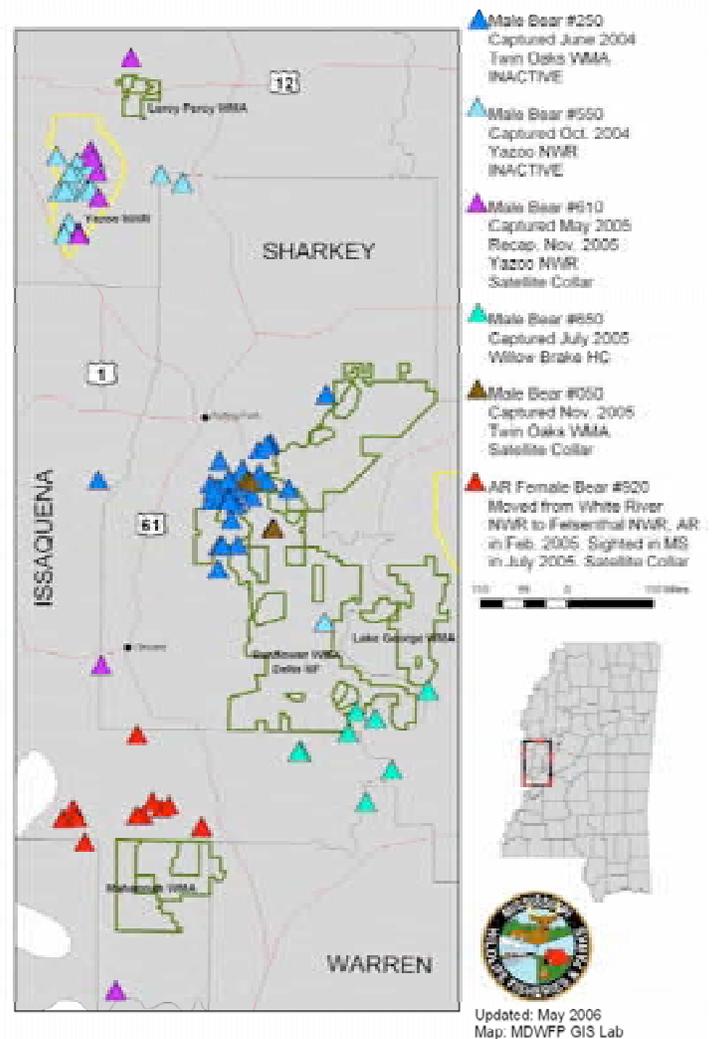
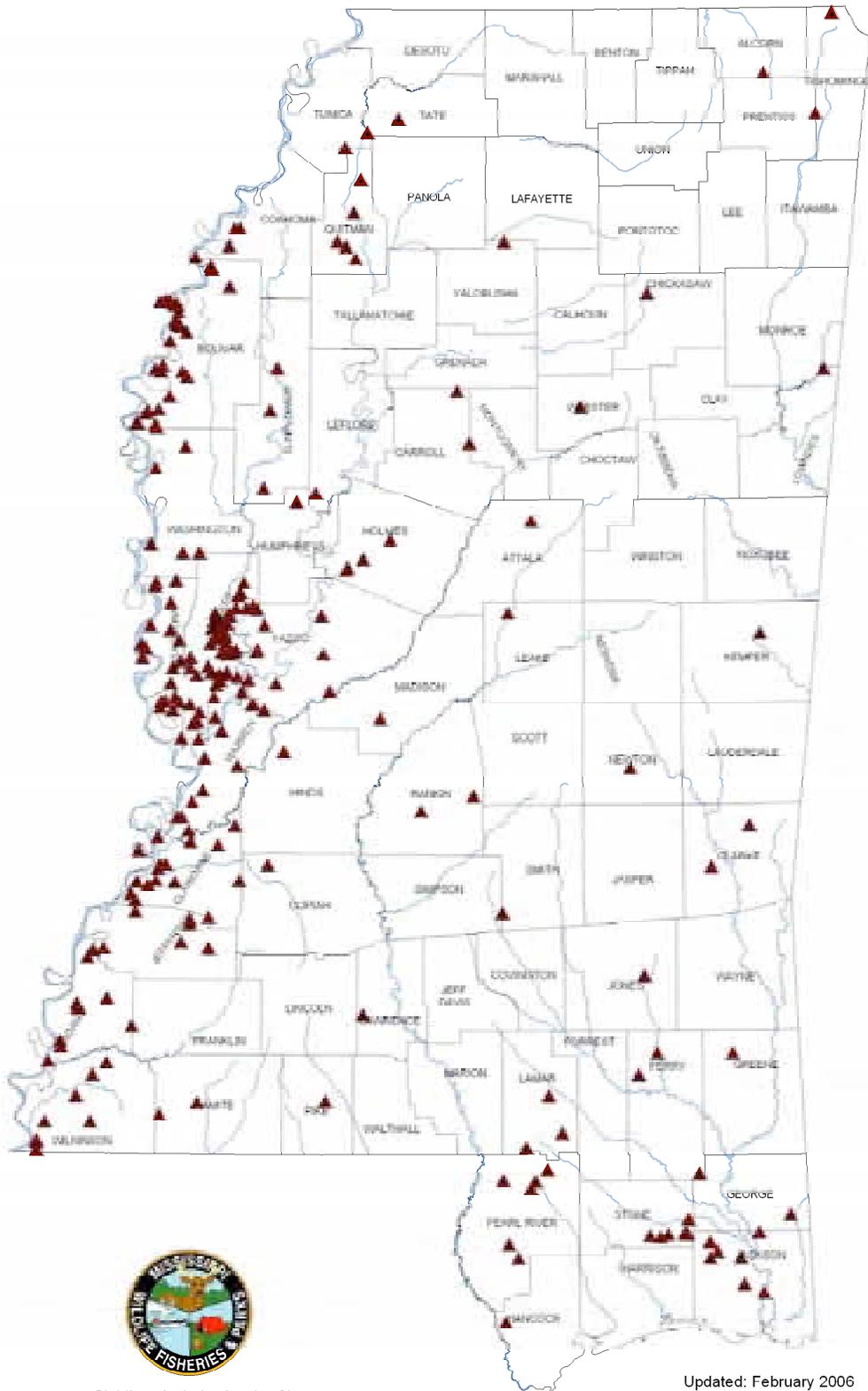


Figure 4. Radio-telemetry locations of captured male bears and Arkansas repatriated female bear in the south Delta region.

In addition to areas listed above, bears have also been documented in other areas of the state (Figure 5). Confirmed bear tracks have been documented along the Mississippi/Alabama state line in Clarke and Kemper counties and several sightings have also been reported in years past in central counties of Mississippi including Yalobusha, Carroll, Madison and Rankin. Black bears (especially males) often travel great distances in search of suitable habitat and potential mates. Sighting reports indicate bears within Mississippi use the habitat along streams and rivers as travel corridors which can lead them across major roadways and into areas of human settlement, often far away from suitable bear habitat.



Sightings include visuals of bears, captures, telemetry locations, and bear sign (tracks, scat, etc).

Figure 5. Reported black bear occurrences in Mississippi, 1996-2006.

PUBLIC SUPPORT/OPPOSITION FOR BEAR RESTORATION

Bear restoration in Mississippi, whether by natural population expansion or reintroductions of bears from other states, has received increased attention from biologists, sportsmen and citizens alike. White et al. (2000) suggested bears, especially females, rarely cross the Mississippi River although females (with and without cubs) have been documented crossing the Mississippi River into Mississippi in recent years. The influx of bears into Bolivar County in fall 2000 was likely the result of an expansion of territory in search of food in response to a mast crop failure in Arkansas. The two radio-collared females from Louisiana that entered into Wilkinson County and the radio-collared female that entered into Issaquena County in 2005, were all females repatriated to other areas in their respective states. Their entrance into Mississippi is likely a product of disorientation in an

attempt to return to familiar territory. With a few exceptions aside, females are not likely to move from areas of high bear densities (i.e. White River NWR, Arkansas and Tensas River NWR, Louisiana) to areas of suitable habitat within Mississippi primarily due to the fact that females generally establish a range within or adjacent to their natal range (Rogers 1987). For this reason, translocations should be considered as an option to restore bears to their historic range in Mississippi.

The success of restoration projects, especially those involving controversial species such as carnivores, often depends on the understanding of human attitudes (Bowman et al. 2004). Time and time again, studies have shown the documentation of public acceptance and attitudes regarding restoration of carnivores are vital to restoration success (Kellert 1985, Clark et al. 1996, Reading and Clark 1996, Duda et al. 1998). Bowman (2004) stated that before bear restoration could occur in Mississippi, certain types of information

must be collected including the location, composition, distribution and size of habitat that will sustain viable populations of bears. In addition to this information, landowner and land-user attitudes toward bears must be assessed to assure public support of any restoration program.



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Attitudes towards endangered species recovery have likely been influenced over the years by cases which featured clashes between private citizens and governmental agencies over property use restrictions (e.g. spotted owl, red-cockaded woodpecker, snail darter). For this reason, older age classes may link bear restoration to a loss of private property rights. In contrast, younger age classes may be influenced by media attention given to endangered species recovery and especially for charismatic species such as bears (Kellert 1994).

People living in rural areas throughout the state are likely to have more negative attitudes about bears because they have a stronger connection to the land and fear damage problems (Kellert 1994). Bowman et al. (2004) found rural residents in Mississippi were less supportive of bear restoration than those living in larger communities. This is likely due to the fact that rural residents will be more directly affected by bear restoration than residents living in urban areas.

The model developed by Bowman et al. (2004) indicated areas in northeastern and southern Mississippi had potential for greater support among residents. DeSoto National Forest was shown to have the greatest public support for restoration and should be the area selected for any future restoration based on human attitudes. However, the authors caution that support for restoration among a human population that has not coexisted with bears does not assure the public will remain supportive once restoration has begun. Although support for bear restoration existed among residents of most areas sampled, wildlife managers should ensure public involvement along the way through area meetings and consistent updates about bear-related activities in the designated area. Attitudes should also be continuously monitored to determine effects of public education programs and personal experiences with bears so more effective educational techniques can be used in the future.

While the possibility of black bear reintroductions has received increased attention over the years, any attempt at such a project in Mississippi will require a restoration plan separate from this document. First and foremost, the plan should contain a follow-up to the study done by Bowman (1999) which assessed habitat suitability and human attitudes towards black bear restoration throughout Mississippi. The follow-up study should concentrate on areas previously identified as the most feasible reintroduction sites to determine if those positive attitudes still exist and to what extent. Other factors such as loss of habitat through encroachment, increases in potential habitat through reforestation programs and increases in information and education activities in certain areas of the state should also be addressed for conclusive results. Any future reintroductions of black bears supported by MDWFP will be science-based and will consider not only the most suitable habitat for the species but also public support and involvement.



PUBLIC INFORMATION AND EDUCATION

In order for black bears to make a successful comeback to forests of Mississippi, they will need support of the public as a whole. Gaining support for a charismatic species of animal such as bear has been shown to be easier than gaining support for smaller, lesser known species (Reading and Clark 1996). Shropshire (1996) determined that 88% of timber companies, 31% of beekeepers, 46% of landowners or private managers, and 79% of the general public favored increasing bear populations in Mississippi; however, experts are quick to point out positive attitudes towards increases in bear populations do not necessarily correlate into support for bear reintroductions (Lohr et al. 1996).

Because black bears have been largely absent from Mississippi for so long, little is known among the general public about the true nature of the animal. In addition, lack of education about black bears has led to the perpetuation of negative stereotypes that have persisted and been passed down through generations. Bowman et al. (2001) compared public knowledge about bears between areas of high bear density in Arkansas (White River NWR) with knowledge in areas of low bear density in Mississippi (Dahomey NWR, Panther Swamp NWR, Yazoo NWR and Delta National Forest). Results showed no difference

between areas with regard to general knowledge about black bears indicating an increase in bear density does not correlate to an increase in knowledge about bears. Because of this, education has been a top priority with regard to management of black bears in Mississippi. In order for bears to make a meaningful recovery in the state, the public must be made aware of not only existence of bears in Mississippi but also of bear biology and behavior. Peyton and Grise (1995) linked

increased education about wildlife with increased wildlife agency support by state residents.

Black bear sightings are increasing throughout Mississippi. While the increase in sightings is widely believed to be a function of an increasing bear population in the state, it is also the likely product of an increased awareness about existence of bears in Mississippi. Reports of bears by the general public are vital to conservation and research efforts of MDWFP personnel. Sightings provide not only locations of bears throughout the state but also give biologists estimates of population numbers in different regions. Of equal importance is the educational opportunity afforded by the report of a bear for two key stakeholders in bear conservation efforts: landowners and sportsmen. Governmental agencies currently own 10% of



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Mississippi's forested lands. Industry owns 14% and 76% is held in private ownership (John Tindall, pers. comm.). With the vast majority of Mississippi forests in private ownership, landowner support will play a major role in continued perpetuation of black bears in Mississippi. Sightings relayed by sportsmen are also important as they often have the best opportunity to observe bears during game seasons, thus enhancing ability of MDWFP personnel to estimate bear numbers.

Opportunities to educate landowners and sportsmen about black bears should be taken at every chance. Any report of a bear on private lands should be followed up with a phone call or visit if evidence is present. Any concerns expressed by the landowner or sportsman should be answered in a direct and professional manner and educational materials provided as a supplement. The MDWFP Hunter Education Program should also include a component about black bears in Mississippi. Information about bear ecology and current research within the state should be discussed as part of the curriculum for each program. MDWFP law enforcement trainees should also be educated about black bears in Mississippi as part of their training. Black bear ecology, current research efforts and handling of human bear conflicts should be incorporated into the training program for all new law enforcement recruits with updates presented at law enforcement staff meetings.

Public speaking engagements are also an effective tool for black bear information and education. Civic clubs that meet on a weekly basis (e.g. Rotary Club, Lion's Club, etc.) are often looking for public speakers to give presentations. Presentations about wildlife are always popular and because many of those in attendance are generally unaware of the presence of bears in Mississippi, black bear presentations are especially popular. Once again, special emphasis should be placed on sportsmen and nature groups although no group should be excluded. Presentations given by regional biologists to hunting clubs and landowners about more common wildlife topics such as deer and turkey management should also include mention of black bears. By educating those having a vested interest in Mississippi's natural lands, black bears can gain support from groups with means and ability to assist in future management. Speaking to groups of school children can also provide increasing returns. Teaching children that bears in Mississippi are, in fact, generally shy and gentle creatures will help stop negative associations in the years to come.

Another important vehicle for public education about black bears is popular media such as newspapers, magazines and pamphlets. Newspapers and magazines have the capacity to reach not just a local area but the entire state which serves to garner support for bear conservation among all citizens, not just outdoorsmen. It is widely believed that greater public knowledge will ultimately translate into greater public acceptance and

support for bears in Mississippi. In addition, educational brochures and pamphlets about bears in Mississippi can present facts which will help to alleviate some of the negative stereotypes commonly associated with black bears. With continuing education, positive attitudes towards black bears in Mississippi can persist even as bear populations increase.



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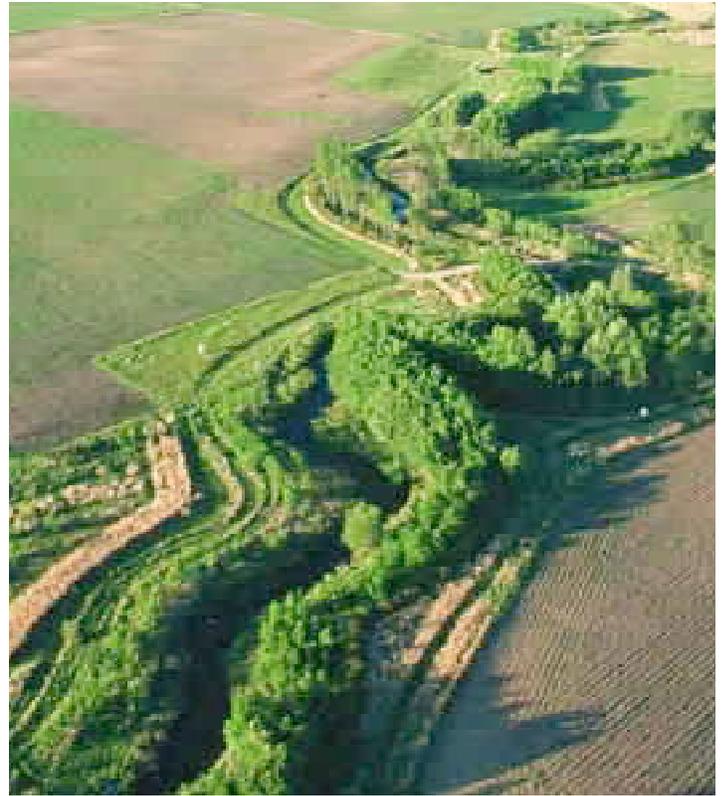
HABITAT MANAGEMENT AND RESTORATION

Black bears are imperiled throughout the Southeastern Coastal Plain primarily as a result of habitat loss. Current distribution of bears throughout the Coastal Plain represents a 93% reduction in range from historic levels (Wooding et al. 1994). Suitable habitat in the Mississippi Alluvial Valley (MAV) was reduced more than 80% by 1980 with remaining habitat declining in quality due to fragmentation and intrusion by humans. Some counties in the lower Mississippi Delta have lost up to 95% of former black bear habitat (Black Bear Conservation Committee 1997). Despite these facts, Wooding et al. (1994) found Mississippi ranked second only to Texas in amount of potential habitat for black bears in the Coastal Plain noting much potential habitat exists in small patches throughout the state.

With regard to forest management, maintenance of a diversity of age classes, stand types and vegetative composition within the forest is key to good bear habitat (Black Bear Conservation Committee 2005). Any habitat must provide escape cover, dispersal corridors, abundant and diverse natural foods, water and denning sites. Bear habitat needs can be met by providing a mixture of openings, thick brush cover, mature mast producing stands and occasional trees and brush piles for denning (Stewart 2000). In the final ruling by the USFWS (1992), it is stated that the principle threat to the Louisiana black bear is not normal forest management but conversion of timbered habitats to croplands and other agricultural uses. In fact, the effects resulting from normal forest management activities (i.e., activities that support a sustained yield of timber products and wildlife habitats thereby maintaining forestland conditions in occupied habitat) were specifically exempted from the “harm” provisions of the Endangered Species Act (U.S. Fish and Wildlife Service 1992).

Travel Corridors

Travel corridors connecting isolated blocks of forest lands are extremely important in regions of fragmented habitat like those found in the Mississippi Delta. Bears routinely use waterways within their home ranges as routes of travel. For this reason, forested areas along waterways are crucial for providing cover for travel and serve to connect forested areas throughout the state.



NRCS

Weaver (1999) found bears routinely used uncleared drainages, ditches, bayous and river banks when traveling through open agricultural areas from one forested block to another in the Tensas River Basin, Louisiana. Additionally, travel corridors on a larger scale may also connect populations of bears in adjoining states, enhancing genetic diversity and population viability by facilitating dispersal of juvenile bears and interbreeding among populations in the region (Weaver et al. 1990). Because hardwoods are the primary species found along waterways, they can also provide hard mast production, den sites and escape cover for bears (Black Bear Conservation Committee 2005).

Den Sites

Black bears in the southeast primarily den in tree cavities or in ground dens found in heavy cover. Currently, for the Louisiana black bear, the USFWS gives protection to den trees, den tree sites and candidate den trees in areas of occupied bear habitat. Candidate den trees are identified as bald cypress and tupelo gum (*Nyssa sylvatica*) with visible cavities, having a minimum diameter at breast height of 36 inches, and occurring in or along rivers, lakes, streams, bayous, sloughs or



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other water bodies (U.S. Fish and Wildlife Service 1992). While cypress trees are considered as primary den trees in the Tensas River Basin (Weaver 1994), Oli et al. (1997) found overcup oak was most frequently used for den sites on White River NWR in Arkansas. Therefore, management strategies to maximize potential tree den sites should include any tree >36 inches in diameter, regardless of species or proximity to water (Black Bear Conservation Committee 2005).

As mentioned previously, although important, den trees are not considered a limiting factor with regards to bear den sites. Ground den sites for black bears can be created by piling logging slash after harvesting operations. Management strategies for creation of ground dens include piling felled tree tops and other logging slash in elevated locations to prevent bears from selecting den sites susceptible to seasonal flooding (White et al. 2001). Areas of dense understory should also be maintained for open ground nests (Weaver et al. 1990).

Escape Cover

As human encroachment and disturbance in bear habitat increases, escape cover becomes an increasingly vital component of bear habitat. Black bears are adaptable and can thrive in close proximity to humans if provided areas of retreat ensuring little chance of close contact with humans (Pelton 2000). Cover which lim-

its visibility, slows foot travel and creates considerable noise when traversed, provides security for bedding, denning and fleeing bears (Pelton et al. 1990). Thick understory brush typically found in forests with fairly open canopies and mature trees provides natural escape cover (Stewart 2000). Thinning of timber stands is often necessary for promoting growth of understory species that provide refuge for bears and should be performed at 5 to 15 year intervals. Females with cubs often select the base of the largest tree in the area for a daybed site so, if disturbed, the mother can send the cubs up the tree to safety. Therefore, leaving a few large trees within an area may promote use of the area by females

and cubs. Stands of switchcane (*Arundinaria gigantea*) also provide excellent cover for bears and should be promoted in areas lacking in adequate cover (Black Bear Conservation Committee 2005).

Food Sources

Black bears are true opportunistic omnivores and will eat almost anything available (Stewart 2000). Food items must be present in sufficient quantity and quality on a year round basis to meet dietary needs of black bears (Black Bear Conservation Committee 2005). Openings in the forest canopy, whether created naturally or by timber harvest, promote growth of early successional species of understory plants and vines such as blackberry, dewberry, pokeweed, greenbriar (*Smilax spp.*) and muscadine which provide important sources of soft mast foods for bears. Over time, midstory species such as paw paw, red mulberry, persimmon (*Diospyros virginiana*) and dogwood (*Cornus spp.*) become preferred foods in the area. Finally, in mature timber stands, hard mast producers such as oaks, pecans and hickories provide carbohydrate-rich food sources prior to denning season. As mentioned previously, a variety of age classes and species compositions within a bear's home range are key to providing an abundance of quality foods on a yearly basis (Black Bear Conservation Committee 2005).

Forest Management

Common forestry practices are necessary to promote exceptional bear habitat. In stands of bottomland hardwood species, natural regeneration through group selection or small patch removals will enhance regeneration of hard mast producers such as oaks. Stand thin-



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nings should be designed to improve species composition, remove individual trees of poor quality, promote regeneration of desirable species, encourage food production and create escape and nesting cover for bears. Stand thinnings should be performed when economically and silviculturally feasible, preferably at 5 to 15 year intervals. High-grade harvesting should be avoided as this can lead to negative changes in stand composition relative to bear habitat. Logging slash should be left on site for bedding areas and foraging sites for insects, invertebrates, amphibians, reptiles and small mammals. Rotation age for regeneration of mast producing trees should be a minimum of 50 years for hard mast production. Additionally, all trees with a diameter at breast height of 36 inches or greater and showing obvious defects (i.e. cavities, broken tops) should be protected as potential den sites for bears (Black Bear Conservation Committee 2005).

In upland pine (*Pinus spp.*) stands, shape of the harvested area should be irregular so edge habitat is maximized. In order to create maximum between-stand

diversity, there should be at least seven years of difference in age class between adjacent regeneration areas. This will help ensure a constant supply of soft mast within a relatively small area. Even-aged pine stands should be thinned as soon as economically feasible (typically by 15 years) to allow sunlight to penetrate to the forest floor encouraging soft mast production and growth of herbaceous vegetation. Burning in pine stands should be done on a 3 to 5 year rotation depending on site conditions. However, caution should be used when burning in winter during the initial five years after timber harvest as bears may be denning in the thick, early-successional cover. Streamside Management Zones (SMZs) should always be protected from harvest and prescribed burns (Black Bear Conservation Committee 2005).



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Reforestation

Black bear habitat is currently on the mend throughout Mississippi. Through programs such as Conservation Reserve Program (CRP) and Wetlands Reserve Program (WRP) thousands of acres of forestland have been preserved and restored in the state. Over 782,000 acres of forest are currently enrolled in CRP through-

(Jackson Field Office) was asked by USDA Natural Resources Conservation Service (NRCS) to provide suggestions on improving habitat on WRP tracts falling within designated black bear priority zones. The first strategy recommended was to provide a diversity of hard and soft mast producing species in order to pro-



NRCS

out Mississippi (Steve Melton, pers. comm.) Over 142,000 of those acres are planted on cropland or pastureland adjacent to streams, wetlands or other bodies of water through a practice known as Riparian Forest Buffer (RFB). While the primary purpose is to filter runoff from adjacent lands, these forested buffers also provide travel corridors, food sources and habitat for wildlife. Mississippi ranks first in the nation for acres of this practice with over 52,000 RFB acres in the Delta alone (Kevin Nelms, pers. comm.).

Additionally, over 118,000 acres of bottomland hardwood forests have been restored on private lands protected by WRP easements in the Mississippi Delta (Kevin Nelms, pers. comm.). In an effort to improve habitat suitability for bears in Mississippi, the USFWS

provide year-round food availability. This is accomplished by planting not only hard mast species such as oaks but also by planting 2 to 5 percent of each tract in soft mast species such as black gum, paw paw and persimmon. Plantings of overcup oak and cypress are also encouraged on areas of lower elevations for future den trees. It was also recommended that denning areas be created by leaving felled tree tops or brush for ground nesting cover in areas above the 10-year flood zone (U.S. Fish and Wildlife Service 2005). In addition to Farm Bill conservation programs, private programs conducted through conservation organizations such as Ducks Unlimited, Delta Wildlife, Wildlife Mississippi, USFWS Partners Program and The Nature Conservancy have also planted countless acres of trees which will continue to provide habitat for bears.

CONFLICT MANAGEMENT

As Mississippi's bear population continues to grow, so too will conflicts between humans and bears. Public attitudes will determine whether bears are considered to be an asset or a liability which will play a major role in whether or not bears can flourish in the state. Humans and bears can coexist peacefully if suitable habitat is provided for bears, if humans are willing to

alter their actions in areas where bears are known to be present, and if solutions are available for human/bear conflicts (Black Bear Conservation Committee 1997). Some interaction between humans and bears is inevitable and chances will surely increase as conservation and restoration projects continue (Yarrow and Yarrow 1999). Unresolved conflicts have the potential to result in the illegal take of bears. Conflicts between humans and bears must be handled in a timely and effective manner by MDWFP personnel to protect bears and prevent negative opinions from forming among landowners. Written materials that educate about bear behavior and how to avoid possible conflicts must be developed and distributed to people who are likely to come into contact with bears.

Attitudes and perceptions toward bears may be conditioned according to whether or not landowners have had negative experiences with bears in the past and the likelihood they may have bear problems in the future (Clark et al. 2001). Bowman et al. (2001) compared landowner attitudes about bears between areas of high bear density in Arkansas (White River NWR) with attitudes in areas of low bear density in Mississippi (Dahomey NWR, Panther Swamp NWR, Yazoo NWR and Delta National Forest). Results showed most Mississippians supported increasing the bear population while landowners in Arkansas were only moderately supportive. The difference between respondents is



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likely a product of greater bear damage and exposure to bears in Arkansas. Mississippians were also willing to incur more damage for the opportunity to see bears and know bears were on their property than those sampled in Arkansas. Once again, this is likely due to the fact that many of those surveyed in Arkansas already have bears on their property and have experienced damage in the past. White et al. (1995) found hunting clubs in the batture lands of Mississippi wanted more bears whereas hunting clubs in the batture lands of Arkansas wanted fewer, suggesting as bear numbers increase, tolerance for bears may decrease. It was also shown that hunting clubs in both Arkansas and Mississippi that had experienced

damage in the past were less likely to support increasing bear populations than those incurring no damage. Despite these facts, Clark et al. (1991) found most Arkansas landowners who experienced damage by bears categorized the damage as tolerable and decreased tolerance of bears was correlated with less knowledge about bears in general. Many landowners with less education and lower incomes often live in areas with a greater potential for problems with bears. Additionally, if damage were to occur, monetary losses would likely be more significant to the household budget (Clark et al. 2001). For these reasons, educational programs should continue throughout Mississippi and landowners should be made aware of assistance programs to help handle problem bear situations if and when they arise.

The majority of conflicts that arise between bears and humans are related to the animals' search for food. Bears possess an acute sense of smell which can easily detect the presence of pet foods, garbage, corn feeders, bee hives, etc. Bears also exhibit excellent learning and long term memory skills which will lead them back to areas where food has been found in the past. This can lead to increasing interactions with humans which can cause the bear to lose its natural fear of people, leading to dangerous situations for both people and bears (Black Bear Conservation Committee 2005).

Without a doubt, the best tool used in human/bear conflict management is prevention. Persons living in close proximity to bears should be educated about problems that can arise and what steps should be taken to prevent them. Once educated about bears, most people are willing to modify their own behaviors to avoid conflicts (Black Bear Conservation Committee 2005). Simple steps taken to remove attractants from an area can often prevent conflicts from occurring. Keeping garbage indoors until time for pick-up, working with waste management authorities to install bear-proof dumpsters, keeping pet foods inside and complete avoidance of intentionally feeding bears in any setting can go a long way in keeping bears from becoming a nuisance. While it is known bears can cause damage to agricultural crops such as corn and milo, losses are usually

insignificant on a large scale and are generally tolerated by landowners (Clark et al. 1991). Additionally, there have been no reports of bears preying on livestock in Mississippi in recent history although there have been reports of bears in livestock pens eating feed.

Beehives (apiaries) are the exception to the rule with regards to agricultural damage by bears in Mississippi. Black bears can destroy several hives and cause great monetary loss in just one night. Beekeepers should always take steps to prevent damage before an incident



MDWFP

actually occurs. Moving hives away from wooded areas that provide cover and travel routes for bears is the first step to minimizing problems. Propane cannons, motion sensitive sirens, scarecrows and strobe lights can all provide temporary relief although long term exposure can eventually render them ineffective (Black Bear Conservation Committee 1997). Properly constructed electric fences have been shown to be almost 100% effective at deterring bear damage to bee hives and should be used as a first line of defense. Locating hives as close together as possible allows for fencing to be more effective and cost efficient. Any person requesting permission to place beehives on public lands in Mississippi should be required to surround those hives with electric fencing. This will prevent damage and losses to beekeepers and provide negative reinforcement which will deter bears from damaging hives in the future. Electric fencing has also been shown to be a highly effective bear deterrent around gardens and livestock yards (Black Bear Conservation Committee 2005).

Maintenance of suitable habitat has also been shown to play a role in the prevention of human/bear conflicts. It has been shown that damage complaints typically increase in years of natural food shortages such as hard mast failures. A habitat providing a wide variety of bear foods will help to offset the loss of any one particular food source during a given year (Eastridge et al. 2000).

Conflicts involving bears can be addressed by either managing the bears involved, manipulating the resource being damaged by bears, or by placing a physical or psychological barrier between bears and the

resource (Black Bear Conservation Committee 2005). MDWFP personnel must be educated and trained about various aspects of human/bear conflicts. MDWFP personnel should also continue to work closely with USDA Wildlife Services personnel to effectively remedy damage and nuisance problems throughout the state. All personnel handling bears should be outfitted with the necessary equipment to handle any situation that may arise. Additionally the MDWFP Standard Operating Procedures should be reviewed and updated on an annual basis to reflect changes in techniques and specific scenarios that may occur.



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CURRENT AND FUTURE RESEARCH EFFORTS

In June 2002, a permanent position was created at the Mississippi Museum of Natural Science for a conservation resources biologist who would focus solely on black bears in Mississippi. The purpose of the position was to coordinate black bear activities throughout the state with an emphasis on education and research.

Current research has focused on maintenance of a statewide bear sightings database and initiation of a statewide trapping and monitoring program. Due to the bear's endangered status throughout the state and its federally threatened status in the lower two-thirds of the state, it became apparent a database was needed to document bear sightings throughout Mississippi. The database allows for better estimation of population numbers as well as documents any potential reproduction in the state. The database also serves as an invaluable tool for creating and maintaining landowner contacts in areas where bears are present.

Trapping efforts have also begun throughout the state on a limited basis. Trapping and marking of bears in Mississippi provides valuable information about population estimates, age and gender demographics, movements, habitat preferences and reproduction that was previously unknown. Because bears in Mississippi are so scattered throughout different regions, trapping efforts have focused on individual bears within different areas. Sightings from biologists, area managers and private citizens have allowed MDWFP biologists to determine areas where bears may be present on a regular basis. After meeting with the landowner or manager, bait stations are established in an effort to pattern the bear's movements. If baits are routinely taken by a bear, then a trap is set. Because trap setting and daily monitoring is such a time consuming process, traps are only set if there is ample evidence a bear is in the area.

All bears captured are marked with ear tags, given a passive integrated transponder (PIT) tag (a small microchip inserted underneath the skin that produces an identifying number when scanned with a hand-held

device) and fitted with a radio collar for tracking movements. All pertinent measurements are taken, hair and tissue samples are taken, blood is collected for analysis and a tooth is pulled for aging. A large animal chemical panel is performed with a portion of the blood serum. Information garnered from the large animal chemical panel will be used as baseline data for comparisons of nutrition levels among bears in different regions of the state as well as monitoring of individual bears over time. The remainder of the serum is frozen and stored at the Mississippi State University Department of Wildlife and Fisheries along with the



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extracted tooth, tissue samples and hair samples. Storage of tissue and hair samples can be used for genetic studies in years to come and the tooth used for aging by counting cementum annuli.

Locations on radio-collared bears are taken on a monthly basis. Locations are obtained by signal triangulation from the ground or aerial telemetry using fixed-wing aircraft. In addition to bears captured and radio-collared in Mississippi, locations are also obtained on bears from neighboring states currently residing in Mississippi. Tracking of radio-collared bears has greatly enhanced our knowledge of bear movements within Mississippi. Greater information could be obtained by locating radio-collared bears on a more regular basis although, currently, time and monetary restrictions have limited such actions. In October 2005, radio-collars with global positioning system (GPS) capability were purchased by the U.S. Forest

Service (USFS) Center for Bottomland Hardwoods Research to study possible interaction between black bears and the endangered pondberry plant (*Lindera melissifolia*) in the south Delta. Collars feature a store-on-board GPS unit which can be released and later downloaded to obtain precise latitude and longitude locations of a bear over a given time interval. While these collars were purchased for use on bears captured in the south Delta (Sharkey, Issaquena, Warren, Yazoo and Washington counties), use of these collars in other regions of the state could provide much greater and more precise data about bear movements and habitat preferences with much less time and money spent by MDWFP biologists.

Continued research is needed to gain a better understanding of bears currently inhabiting Mississippi. Tracking the few radio-collared bears within the state



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has provided a great deal of insight into movements and patterns of local bears. However, in order to conduct any form of scientific analysis on a statewide level more bears need to be captured and monitored. This will require a cooperative effort between natural resource agencies and university personnel and will necessitate a person whose only responsibility is trapping and subsequent monitoring. Since 2002, groundwork has been laid for such a project through contacts with landowners and involvement of private citizens with regard to bear sightings and documentation. Unfortunately, without a timely response and effort, reported animals often go uncaptured. A continuous research effort done cooperatively between university researchers and MDWFP would allow for more data to be collected and analyzed as part of an ongoing project conducted by graduate students and technicians from

the university and biologists with MDWFP. Information garnered through such a cooperative effort would continue to expand our knowledge of bears in Mississippi and aid in future management of the species.

Additionally, and more importantly, is the need to assess public attitudes in the state with regard to bears. Many citizens are still unaware that bears even exist within Mississippi, much less have an understanding of bear behavior and ecology. Efforts to increase public awareness and education about black bears have been a top priority in recent years and should continue to be so. Studies need to be conducted to determine if these efforts are succeeding or if new educational strategies should be developed. Additionally, in areas where bear sightings are becoming more frequent, surveys should be conducted to determine amount of knowledge existing about bears among landowners in the area. Results of this study could give a clear direction on methods to educate the public and identify areas in the state needing increased attention with regard to bear education.



USFWS

Habitat suitability for bears within the state should also be a primary focus in bear conservation efforts. Fragmentation is a major concern with regard to potential bear habitat, especially in the Delta region. Presently, the most suitable habitat for bears in the Delta exists in isolated pockets throughout the region.

Key areas throughout the state have been identified by the USFWS as potential bear habitat conservation and restoration areas (Figure 6). Through public and private reforestation programs, these priority areas will serve to connect larger tracts of public lands currently containing bears and provide travel corridors between other areas of suitable habitat.

As bear habitat is expanded and connected through reforestation projects, of particular concern is the impact of major roadways through occupied areas. As stated earlier, one of the leading causes of death among non-hunted populations of bears in the southeast is vehicle collisions. Efforts should be made to identify wildlife crossings along major roadways so steps can be taken to minimize vehicular accidents through the use of wildlife underpasses or road signs alerting motorists to the possibility of bears crossing the roadway. Future construction of major roadways should also take into consideration habitat “funnels” which could put bears and other wildlife at risk for vehicular collisions. Natural resource managers should work closely with Mississippi Department of Transportation (MDOT) planners and engineers to implement strategies in road construction to minimize wildlife/vehicle collisions.



USFWS

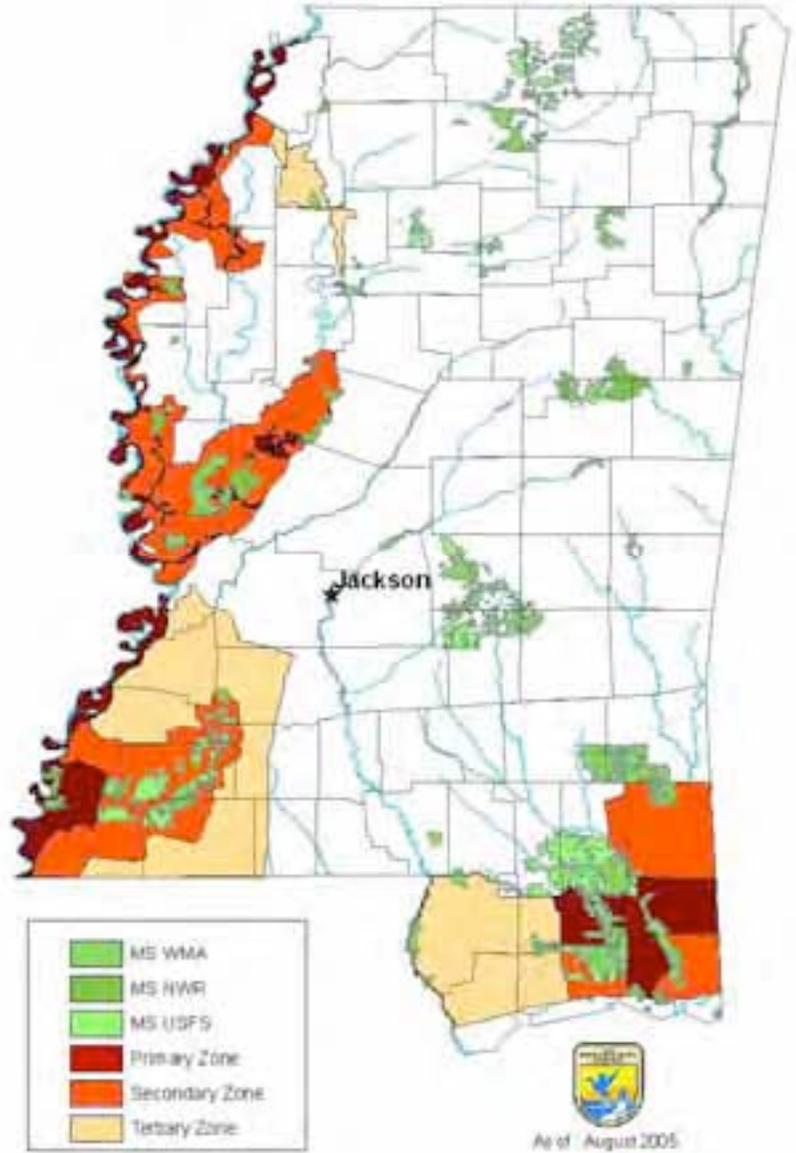


Figure 6. USFWS priority areas for conservation and restoration of black bear habitat in Mississippi.

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APPENDIX A

MDWFP Black Bear Management Objectives



MDWFP BLACK BEAR MANAGEMENT OBJECTIVES

The objectives and strategies listed in this section are to be completed within five years of the publication of this document. These objectives will be reviewed by the MDWFP Black Bear Committee at five year intervals to determine the success of the proposed objectives and the effectiveness of the strategies provided. New objectives and strategies for completion will be proposed at that time if deemed necessary.

Black Bear Education for MDWFP Personnel

Objective: Form MDWFP Black Bear Committee.

Strategy: Comprise committee of MMNS bear biologist, MDWFP chief of law enforcement, MDWFP chief of wildlife and MDWFP biologists from “key” bear regions within state: Delta region, Southwest region and Gulf Coastal region. Group will meet semi-annually to coordinate bear-related activities and review and update bear management protocols.

Objective: Develop MDWFP Black Bear Management Plan.

Strategy: Original plan will be written by MMNS bear biologist and will be reviewed and edited by the MDWFP black bear committee. Plan will also be reviewed by an outside group composed of biologists from other public and private natural resource agencies within state. Plan will provide information and management strategies for black bears in Mississippi and will be distributed to MDWFP biologists and law enforcement personnel when completed. Plan will be revised and updated by MDWFP Black Bear Committee at five year intervals.

Objective: Develop MDWFP Standard Operating Procedures (SOPs) for black bears.

Strategy: MMNS bear biologist will collaborate with regional biologists and law enforcement to develop protocols and guidelines for response to situations that might arise with regard to bears. SOPs will address general sightings reports, human/bear conflicts, accidental capture, handling of injured and dead bears and orphaned cubs. Once completed, SOPs will be distributed to MDWFP biologists and law enforcement personnel.

Objective: Educate MDWFP law enforcement trainees about black bear ecology and research in Mississippi.

Strategy: A program will be developed to show at the MS Museum of Natural Science during conservation officer training that gives information about MDWFP’s bear program. Presentation will be in Power Point format and will address black bear ecology, ongoing research efforts and appropriate responses to various scenarios regarding bears. MDWFP SOPs and black bear management plan will be presented as supplemental materials.

Objective: Provide updates on bear management and research efforts to MDWFP personnel.

Strategy: MMNS bear biologist will keep regional biologists apprised of ongoing bear conservation and research efforts through monthly staff meetings and email notification. Regional biologists will attend district law enforcement meetings to update conservation officers about ongoing bear activities in their respective regions.

Training for MDWFP Personnel

Objective: Develop field manual for properly handling bears for research and management purposes.

Strategy: MMNS bear biologist will develop field manual which gives written protocols and procedures for trap setting, immobilization drug mixing, drug delivery techniques, measurement documentation, sample collection and radio collar fitting for captured bears. Field manual will be distributed to MDWFP biologists as a reference.

Objective: Provide training to MDWFP regional biologists on capture, immobilization and subsequent work-up of black bears.

Strategy: Regional biologists will be provided with written information for procedures and protocols associated with the capture and data collection of black bears. Standardized video footage of procedures will also be distributed for viewing. Additionally, MMNS bear biologist will include regional biologists in all steps of capture, immobilization and work-up of bears captured for any purpose within their region. This will provide hands-on training which will be necessary in future situations involving bears.

Objective: Provide mobile culvert traps for biologists in regions known to be inhabited by bears.

Strategy: One mobile culvert trap (culvert trap mounted on some form of trailer) will be assigned to each of three "bear regions" (Delta, Southwest, and Coastal) for use by regional biologists. Culvert trap will be stored at district headquarters or designated WMA within region. Trap will be used for capturing of bears for research and nuisance abatement purposes as well as transport of bears in event of injury or relocation. Two culvert traps will also be kept at MMNS for use by MMNS bear biologist.

Objective: Assemble black bear "capture kits" for biologists in each region.

Strategy: Kits will be developed which will contain all pertinent equipment needed for bear work-up including immobilizing equipment (drugs, darts, delivery systems, etc.), weight scale, tagging equipment (ear tags, PIT tags), radio collars, etc. Once completed, kits will remain with designated biologist in each region for usage. Immobilization drugs and radio collars for each kit will be inventoried and distributed through MMNS bear biologist. Equipment will be acquired and maintained by regional biologist.

Black Bear Education for Citizens of Mississippi

Objective: Use popular media to teach about black bears.

Strategy: Continue printing articles in popular magazines about bears in Mississippi. Special emphasis should be given to sportsman's magazines (i.e. Mississippi Outdoors, Mississippi Woods and Waters, etc.) although all magazines should be considered. Also, continue to work with local and state newspapers to publish stories about bears as they occur in their respective areas in an effort to generate local interest. News and television shows should also be contacted to report on breaking news stories about bears within coverage area.

Objective: Develop a Power Point presentation about black bear history and conservation in Mississippi.

Strategy: Presentation will be developed by MMNS bear biologist and distributed to MDWFP regional biologists. Regional biologists can use all or a portion of bear presentation in lectures and presentations within region. Any presentations to landowners, hunting clubs, civic clubs, etc. about wildlife management should contain information about bears and bear management.

Objective: Develop printed materials to be distributed that educate about bears.

Strategy: One pamphlet will provide information about bear ecology and the history of bears in Mississippi along with ongoing research efforts by MDWFP. Second pamphlet will educate citizens about how to avoid possible conflicts with bears by giving strategies that will help prevent future problems. Additionally, fact sheet originally developed by MSU Extension Service about the ecology and management of the Louisiana black bear will also be updated and reprinted for distribution. Pamphlets should be distributed at sportsman's expositions, hunter education seminars, public speaking engagements, MDWFP district offices and mailed to hunting clubs and landowners listed in the Deer Management Assistance Program (DMAP) database.

Objective: Develop educational display about black bears in Mississippi.

Strategy: A tabletop display will be designed which gives information about black bears in the state. The display will be portable and can be used at wildlife expos, sportsman's banquets and street festivals to educate the public about bears. Display will be developed cooperatively between MDWFP and the Bear Education and Restoration (BEaR) Group of Mississippi.

Objective: Incorporate black bear information into hunter education programs.

Strategy: Include information about black bear ecology and behavior into hunter education programs throughout Mississippi. Hunter education literature will provide information on the endangered status of bears in Mississippi, bear ecology, how to identify bear sign and steps to avoid conflicts between humans and bears by removing attractants from camps and prohibition of using baits while hunting.

Objective: Conduct landowner seminars.

Strategy: Work with groups such as Delta Wildlife, BEaR Group of Mississippi, Black Bear Conservation Committee (BBCC) and MSU Extension Service to organize programs that target landowners in areas where bears are known to be present. Programs will also be developed for landowner groups in other regions requesting information about bears. Programs should address bear ecology, negative stereotypes associated with bears and human/bear conflict avoidance and resolution. Seminars should also target other groups who are likely to come into contact with bears such as beekeepers, agricultural producers and timber managers.

Human/Bear Conflict Management

Objective: Distribute educational pamphlets about human/bear conflicts.

Strategy: Pamphlets that provide information about avoidance and resolution of human/bear conflicts should be mailed to hunting clubs in areas known to harbor bears. Addresses and contact information can be obtained from MDWFP-DMAP records. Pamphlets should also be distributed at wildlife expos and educational presentations.

Objective: Respond to all human/bear conflicts in an expeditious manner.

Strategy: Any call regarding conflicts or damage resulting from bears should be addressed in a timely and efficient manner according to the MDWFP black bear SOPs. Site visits will be done as soon as possible by a representative from MDWFP or USDA Wildlife Services (WS). Recommendations will be followed up by a phone call or site visit to determine effectiveness of actions taken.

Objective: Coordinate with USDA Wildlife Services for appropriate response and handling of nuisance complaints.

Strategy: MDWFP will continue to work closely with WS personnel to provide responses and solutions to complaints involving bears. WS biologists will be trained and permitted to handle bears in the same manner as MDWFP regional biologists. Any conflicts involving bears will be handled as a joint effort between WS and MDWFP. WS will also be involved in any updates and revisions to the MDWFP Standard Operating Procedures (SOPs) regarding human/bear conflicts.

Black Bear Research

Objective: Maintain black bear sightings database.

Strategy: Continue recording sightings information into sightings database at MMNS for purposes of public information and education and statewide population estimation. Information will also be used as a means of determining target areas for possible research captures, monitoring of reproductive success throughout the state and as landowner contact information. Databases containing data collected during capture, nuisance activity and telemetry coordinates will also be maintained at MMNS.

Objective: Coordinate with universities to continue black bear research in Mississippi.

Strategy: MDWFP will continue to provide both monetary and in-kind support for university black bear research throughout the state. Research parameters and projects will be developed cooperatively for studies regarding public opinion, education levels among citizens about bear behavior and ecology, habitat suitability, bear populations and movements and feasibility of bear reintroductions.

Objective: Develop statewide population monitoring techniques.

Strategy: MDWFP will work with other natural resource managers to develop and implement bear population monitoring techniques (e.g. bait station surveys, hair snare surveys) throughout the state. Monitoring will be done as a cooperative effort between MDWFP and other public and private natural resource management agencies to provide population estimates and growth trends for black bear populations in Mississippi. Surveys will be conducted on a yearly basis to provide accurate data over time.

Objective: Identify key areas within Mississippi for increasing or enhancing black bear habitat.

Strategy: MDWFP will work closely with USDA NRCS, USFWS and other public and private natural resource management agencies to identify priority areas for black bear habitat restoration or enhancement. Special emphasis will be placed on areas that have existing bears areas that might serve as connecting corridors between isolated habitats containing bears, and areas that would expand habitat around existing forested public lands. Efforts will not only take into account habitat improvement within state, but also expansion and linking of habitats with adjacent states, especially those areas that have existing bear populations. The Black Bear Management Handbook, printed by the BBCC (2005), will be distributed to interested landowners as a guide for increasing habitat quality for black bears.

Objective: Continue trapping and monitoring of bears throughout the state.

Strategy: MDWFP will work with public land managers, universities and private landowners to capture bears throughout Mississippi. Radio-collared bears will be monitored on a regular basis to gain better insight into movements, reproduction and habitat preferences. GPS collars will be used whenever possible to provide more accurate and timely information about bears throughout the state.

Human-Induced Bear Mortality

Objective: Prevent illegal takes through education and enforcement.

Strategy: Educate the public about the state endangered and federally threatened status of black bears in Mississippi and the severe penalties for illegal kills. MDWFP “Attention Hunters” signs should be posted on all public hunting lands throughout the state which detail fines associated with killing bears. Signs should also be distributed by MDWFP personnel to landowners and hunting clubs in areas where bears are known to be present. Any person caught illegally killing a bear will be prosecuted to fullest extent of the law as an example to other would-be poachers. Additionally, newspaper and television media should be made aware of illegal kills for reporting and publication.

Objective: Prevent accidental deaths caused by research activities.

Strategy: Provide written protocols and hands-on training to anyone involved in capture and immobilization of black bears. Only persons permitted through MDWFP will be allowed to capture and handle bears in Mississippi. Requirements for permit will be determined by representatives from MDWFP, WS and USFWS.

Objective: Develop regulations for hog trap design.

Strategy: Draft public notice of intent to be presented before Mississippi Wildlife Commission which gives criteria for hog trap design in Mississippi. Notice will provide for an opening in top of any hog trap used on public or private lands allowing for escape of non-target species such as bears.

Objective: Coordinate with Mississippi Department of Transportation (MDOT) to identify current and potential bear crossings on roadways.

Strategy: Work with MDOT to identify potential bear crossings on previously constructed roads and future projects. MDWFP will work with engineers and planners to develop wildlife underpasses and drift fences for new highway construction and establishment of bear crossing signs on roads currently being used in areas where bears are frequently sighted.

APPENDIX B

**MDWFP Standard Operating Procedures for
Black Bears**



MDWFP STANDARD OPERATING PROCEDURES FOR BLACK BEARS

Background

Black bears are protected in Mississippi and considered a federally threatened species in the southern two-thirds of the state. Baseline data and information regarding their presence in the state is extremely important to ongoing conservation and research efforts. MDWFP is the leading agency with regards to bear management and research within the state so consistent protocols must be followed in order to insure quality information and proper resource management at both state and federal levels. Data collected from bears that are injured, dead, nuisance or trapped for research purposes is crucial to management of this species. Information from general sightings is also very useful in determining range and reproductive success of populations within the state.

As bear populations increase throughout Mississippi, inevitably, so too will interactions between bears and humans. Handling of problems associated with bears is vital to the management process and necessary to ensure support for bear conservation throughout Mississippi. These Standard Operating Procedures (SOPs) are designed to give a framework for handling all manner of bear/human interactions including: general sightings, nuisance complaints, sick or injured bears, bears captured accidentally, dead bears and orphaned bear cubs. The procedures listed in this document are by no means permanent or unchanging as every situation involving bears will be different. They are intended as guidelines for MDWFP biologists and conservation officers to follow in situations where there is potential for negative repercussions for both people and bears.

MDWFP personnel (biologists and conservation officers) should be educated about black bear habits and ecology and trained in the latest techniques for black bear management. MDWFP personnel designated to handle bears should be equipped with proper tools to handle any situation that might arise and trained on how to properly use the equipment in certain situations. MDWFP personnel should be made aware of ongoing research efforts and bear activity throughout the state so they can relay information to the general public, thus garnering support for bears and bear research.

General Sightings

Persons reporting a bear occurrence should be questioned for general information about the bear before anyone is dispatched to the scene. Questions should follow the sighting occurrence sheet to determine validity of report as accurately as possible. If the person reporting a sighting indicates there is evidence (e.g. tracks, hair, scat, photograph, etc.) of the bear in question, an officer or biologist should be dispatched to evaluate the scene and determine if evidence is indeed that of a bear. If no evidence of sighting exists, but the officer or biologist on scene feels confident sighting is credible, GPS coordinates should be recorded and an occurrence report filled out detailing the incident. A copy of the occurrence report should be sent to the regional biologist and the black bear biologist at the Mississippi Museum of Natural Science (MMNS) to be entered in the black bear occurrence database. Educational materials about bears (e.g. pamphlets, fact sheets, newsletters, etc.) should be distributed in person or by mail to anyone reporting a bear sighting.

Nuisance Bears

Any report of damage or threats to human safety by bears should be followed up by MDWFP or USDA Wildlife Services (WS) personnel within 24 hours. It is imperative that public concerns about bears be addressed in a timely and professional manner to prevent negative feedback regarding bears. If damage or disturbance is determined to be caused by a bear, officer should contact regional biologist to alert them of the situation. Documentation should be made of location and type of damage or disturbance and sent to regional biologist and bear biologist at MMNS.

- 1.) For the first report of nuisance bear problems, the biologist or officer should recommend passive action be taken to solve problem. This can usually be done by telephone. Determine if the problem can be solved by removing garbage, pet foods or other attractants from the scene. **Preventative measures should always be first priority when attempting to solve problems regarding bears.** In addition, the person(s) reporting the problem must implement any recommended actions by MDWFP before any further action is taken to relieve problem.
- 2.) If the problem persists, area should be visited by trained MDWFP or WS personnel to determine if landowner has taken necessary steps to follow previous recommendations. Before any direct action (i.e., trapping and/or hazing) is taken to relieve the problem, the Jackson field office of the the U.S. Fish and Wildlife Service (USFWS) should be notified and made aware of the situation. Examples of nuisance bear problems where trapping and/or hazing may be necessary include: aggression towards humans, damage to beehives, damage to buildings or equipment, frequent visits to campsites or attacks on livestock. Bears that have been seen or are simply passing through an area do not qualify as a nuisance problem. WS will make necessary decisions regarding actions taken to solve nuisance problems (i.e. construction of electric fencing, trapping, and/or hazing with rubber buckshot, dogs, or pepper spray). MDWFP personnel will assist with any necessary actions recommended by WS. Barring special circumstances, nuisance bears should always be captured using a culvert trap to prevent the public from coming into contact with a semi-mobile bear caught in a foot snare.
- 3.) Any bear captured for any reason should undergo a full “work-up” by a trained biologist who is permitted through MDWFP to handle bears in Mississippi. This would include taking all necessary measurements listed on the MDWFP Black Bear Capture Form. The bear should be PIT tagged, ear tags placed in both ears and, when possible, fitted with a radio collar for future tracking. A premolar should also be removed for aging. MDWFP regional biologists and WS biologists will be trained in techniques for bear work-ups and will be supplied with a kit containing all pertinent tools and tagging equipment necessary for field work-ups.

Injured Bears

In the case of an injured bear, receiving officer should immediately contact regional biologist and MMNS bear biologist. The officer should clear the area of any unnecessary persons immediately as injured bears are unpredictable and can pose serious threats to people. Experience has shown bears are extremely resilient animals and can recover from almost any injury, therefore immobilization of the bear should only be carried out if deemed necessary by MDWFP biologist present. If possible, a qualified veterinarian should examine the bear at the scene to determine extent of the bear’s injuries. Any necessary treatments should be made on site and the bear left in the area to recover. If the bear is in a highly visible area (roadside, neighborhood) it should be tranquilized, given a complete work-up, and transported to more suitable habitat for recovery. Release sites will be determined after consultation among MDWFP personnel present. First priority for release sites should be MDWFP wildlife management areas, USFWS national wildlife refuges, or USFS national forests in the general vicinity of capture. The area or refuge manager will be consulted prior to release of the bear. MDWFP area managers should also contact USFS District Ranger if WMA is on a national forest.

If the bear has been mortally wounded (spinal injury, visible entrails), then it should be euthanized by authorized MDWFP personnel. **Important:** Bears should not be dispatched unless vital signs are practically non-discernable and death is certainly imminent. This should only occur after the area has been cleared of all other non-authorized personnel. This decision rests solely with biologist at scene or verbally authorized after regional biologist or MMNS bear biologist has been made aware of situation. USFWS will be contacted immediately if dispatched bear is within the federally listed range.

Accidental Capture

Bears captured unintentionally (e.g. hog traps, cornered or treed in residential areas) should remain contained until a biologist has been notified. The officer at the scene should immediately contact regional biologist and MMNS bear biologist. MDWFP personnel must take charge of the scene and keep onlookers away from the area for their own safety and for the safety of the bear. If necessary, local law enforcement personnel should be enlisted to assist with crowd control.

If the bear is close to suitable habitat, it should be allowed to leave the area on its own. This is only possible if onlookers are inside their houses and out of sight of the bear. If this is not feasible or bear has wandered too far into an urban setting to safely return to suitable habitat without coming into contact with more humans or crossing major roads which could lead to vehicular accidents, then regional biologist on scene will have to tranquilize the bear. If the bear is in an elevated position, something should be placed under the bear in an attempt to break the animal's fall. Trampolines, inflatable air mattresses, stuffed or inflated garbage bags can all be used as cushions to break a bear's fall from an elevated position. The local fire department should be contacted for possible assistance with a catch net or use of a bucket truck in the event bear becomes lodged in a tree.

The biologist at the scene should take all pertinent biological measurements, tag the animal and affix a radio collar. The bear should then be transported to a suitable release site as close as possible to the area of capture. Release sites will be determined after consultation among MDWFP personnel present. First priority for release sites should be MDWFP wildlife management areas, USFWS national wildlife refuge or USFS national forests in the general vicinity of capture. The area or refuge manager will be consulted prior to release of bear. MDWFP area managers should also contact USFS District Ranger if WMA is on a national forest.

If a bear is deemed to be an immediate threat to safety of humans in an area then the bear may be euthanized by MDWFP personnel on site. This decision can only be made by regional biologist or MMNS bear biologist on the scene or authorization given verbally after full details of situation have been given. If regional biologist or MMNS bear biologist is not available to respond either in person or via telephone, the MDWFP law enforcement officer on site may euthanize the bear if necessary only after notifying their supervisor of the situation. Any euthanized bear should be kept cool or frozen until transported to MMNS for measurement and documentation. USFWS will be contacted immediately if euthanized bear is within the federally listed range.

Dead Bears

Reports of dead bears should be responded to within 24 hours. For bears believed to have been killed illegally contact U.S. Fish and Wildlife Service Law Enforcement immediately. **Areas in which bears are suspected of being killed illegally should be treated as a crime scene and processed accordingly.**

For any bears found dead that are not suspected of being killed illegally, location and situation should be recorded and photographs taken of the scene. The bear should then be picked up, kept cool and/or frozen and transported to MMNS. If the bear has begun to decompose, skull should be removed and transported to MMNS. The remains of the animal should be disposed of in a sanitary fashion (incinerated or buried). No portion of a bear carcass should be left where the public could find it as possession of bear parts (from native Mississippi bears) is a violation of state and federal law.

Orphaned Cubs

Bear cubs should not be considered orphaned unless the female is confirmed to be dead. If death of the female cannot be confirmed, the cub should be left in, or returned to, the area where it was found. Any cub that is treed or accidentally captured should be allowed to leave the area on its own after removing onlookers from the scene. Any motherless cubs captured between January 1 and August 1 should be transported to the Jackson Zoo immediately. Contact between cubs and humans should be kept to a minimum for future reintroduction. First priority for reintroduction should be fostering of cubs to surrogate females with cubs. Reintroduction should take place as soon as possible by placing the cub with a female having cubs of a similar age. If a suitable foster female cannot be found, MDWFP, USFWS and Jackson Zoo curators will make a determination regarding prolonged care of the animal. Regardless of condition of mother, cubs found or captured after August 1 should be left in the wild.

APPENDIX C

MDWFP Black Bear Occurrence Report Form



Black Bear Occurrence Report

Mississippi Department of Wildlife, Fisheries and Parks



Person Reporting Occurrence: _____

Address: _____

Phone/Email: _____

Was this information verified? Yes No By whom? _____

Agency/Affiliation _____ Phone/Email: _____

Observation Data

Date of Occurrence: _____ Time: _____ a.m. p.m.

Type of Evidence: (check all that apply) Sighting Track Scat. Photo Claw marks
 Hair Other _____

Location (Lat/Long): _____ County: _____

Proximity and direction to nearest landmark: (road, road, etc.) _____

Habitat at Occurrence Site: Bottomland hardwoods Cropland River/stream bank
 Regenerating forest Mature pine Pasture Upland hardwoods Residential
 Other _____

How many bears were observed? _____ Were cubs present? Yes No

Was the bear wearing ear tags? Yes No Left tag color _____ Right tag color _____

Was the bear wearing a collar? Yes No Color of collar _____

Distinguishing physical characteristics: (describe any scars, ear infections, etc.) _____

Comments: _____

Report occurrence info to Brad Young at the Mississippi Museum of Natural Science:
 Phone: (601) 354-7303 Fax: (601) 354-7227 Email: brad.young@mms.state.ms.us

APPENDIX D

MDWFP Black Bear Capture/Mortality Data Collection Form

Physical Data

Sex: Male Female Estimated Age Class: Adult Subadult Yearling Calf (year)
Physical Condition: Excellent Good Fair Poor
Pelage Color: _____ Pelage Density: Heavy Medium Light Mat
Muzzle Color: _____ Chest Blaze: Yes No Blaze Appearance: _____
Tooth Wear: Light Medium Heavy Estimated Age by Tooth Wear: _____
Tooth Losses/Abnormalities: _____
Distinguishing Marks or Scars: _____

Reproductive Data

Testes Descended: Yes No Length: _____ mm. Width: _____ mm.
Swollen Vulva: Yes No Lactation: Yes No Teat Color: _____
Number of Teats: _____ Teat Length Range: _____ cm Teat Width Range: _____ cm
Cubs/Yearlings Observed: _____

Marking Data

Right Ear Tag: Existing New Number: _____ Color: _____ Type/Agency: _____
Left Ear Tag: Existing New Number: _____ Color: _____ Type/Agency: _____
PIT Tag: Existing New Number: _____ Location: _____
Tattoo: Existing New Number: _____ Location: _____
Radio Collar: Existing New Type: _____ Serial No.: _____
Collar Frequency: _____

Vital Signs

Time	Temperature (°F)	Respirations (breaths per minute)	Pulse Rate (beats per minute)
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Samples Collected

Tooth: Yes No Location: _____
Hair: Yes No Location: _____
Tissue: Yes No Location: _____
Blood: Yes No Location: _____
Other: _____

Comments: _____

APPENDIX E

Black Bear Contact Information



Black Bear Contact Information

MDWFP Communications Center: 601-432-2170

Brad Young – Black Bear Biologist,
MS Museum of Natural Science
601-354-7303 (Work)
601-906-4143 (Cell)

Richard Rummel – Wildlife Specialist,
MS Museum of Natural Science
601-354-7303 (Work)
601-278-0019 (Cell)

Kris Godwin – MS State Director,
USDA Wildlife Services
662-325-3014 (Work)
662-769-0022 (Cell)

John Collins - Chief of Law Enforcement,
MDWFP
601-432-2173 (Work)

Larry Castle – Chief of Wildlife,
MDWFP
601-432-2196 (Work)
601-540-8619 (Cell)

Bob Oliveri – USFWS Law Enforcement
601-965-4469 (Work)
601-750-0277 (Cell)

Shauna Ginger – USFWS Ecological Services
601-321-1130 (Work)
601-953-0773 (Cell)

MDWFP Regional Wildlife Biologists

Jerry Hazelwood, Northeast Regional Wildlife
Biologist
662-423-1455 (Work)
662-438-6389 (Home)

Brad Holder, Northwest Regional Wildlife Biologist
662-832-2110 (Cell)

Jackie Fleeman, West-Central Regional Wildlife
Biologist
662-873-3497 (Cell)
662-873-2413 (Home)

Lann Wilf, West-Central Regional Wildlife Biologist
662-299-1454 (Cell)
662-746-0096 (Home)

Chad Dacus, East-Central Regional Wildlife
Biologist
601-842-4383 (Cell)

Scott Edwards, East-Central Regional Wildlife
Biologist
662-325-7490 (Work)
662-418-3004 (Cell)

Chris McDonald, Southwest Regional Wildlife
Biologist
601-835-3050 (Work)
601-757-2313 (Cell)

Kathy Shelton, Southeast Regional Wildlife Biologist
601-928-3720 (Work)
228-860-0573 (Cell)
228-396-0984 (Home)

Russ Walsh, Southeast Regional Wildlife Biologist
601-408-3399 (Cell)

