

***Ursus* in a Sky Island Range**

The Ecology, History, and Management of Black Bears in the Huachuca Mountains of Southeastern Arizona

Steve Pavlik

Introduction

My *Field Notes* tell me that the date was June 30, 2001. I was hiking the south side of the Huachuca Mountains on the seldom-used Bear Canyon Trail. This trail, as its name implies, snakes its way almost four miles up Bear Canyon, a steep sided gorge split by Bear Creek, to the Crest Trail that runs the length of the Huachuca Mountains. About one mile from the top it passes a small pool of water erupting from the ground named Bear Springs. After a steep climb the Bear Canyon Trail meets the Crest trail at a point known as Bear Saddle. Obviously, bears have long played a major role in the lore of this small area of southeastern Arizona.

And it was clear that bears still inhabited this remote rugged canyon. Along the entire length of the trail I found bear “sign” everywhere: piles of scat, tracks in the powdered earth, large rocks that were turned over, torn up logs, claw marks on a number of the more predominant trees, and trail signs that were well chewed. As I climbed the trail I stopped from time to time to look over the occasional open areas on the surrounding hillsides with my binoculars. For the most part, however, the vegetation in this canyon is thick and dark. I saw a number of suspicious shadows, but no bears. But I did see an abundance of bird life including a raptor passing quickly out of sight that might or might not have been a northern goshawk, and several white-tailed deer. One doe gently walked right up to me as I took a cool sip of water from Bear Spring. I also fortunate enough to see a gorgeous rock rattlesnake as it slid gracefully across the trail in front of me.

When I reached Bear Saddle I took off my backpack, leaned back against a large oak tree, and after finishing a chocolate bar, dozed off to sleep. I awoke about thirty minutes later to the sound of thunder and the sprinkle of rain. The Huachuca Mountains – the word “Huachuca” supposedly meaning “thunder” in the Apache language – are notorious for their sudden summer storms. Not wanting to be on the mountains in the middle of a lightning storm, I slipped my pack back on and reluctantly headed back down the trail.

About one mile from where I parked my truck the rain began to pick up. Since the trail was now fairly level, I decided that I would increase my own pace so not to get a good drenching. I began to trot quickly – and silently – on the rain soaked canyon floor. I had traveled only a couple of hundred yards in this manner when I rounded a sharp turn on the trail and suddenly found myself face to face with a black bear less than five paces in front of me. I could have reached out and touched his (or her?) nose with my hiking staff. We both stopped in our tracks to stare in

amazement at each other. For several brief but precious seconds we looked into each other's eyes and took measure of the situation. The bear itself appeared to be a full-grown adult. In Arizona this means an average of 150 pounds for females and 275 pounds for males with a height of about three feet at the shoulder (LeCount, 1988: 17). It certainly *seemed* large, so quite possibly it was a male. This particular bear was also black in color – many Arizona “black” bears are brown and sometimes even blonde (see Waddell and Brown, 1984: 350). Moreover, the coat of this bear was in great condition – so often they are shedding and look somewhat “ratty.” All things considered, this magnificent animal was a healthy bear seemingly in the prime of its life. Then I remembered my camera hanging on my belt. Ever so slowly I moved my right hand towards it, a foolish move. That was all it took - the spell was broken. The bear gave out a loud “woof!” whirled, and went crashing off the trail into the dense vegetation. In an instant the bear was gone. For quite some time I stood there alone in rain with the sound of thunder echoing off in the distance. I could hear my heart pounding loudly within my chest. Although I have had numerous other bear encounters before and since, this one was different. Perhaps it was because of the suddenness or closeness of the meeting, perhaps it was because of the eye contact we made. The initial look of amazement, then curiosity I saw in its face – undoubtedly the same look it saw on mine. Then, at least on my part, the realization of the rare gift that I had been granted that day, the opportunity to share a brief moment with a truly special creature. I felt blessed, I felt *alive*. Nor could I stop smiling. After a while I continued on my way, but this time I walked a little more slowly, more alert, and far more aware of my presence and place in the mountains.

Bears have long invoked the deepest of emotions from within the human soul. Love and fear, reverence and hatred, and sheer wonderment are just a few of feelings they bring out in us. Throughout history humans have worshipped bears and have offered them sanctuary. We have also hunted and exploited them in ways that are unconscionable and bring discredit to our own species. In North America, mankind has shared the land with bears for over 20,000 years. Once giant short-faced bears and grizzlies held dominance in the forests, grasslands and deserts of America and it was the human race that clung tenuously to existence. Today the short-faced bear is gone and modern-day species of bears, grizzlies, polar bears, and black bears, survive as carefully managed populations that exist only at our pleasure.

Throughout much of North America bears are under siege. Over-development and the subsequent loss or fragmentation of habitat, over-hunting, and in some places the killing of bears for the sale of their body parts on the black market have contributed to putting some bear populations at risk of serious decline, and in some cases, extinction. The key to bear conservation and management, and consequently survival, is knowledge. It is in that spirit that this paper is presented.

The purpose of this paper is to discuss the ecology, history, and management of the American black bear, *Ursus americanus*, in one specific geographic location – the Huachuca Mountains of southeastern Arizona from 1982 through 2004. This paper is not, however, meant to be a scientific treatise or a biological assessment of the black bear population in the Huachuca Mountains. My intention is to present a “portrait” if you will, of black bears within this particular mountain range that is based on the relatively small amount of research that exists along with my own work, opinions, and ideas. In the first part of this paper I will discuss two prehistoric

species and one historic but now regionally extinct species of bear – the grizzly bear - that once inhabited the Huachuca Mountains. This section will provide something of an early perspective and some background to a discussion of black bears in this mountain range. The remainder of this paper will deal with the ecology of the black bears, the historical relationship between man and bears, and the management of black bears in the Huachuca Mountains with emphasis placed on the causes and dynamics of mortality and removal, factors that have a direct bearing on their continued survival in the Huachuca Mountains. I will conclude by offering some comments and recommendations in regard to how we can maintain healthy bear populations and a peaceful co-existence between bears and people.

The Huachuca Mountains are one of the “sky island” mountain ranges in southeastern Arizona, so-called because they rise precipitously like islands from the desert floor.¹ The Huachuca Mountains consists of four distinct “life zones.” The Lower Sonoran zone begins with an elevation of 3,960 to 4,950 feet. This zone receives about 12 to 15 inches of rain per year and in terms of vegetation, is characterized by various grasses and scrubs. The Upper Sonoran zone continues with an elevation of 4,785 to 6,400 feet. This zone receives an increased amount of moisture and is characterized by woodlands of Mexican blue oak and alligator juniper. Cutting through these woodlands are canyon riparian forests. The creeks responsible for creating these canyons contain stands of Arizona sycamore. The next zone is the Transition zone with an elevation of 6,000 to 8,000 and is dominated by Apache and Chihuahuan pine. The fourth and final life zone is the Canadian or Montane zone that begins at 7,500 feet to the highest point in the Huachuca Mountains, Miller Peak with an elevation of 9,466 feet. Historically, this zone receives the greatest amount of precipitation, about 30 inches a year, much of it in the form of snow. The characteristic forms of vegetation in this zone are Douglas fir and some quaking aspen. Black bears utilize all four of these life zones but reside primarily in the upper three.

The Huachuca Mountains are owned principally by three entities: The United States Forest Service (41%), private ownership (32%) and the U.S. Army (21%). In addition, the extreme southeastern portion of the Huachuca Mountains is located within the 4,750 acre Coronado National Memorial operated by the United States Park Service. Generally the northeast portion of the Huachuca Mountains is part of the Fort Huachuca army base. East of Fort Huachuca is the city of Sierra Vista, a sprawling community of 37,775 people (2000 Census) that over the years has expanded southward to push right up against the base of the Huachuca Mountains. This paper will consider the impact of the Sierra Vista urban area, and Fort Huachuca on the Huachuca Mountains bear population. Two other locations adjacent to the Huachuca Mountains will also be considered as part of the study area for this paper, the San Pedro River and the Canelo Hills.

The San Pedro River is located east of the Huachuca Mountains and the city of Sierra Vista. The river begins in the foothills of Mexico’s Sierra Madre Occidental and flows north 93 miles into Arizona before continuing its journey another 100 miles to where it enters into the Gila River. In many places the banks of the San Pedro are lined with Fremont cottonwoods, Goodding willow trees, and other types of vegetation to form one of the most important riparian areas in the American Southwest. The San Pedro riparian corridor supports over 350 species of birds – nearly one half of all of the breeding species in North America – making it an internationally renown birding location that attracts thousands of birdwatchers each year from throughout the

world. In addition, the river is also home to over 80 species of mammals and 47 species of reptiles and amphibians. This river was once home to 14 species of native fish. Today these have been largely replaced by introduced species and only two types of native fish remain. The San Pedro has also long been recognized as one of the most “endangered” rivers in the United States due to the pressures being placed on its aquifer by the rapidly growing human population. In 1988 the United States Congress created the San Pedro Riparian National Conservation Area, a 58,000 acre tract of public land designed to preserve a portion of the this important riparian area. Historically the San Pedro has also served as an important corridor for both wildlife and people traveling to and from the mountains of Mexico that lie immediately south of the Huachucas.

The Canelo Hills lay west of the Huachuca Mountains, separated by Highway 83, a mostly paved two-lane road that leads to Parker Canyon Lake and around the mountains. Roughly parallel to the highway is the rugged Turkey Creek Canyon that serves as one pathway into the Canelo Hills. The Canelos themselves are “rolling” hills, typically covered in grasses and scrub oak woodlands with the north end extending to the Santa Rita Mountains, and the south end to Parker Canyon Lake and the Mexican border. West of the Canelo Hills are the grasslands of the San Rafael Valley that extend to the Patagonia Mountains and south into Mexico. These grasslands consist largely of privately owned cattle ranches. Water tanks built by ranchers are found through the Canelo Hills and the San Rafael Valley and provide water not only for livestock, but for wildlife as well. Historically, the Canelo Hills has also served as a corridor for bears migrating in and out of the Huachucas from the Patagonias and the Santa Rita Mountains.

Prehistoric and Extinct Bears in the Huachuca Mountains

The earliest recorded bear in Arizona is a specimen of the species *Agriotherium*, a rare fossil mammal that was found along the lower San Pedro River near Redington at a site known as Old Cabin. Little is known about the life history of this massive animal, but the San Pedro specimen dates from the middle Pliocene - approximately five million years ago (Smith, 1968: 49-51, Lindsay and Tessman, 1974: 6, Brown, 1993: 10-11; and Peachy, Personal correspondence: 2004). Considering the location of this fossil bear find, it is quite possible that the Huachuca Mountains were also home to this prehistoric species.

The documented history of bears in the Huachuca Mountains is one that began during the Late Pleistocene Epoch. In 1999, Steve Wilsey, a caver exploring Pyeatt Cave in the northern Huachucas discovered the mandible bone of what proved to be a Giant short-faced bear, *Arctodus simus*. Wilsey informed Nick Zapplewski of the Sam Noble Museum of Natural History in Oklahoma who brought in a team of cave paleontologists to investigate. Along with a geologist, William Peachy, these scientists carried out a preliminary field investigation. Several additional limb bones of this animal were eventually discovered. The remains of this short-faced bear were dated at no less than 20,000 years. This discovery was significant because with the notable exception of the La Brea tar pits in California, short-faced bear finds in North America have been rare. *Arctodus simus* was the largest carnivorous animal to ever live in North America. It occurred throughout the continent from Alaska to the central Mexico, east to Virginia and west to California. The “bull dog bear,” as it is also known due to its massive head

size, was short in body, but long in leg. With a powerful musculature, it was a huge animal measuring more than five feet at the shoulders and over fifteen feet tall when standing. Some short-faced bears exceeded a ton in weight. Large and swift, this bear is credited by some as having been the foremost carnivore and predator to have ever inhabited the Americas. Some paleontologists have even speculated that it possibly discouraged humans from inhabiting the North American continent for many years (Brown, 1993: 12). But in North America *Arctodus simus* – a member of the *Ursidae* subfamily *Tremarctinae* (“Short-Muzzled Bears”) – proved to be an evolutionary dead-end. Although giving rise to the Spectacled bears (*Tremarctos ornatus*) of South America, the bloodline of *Arctodus simus* ended elsewhere in the world. In its place the genera *Ursus* – the “true bears” – the brown bears or grizzlies and the black bears – rose to prominence throughout the world including North America and the American southwest (Brown: 17).

The grizzly bear, *Ursus arctos*, was once found throughout the Western United States including Arizona and in every Sky Island Mountain range of southeastern portion of the state (see Brown, 1985, and Householder, 1961). Often these bears are listed in the records as being silvertips, brown bears, or most commonly in southeastern Arizona as “cinnamon” bears. The historical existence of the grizzly in the Huachuca Mountains, and in the Canelo Hills, is well documented.

David E. Brown, in his book *The Grizzly in the Southwest* gives an account of a grizzly killed at the northern end of the Huachuca Mountains in 1867 by John Spring, a soldier stationed at Camp Wallen. According to Spring:

The bear was not large, probably not over three years old, and could hardly weigh more than 500 pounds “on the hoof”; but its meat was tender and juicy. The skin I have still, and regret to say that it contains more bullet holes than the desired number, and certainly far more than are generally made in the killing of a cinnamon bear. (In Brown, 1985: 43-44).

Another incident involving a grizzly bear and a market hunter from Tombstone occurred in 1892. The following article appeared in the *Tombstone Epitaph* under the title, “A Bear Story:”

John Waters had a narrow escape from being annihilated by a bear in the Huachuca Mountains on Sunday last. He had killed a she-bear and one cub and was removing the entrails from the former, when he heard a noise above him on the trail. His first thought was that a herd of cattle were stampeding somewhere in the vicinity. He looked up from his work and saw within thirty feet of him an immense bear coming at him. He seized the rifle, which was at his side, and fired, but missed the mark. The enraged animal came straight on without a halt and when within ten feet of Waters, he fired again, the bullet striking bruin right between and a little above the eyes. Waters had hunted bear long enough to have the sense to jump to one side and let the brute have the right of way. As soon as he was struck he tumbled like a huge rock, and the momentum carried him past where Waters stood. He was a giant and weighed 800 pounds. His skin was purchased by O.C. Smith, who will send it east to be tanned. The bear was a silvertip and the skin was a magnificent one. (*Tombstone Epitaph*, October 9, 1892).

Since the article singles out this bear as being a “silvertip,” it seems highly probable that the other two bears Waters killed that day were black bears. C.J. Bahre in his article “Land Use History of the Research Ranch, Elgin, Arizona,” also refers to this bear and states that it was the last grizzly recorded from the Huachuca Mountains (Bahre, 1977:31). I found no later references to grizzlies in the Huachuca Mountains that would dispute this claim.

A somewhat less reliable reference to the presence of grizzly bears in the Huachuca Mountains is Grace McCool, a regular feature writer for the *Gateway Times* newspaper of Sierra Vista back in the 1960s. In an article entitled “Bear Canyon Campsite,” – a location in the Huachuca Mountains – she wrote:

Bear Canyon received its name from the man-eating cinnamon bears common in Southeastern Arizona, until 70 years ago. They were all killed before 1900. However a few harmless little black bears still live in the area. Mr. Joerger was chased up a tree by a mother bear, and her cubs, a few years back while on a hike to Miller’s Peak (McCool, 1960).

The “man-eating cinnamon” bears McCool refers to are undoubtedly grizzlies. Leonard Taylor in his *Hiker’s Guide to the Huachuca Mountains* also states that Bear Canyon is “thought to be named after the grizzly bear, which once roamed this area before the turn of the century.” (Taylor, 1991:35).

Grizzly bears also inhabited the Canelo Hills, in fact the hills themselves receive their name from the great bears. According to Addie Musgrave Parker, former postmistress for Canelo, the local hills were originally called La Sierra de los Osos Canellos – “Mountain of the Cinnamon Bears” (Parker, Arizona Historical Society, January 27, 1923).

Bob Householder, in his paper entitled “The Grizzly Bear in Arizona,” wrote “The Santa Cruz River bottom was a favorite hangout for these bears, all the way from Nogales to the Tucson area.” (Householder, 1961, Part I: 18). The area that he is speaking of includes the San Rafael Valley near the Canelo Hills. Householder quite possibly used information provided by the noted hunter and outdoor writer Jack O’Conner who wrote in his book *Hunting in the Southwest*, “There were grizzlies in the Santa Cruz Valley of southern Arizona, as several old timers have informed me.” (O’Conner, 1945:214).

These references to grizzlies in the Canelo Hills and the Santa Cruz River valleys are especially interesting in that these areas are low hills and riparian grasslands. Other early writers also noted that grizzlies were animals of the grasslands throughout their range in the United States. It would appear that the same can be said for the grizzlies that inhabited Arizona as well.

Grizzly bears were hunted relentlessly in the American west as a means to protect livestock interests. In reality, the policy pursued by ranchers was not one of control, but of extermination. Not only grizzlies, but also black bears, wolves, mountain lions, and other predatory animals were targeted for eradication. By the turn of the century, grizzly bear numbers were much reduced throughout the west and in some areas – the Huachuca Mountains for example – the great bear was already extirpated. The federal government had long supported this extermination policy, and in 1914, the U.S. Congress took the final step towards completely eliminating the grizzly bear when it authorized the establishment of the Predatory Animal and Rodent Control (PARC) branch of the Biological Survey of the U.S. Department of Agriculture. Money was appropriated to hire an army of three hundred professional hunters whose sole task it was to kill predators (Brown, 1985: 125-128). These men did their job well and grizzly bear was soon on the path to extinction in the American Southwest. The last grizzly killed in Arizona was taken by a government hunter southeast of Clifton on September 13, 1935 (Brown, 1985: 157-158).

The Ecology of Black Bears in the Huachuca Mountains

Prehistoric black bear remains have been found in the Canelo Hills at a site known as Papago Springs. Quentin Roosevelt – the grandson of former president Theodore Roosevelt – and J.W. Burden first discovered this site in 1934 and it proved to be a treasure trove for paleontologists. A list of the fauna found at Papago Springs included 29 genera and 34 species or subspecies of mammals. Among these was the largely complete skull of late Pleistocene age black bear. Initially this animal was thought to be a unique subspecies and was named *Ursus americanus gentryi*. More recently, however, paleontologists have determined it not be a subspecies but simply an early specimen of *Ursus americanus* (Skinner, 1942: 159-163; see also Czaplewski et al, 1999: 16-17). The specific time period of this fossil was placed within the final glacial event, the Wisconsin stage, making this early black bear approximately 26,000 years old.

While it is not within the scope of this paper to provide a detailed discussion of the life history of black bears, a general overview of the ecology of this species is important in order to understand the unique dynamics of the bear population currently living in the Huachucas.² Such information will provide a foundation for a number of issues that will be addressed later which have a direct impact on the health, welfare, and indeed, the very survival of bears in this mountain range.

From October 5-9, 1982, Al LeCount, then head of the Bear Study Team for the Research Branch of the Arizona Game and Fish Department (hereafter AGFD) led a reconnaissance team of other three biologists into the Huachuca Mountains in an attempt to obtain increased information on bear numbers. This effort, as brief and as informal as it was, is the only survey ever conducted on black bears in the Huachuca Mountains. For five days these biologists walked 55 miles over 16 survey routes recording bear sign and collecting scat. For the purposes of this paper I have relied heavily on the unpublished report of this project (LeCount, 1984a).

Other than LeCount's survey, little other black bear research has been conducted in the Huachuca Mountains. In 1970 or 1971 an abortive effort was first made when a mountain lion research team under the leadership of Fort Huachuca biologist Larry Ethelbah and with the assistance of famed houndsman Dale Lee captured and ear-tagged three bears. The project, however, ended that very year and none of the bears were ever recovered (Ethelbah, Personal communication: 2006). More recently, since 1995, biologists have operated a number of remote cameras at Coronado National Memorial. These cameras have taken a number of photos of black bears and Barbara Alberti, the former lead biologist at Coronado National Memorial has been kind enough to share with me these photos and related data.

Additional information is taken from black bear studies from other parts of the state, especially LeCount's Central Arizona bear research that was conducted in the Four Peaks area of the southern portion of the Mazatzal Mountains (LeCount, 1982b, 1983, 1984b, 1987, and LeCount, Smith, and Wegge, 1984). The habitat in this study area is similar to that of the Huachuca Mountains. Also valuable was the unpublished final report and published papers of a one-year (1980-81) research project on black bears in the Pinaleno Mountains conducted by Thomas E.

Waddell and David E. Brown (Waddell and Brown, 1981, 1984a and 1984b). The Pinaleno Mountains, like the Huachuca Mountains, are located in southeastern Arizona and are considered to be a sky island mountain range though the average elevation of this mountain is considerably higher. In addition, I have also utilized other published and unpublished reports, personal interviews, and data gathered from my own field work and notes.

The AGFD estimates that there are approximately 2,500 to 4,000 black bears in the state. The discrepancy between these figures reflects the fact that large wide-ranging carnivores are difficult to count and that consequently the department is simply making its best “educated guess” based on the scant research data that is available to it. The same is true for bear populations in the Huachuca Mountains. The estimates for this population range from a possible low of 25 animals to a possible high of 60. In its “Hunting Report: Game Management Unit 35 A,” – this unit being specifically the Huachuca Mountains – AGFD states that the population, in units 35 A and 35 B, is estimated at 30-60 resident bears with an unknown number of transient animals (Arizona Game and Fish, 2003). Unit 35 B is the Patagonia Mountains that are separated from the Huachuca Mountains by the Canelo Hills and the San Rafael Valley. Since the Huachucas and the Patagonias are similar in habitat and are more or less connected by grassland and riparian corridors that wildlife clearly traverse, AGFD essentially considers the bears living in these ranges to be one population. As noted earlier, the only bear study ever conducted in the Huachuca Mountains was that of LeCount in 1982 and published two years later – over twenty years ago. At that time LeCount estimated – based primarily on the amount of bear sign observed and his experience with studying bears in other Arizona mountain ranges – that there were 25 bears – plus or minus 5 animals – inhabiting the Huachuca Mountains (LeCount, 1984a: 7). LeCount believes that this figure may still be accurate since he felt that the bear population was then at capacity for the amount of adequate habitat available for them (LeCount, Personal communication: 2004). John Millican, the current AGFD Wildlife Manager for the area estimates, however, that the present population is roughly 30 to 50 resident bears, again with an unknown number of transient bears moving into and out of the area on a yearly basis. This number includes bears found in the Canelo Hills (Millican, Personal communication: 2004).

The spring emergence from their dens following winter hibernation is generally considered to be the start of a season in the life of a black bear. In Arizona, black bears emerge from their dens in March or April. Males emerge first. Females without cubs follow shortly after. Females with newborn cubs remain at the den site until early May (LeCount, 1988: 17).

Black bear cubs are born in the den in late January or early February and weigh less than eight ounces at birth. In Arizona the average litter size is two cubs, occasionally three. The average sex ratio in black bear litters is about 50-50 male to female. Upon emergence from the den, cubs average six pounds in weight (LeCount, 1984b: 5-6, LeCount, 1988: 17). By the end of the summer the cubs will be weaned, but will den with their mother during their first year. Black bear mothers produce cubs every second year. Black bear reproduction rates are among the lowest of any species of mammal in North America.

Starvation is generally the main cause of mortality for black bear cubs, especially in periods of food shortages. Cubs that die from starvation usually do so within the first two months upon

emerging from dens (Fair, 1990: 75). LeCount is credited as being one of the few biologists to study the causes of cub mortality in black bears (Rogers, 1993: 96). In his Central Arizona study he found that the infant mortality rate for black bear cubs is approximately 42% in the first year. He hypothesized that starvation was main cause of this mortality rate (LeCount, 1984b: 6-7).

Other than starvation, the biggest threat to black bear cubs is the possibility of being killed and eaten by other bears, most notably males. Such killing of cubs by adult males is usually limited to offspring that they themselves did not sire, probably for the purpose of enhancing the chances of passing down their own genes. In his study of black bears in north central Arizona, LeCount found that that leading cause of cub mortality was cannibalism. In this study, 7 of 8 determined deaths of radio-collared cubs resulted from this cause. (LeCount, 1987: 75-76). Black bear mothers will defend their cubs against attack by other bears. Most commonly, however, they take preemptive measures to avoid such conflict. One strategy documented in the Huachuca Mountains by Sue Morse, founder and director of Keeping Track – a Vermont-based community wildlife monitoring program - is the utilization of “babysitter trees” - a term coined by Morse. These trees, usually large conifers, are used as “daycare centers” where a cub can stay in relative safety while its mother feeds nearby. Morse discovered one such tree in the Huachuca Mountains in the 1980s. This tree is a large Arizona pine – approximately 65 feet in height and nine feet in circumference - and is located near a permanent spring. Tracks worn into the earth – perhaps by generations of bears – lead right up to the base of the tree. Elsewhere in the eastern United States, Morse has actually observed a mother black bear sending her three cubs up such a babysitter tree. The female bear did so by huffing and snorting a series of vocalizations and then slapping and scratching the tree as if to underscore her instructions. In such cases the cubs will remain in the topmost branches of the tree until the mother calls them down upon her return (Morse, 2000: 17).

Black bear cubs stay with their mothers through the first year, denning with her for their first winter, then into the following spring. Family break-ups occur when the yearlings are about seventeen months old (Fair, 1990: 71). In 1991 wildlife officials at Fort Huachuca trapped a female and her two cubs, which they classified as being “nuisance bears.” This family was relocated to the Chiricahua Mountains. It was believed that the cubs were about 1 ½ years old (Stone, Personal communication: 2004).

Black bears are secretive animals that go to great pains to avoid contact with humans and other bears. They are active throughout the day but especially so in the late evenings and early mornings. During the daytime black bears often utilize “day beds” - dug and cleared depressions in the ground several inches deep in the center where the bear will sleep or rest. Black bear beds normally occur in thick cover and are usually up against large trees, logs or boulders. Cheryl Mollohan, in her study of black bears in northern Arizona found that bed sites were chosen primarily for security and that vegetative quality, topography and slope were the primary factors in determining selection sites (Mollohan, 1987: 146). If the bear remains in the area, two or three day beds may be found in close proximity to each other. LeCount believes that such sites do not necessarily indicate the presence of more than one bear, but more likely one individual animal staying in the same location over several days. (LeCount, 1986:17). Black bears of all sizes are also excellent climbers and may also rest or sleep draped over a branch of a tree or often in association with a “nest.” Black bear nests are made when the bear reaches out, grasps, pulls in

to itself and breaks numerous nearby branches of a tree that it is in. Some biologists believe that nests are the product of feeding activity only and that bears do not actually sleep in them. Other biologists believe that bear nests are exactly that, places where a bear actually rests or sleeps. Certainly the branches provide the bear a greater measure of support so that it does not fall, and also provides a higher degree of visual camouflage as well from prying eyes below. Given the incredible intelligence of bears, and the fact that most nest trees are not marked in any way – something that would draw attention especially to a young or subadult animal desiring some peace and quiet – I do not find this possibility unfeasible. As in the case of day beds, several nests are often found in close proximity to each other and generally reflect the presence of only one animal. In the spring of 2004 I found one such cluster of black bear nests – probably from the previous year - in a side canyon off of Garden Canyon in the Huachuca Mountains. Three nests were located in a single tree and a fourth nest in an adjacent tree. The trees were silver leaf oaks that were about 50 feet in height. The nests were all located about 30 feet from the ground. The four nests were clustered close enough together that I was able to photograph all four with one camera shot. I located this site when I first came across a large number of broken branches and twigs at the base of the trees that had fallen during the construction of the nests. This site was located very near a spring and the babysitter tree discussed earlier.

Black bears are generally solitary animals. With the exception of mothers with cubs, they spend most of their time alone. Female black bears, especially those with cubs, tend to be somewhat territorial. Each possesses a distinct area of land it considers home and from which it excludes other adult bears, and especially other females. They do so by constantly marking the area with their urine. Adult males are not as territorial, though they go through great efforts to avoid other male bears. In addition, both male and female black bears possess definite home ranges – larger foraging areas surrounding the defended territory. Home ranges often overlap, and a male's home range will generally overlap that of several females. In addition, the home ranges of black bear males are generally much larger than those of females (see Fair, 1990: 73-75). More will be said about the home ranges bears in Arizona and the Huachuca Mountains bears later in this section.

Although classified as carnivores, black bears are omnivores and are opportunistic feeders. In other words, they will eat a wide variety of foods. 75% of a bear's diet in Arizona, however, is plant material. LeCount recorded 21 species of plant material utilized by bears in the Four Peaks study area (LeCount, Smith, and Wegge, 1984: 7). Most of these plants are also found in the Huachuca Mountains and bears in this range undoubtedly consume and enjoy an equally varied menu.

Throughout the spring and into the early summer green grass comprises the bulk of a black bear's diet. Although LeCount's Bear Study Team found little evidence in the scat they examined of extensive feeding on grass by bears in the Huachuca Mountains, it was assumed such grass remains in scat simply deteriorated and had disappeared by fall (LeCount, 1984a: 9-10). Undoubtedly bears in the Huachuca Mountains differ little from those in other Arizona mountain ranges in this respect. In late April and early May of 2004 I made my own reconnaissance of three separate locations in the Huachuca Mountains looking for indications of bear activity at lower elevations. Specifically I examined Bear Canyon, Miller Canyon, and McClure Springs. All three of these areas generally show considerable bear sign by early June.

Despite the fact that all three locations had an abundance of water and green grass, I found no evidence that bears had yet been using these resources. Observations made by Mark Pretti, a former naturalist at the Ramsey Canyon Preserve, seem to confirm this. Pretti reports finding scat in April and early June at higher elevations in the Huachuclas that was comprised entirely of grass, yet none at the lower elevations later in the spring (Pretti, Personal communication: 2004). Quite possibly bears emerge from hibernation at higher elevations and simply stay near their den sites and consume grass in the early spring then later move down the mountain to take advantage of other food sources.

It should be noted that there are other factors that combine to keep bears near their den sites upon emerging from hibernation. Black bears shed their foot pads during hibernation and most certainly have sensitive feet for a period of time which serves to discourage movement. Although this phenomenon has been recorded primarily in bears living in colder climates, LeCount states that Arizona bears also shed their pads (LeCount, Personal communication, 2004. See also Rogers, 1974, and Beecham and Rohlman, 1994: 192-193). Another factor is that after many months of inactivity, bears are simply lethargic for at least several weeks. In addition, females with cubs are probably cautious over the prospects of taking their newborns into non-familiar surroundings and perhaps into the territory of a predatory male.

In the late spring and summer Huachucla Mountains bears feed primarily on manzanita berries and insects. The bears find insects by turning over rocks or by tearing apart rotten logs and stumps. This activity seems to pick up after the summer monsoons begin in July and various insects begin to lay their eggs. Insects, especially ants, form most of a bear's non-vegetative diet and provide an important source of protein. In 1982 local residents informed LeCount that bears also regularly came into orchards in Ramsey and Miller Canyons to feed on apples when they are ripe (LeCount, 1984a: 5). Over the years the orchards in Ramsey Canyon, at least those on the Ramsey Canyon Reserve, has been allowed to revert back to the wild but still produce fruit. Bears still frequent these orchards in July where they feed not only on apples, but plums and apricots as well (Pretti: 2004). In the spring of 2004 I found bear scat in Ramsey Canyon that contained apricot pits. In other areas in Arizona black bears also feed on a variety of other natural "soft" mast foods, especially berries like madrone berries, humbleberries, raspberries, service berries, pigeonberries, as well as chokecherries, currants, and ripened grapes. In the lower elevations, squawroot is also consumed. Black bears may also venture into the semi-desert grasslands to feed on prickly pear fruit. In the summers of 2002 through 2004 Marty Teugel, a biologist who was studying box turtles for Arizona Game and Fish at the time, reported finding evidence of bears working the mesquite groves in the flat grasslands located on the eastern base of the Huachucla Mountains near the aerostat station on Fort Huachucla (Teugel, Personal interview, 2005). These were dry summers and the fact that the bears were feeding on mesquite beans in the more open areas at such low elevations, suggest that they probably could not find food higher up.

The stripping of bark from fir trees and the "raking" with their incisors to eat the cambium layer beneath is another spring feeding activity that has been observed in other Arizona bear populations, particularly in the Pinalena Mountains (Waddell and Brown, 1981:4). This tree stripping, however, generally seems uncommon in the state (LeCount, 1986: 17). Hoffmeister and Goodpaster mention this in association with bears in the Huachucla Mountains, but it appears

to be an insignificant factor in regard to both the health of bears and trees (Hoffmeister and Goodpaster, 1954: 70).

Carrion is another source of food consumed by black bears whenever they can find it. In LeCount's reconnaissance of the Huachuca Mountains he found that 5% of the bear scat he collected contained deer hair whereas only 2% of the scat he collected on other studies did. This somewhat higher percentage was attributed to bears finding and utilizing mountain lion kills (LeCount, 1984a: 6). Bear predation on wild ungulates, most commonly deer fawns and elk calves in the spring, has also been documented in Arizona. Cases of predation, however, seem relatively uncommon (LeCount, 1986: 81-84). Even more uncommon, though not unheard of, is black bear depredation on domestic livestock. I have heard of no cases of livestock depredation that were attributed to bears in the Huachuca Mountains, though one domesticated duck was apparently lost to a bear in 1999 (Millican to Haynes, 1999). It is my guess that most reports of livestock depredation in other areas of the state were situations where the bear found and claimed the carcass of an animal that had died of other causes (See Pavlik, 1997: 481).

In the late summer and fall, Huachuca Mountain's bears feed primarily on juniper berries. When bears find an area with a large number of berry producing juniper trees, they will stay in that area until the food supply is exhausted. LeCount's team speculated that bears in the Huachuca Mountains probably moved into the juniper areas in August and September, and stayed there at least into October when they conducted their study (LeCount, 1984a: 5).

On October 20, 2002, my brother, Richard Pavlik, and I observed a bear at a water tank in the Canelo Hills. We were duck hunting at this tank when the bear walked out of a nearby canyon to the tank and drank from it. The bear then passed within 20 feet of us and re-entered the canyon. The entire event took about five minutes and the bear apparently never saw or caught scent of us. A closer examination of the area revealed a large amount of bear sign. The tank was twenty feet adjacent to a small stand of juniper and oak trees where the majority of the bear sign was located. At the base of the largest juniper, a tree that measured exactly seven feet in diameter at the base, and thirty feet in height, I found the day bed of this bear. Surrounding this day bed were 21 separate scat piles of various ages, including one pile that I estimate was comprised of at least six different deposits. Why this bear choose to use this exact spot repeatedly is a mystery. All of this scat was located within a twenty square foot area, although other scat deposits were found throughout the general area. This scat was comprised primarily of juniper berries. It was clear that this bear had been staying in this area for quite some time, several weeks at least. I continued to monitor this site and found additional fresh scat until mid-November. In all, this bear stayed in this small area for almost two months. It is interesting to note that this location is relatively open country and that the stock tank is a popular spot for duck hunters at this time of year. I would guess that hunters "jump" this tank 4 to 5 times a week during the season. Not more than five minutes before the bear's arrival we had fired off several shots ourselves. The abundance of food and the availability of a dependable water source in a drought year combined to temper any concerns this bear might have had regarding the presence of human – even humans shooting firearms.

Another important source of fall food for black bears in the Huachuca Mountains has historically been acorns – so-called "hard mast." There are at least eight species of acorn-bearing oaks that

grow in the Huachuca Mountains, among them, Emory oak (*Quercus emoryi*) Arizona oak (*Q. arizonica*), Mexican blue oak (*Q. oblongifolia*), silver leaf oak (*Q. hypoleucoides*), and Gambel oak (*Q. gambeli*). In good years bears feed extensively on acorns during the late summer months. Oaks, however, are extremely dependent on winter precipitation, particularly snow that sets on the ground and seeps slowly and deeply into the earth. In years of little or no winter precipitation, acorn production may completely fail. Such has been the case in recent years due to a prolonged drought that will be discussed later in this paper. In sum, it can be said that bears have over the past ten years generally faced serious acorn shortages in the Huachuca Mountains. Quite possibly bears have learned not to depend on acorns as a food staple in the Huachuca Mountains and now rely far more extensively on manzanita and juniper berries.

Lynn Rogers, one of the nation's foremost authorities on black bears, points out that despite the varied food habits of bears, the list of foods to which they can turn to during shortages of preferred foods is not as long as generally is thought (Rogers, 1976: 432). In the Huachuca Mountains manzanita and juniper berries, and acorns, comprise almost the totality of critical diet. Moreover, it is impossible to overstate the importance of mast consumption – soft and hard - in the fall for black bears. This is the time of the year when bears engage in over-eating in order to “bulk up” for hibernation. The weight gained, or not gained, at this time of year might very well mean the difference between survival or death during the dormant months of hibernation, especially for older bears. In addition, the availability of mast also effect the condition of pregnant females going into hibernation, and consequently, the success or failure of cub production, and ultimately, the survival of the cubs that are born (Rogers, 1976: 433-436). Research conducted recently in New Mexico, for example, indicates a strong correlation between acorn production and bear reproductive success (Costello, 2001: 47).

Black bears also require sources of fresh drinking water. In the Huachuca Mountains there are a number of perennial streams, such as Bear, Ramsey, and Cave Creeks. These streams flow steadily for much of the year and generally contain at least some pools of water during drier periods. Also important to wildlife are the springs that exist throughout the range. Many of these offer dependable water sources throughout the year. Adequate summer monsoons, and especially winter precipitation, are vital factors in assuring the well being of bear populations in Arizona.

In addition to natural smaller bodies of water, man-made stock tanks and ponds are also frequented by black bears and are vital to their well-being. Bears also use such water sources as a means to cool off during warmer periods and have occasionally been observed – including females with cubs – swimming in water ponds at both the Coronado National Memorial and Ramsey Canyon (Alberti, Personal Communication: 2004; Pretti, Personal Communication: 2004)

To the immediate southwest of the Huachuca Mountains is Parker Canyon Lake, a popular location for many human anglers in southern Arizona, and for black bears. This lake has 130 surface acres of water. Although bears certainly use this year-round dependable water source, sightings are rare. Two different bears, for example, were seen during the spring of 2004 (Bustos, Personal communication: 2004). Bears use the front of the lake and occasionally get into the garbage cans at the marina in search of entails carelessly deposited there by fishermen.

Such occurrences, however, are rare and marina personnel demonstrate great tolerance for any such incidents. More often bears restrict their use of the lake to the back end where water levels are lower and consequently human activity is minimal. In the summers of 2004 and 2005 I found fresh bear sign in this location. An abundance of manzanita berries was also present and the bears were definitely utilizing this food source. Collins Canyon, Parker Canyon, and Turkey Creek are also located to the north of Parker Canyon Lake and both provide water as well as corridors for black bears into the Canelo Hills and presumably to the Patagonia Mountains.

To the east of the Huachuca Mountains is the San Pedro River. In addition to providing the promise of water and food, the San Pedro has also historically served as a major corridor for bears passing in and out of the Huachuca Mountains to other mountain ranges in southeastern Arizona and Mexico. There are numerous reports of bears using the San Pedro River, including one visual sighting reported to me in the spring of 2004. Unfortunately urban development and the existence of a major highway separating the Huachuca Mountains from the San Pedro have combined to form a potentially deadly gauntlet for any bear attempting to travel in that direction. More will be said about this problem later in this paper.

The availability or absence of mast and water greatly affects the size of the home range of black bears – the area in which an animal travels in the scope of normal day to day activities. LeCount in his study of bears in the vicinity of Four Peaks in the southern portion of the Mazatzal Mountains found the mean home range size to vary according to sex and age. Subadults – bears less than four years old - demonstrated the greatest home range – 16.2 square miles. The home range of adult males was 11.2 square miles. The home ranges of subadult and adult females were considerably smaller, 6.9 and 5.0 square miles respectively (LeCount, Smith, and Wegge, 1984: 13, 15). Research conducted in other parts of the United States also shows that males, and particularly subadult males, tend to travel the greatest distances. Often subadult males are pushed out of the area from which they were born by other adult male and consequently are forced to go in search of their own home range. This often brings them in contact, and oftentimes conflict, with other bears and humans. The actual home ranges of the Four Peak's bears tended to be more restricted than in other studies. LeCount noted that habitat diversity and quality influences bear migration pattern and that the Four Peaks area provided all of the essentials of high quality bear habitat in terms of food, water, cover, and space (LeCount, Smith, and Wegge, 1984:16). In effect, the Four Peaks bears did not have to travel. LeCount also found evidence of bear movement in the Huachuca Mountains, and speculated that many bears moved into and actually concentrated in certain portions of the mountains to take advantage of specific food items at different times of the year (LeCount, 1984a: 6). LeCount made no attempt to estimate the size of the home ranges of bears living in the Huachuca Mountains.

Also unknown is the extent to which bears in the Huachuca Mountains move outside their home range – particularly back and forth between the Huachucas and other nearby mountain ranges. Bears possess well-developed navigational abilities and often travel extensively, especially males in search of breeding opportunities. LeCount, in his study of bears in the Four Peaks area found considerable migration of males from the Mazatzal Mountains to other nearby ranges (LeCount, Smith, and Wegge, 1984: 15). Movement of bears between the Huachucas and the Santa Rita and/or the Patagonia Mountains certainly occurs and requires the animals to travel through the

Canelo Hills and across the San Rafael Valley. Another route to the Santa Rita Mountains is north of the Canelo Hills through the grasslands of the Audubon Research Ranch. A bear was sighted on the ranch in May, 2001 by Audubon biologists Bill Branon and Linda Kennedy. Volunteers from Sky Island Alliance have also found bear tracks there on two other occasions (Kennedy, Personal interview: 2006). In January 2005, another bear spent an evening in a backyard tree belonging Jane Woods who lives two miles east of Elgin very near the Audubon Research Ranch. A nearby canyon leads into the Mustang Mountains (Woods, Personal Interview: 2006). It is highly likely that bears regularly travel to and from the Huachuca Mountains and the Whetstone Mountains to the north through the Mustangs and Rain Valley. The Whetstones are also thought to be good habitat and probably has its own small resident population (Childs, Personal communication: 2004).

Steve Grombly is a long time resident of the Huachuca Mountains area and an avid bear hunter who spends a great deal of time in the field. Grombly has also seen a number of bears in the Canelo Hills and has heard of several other bear sightings there as well. Grombly believes that many of the bears that have been seen in the Canelo Hills are not animals simply passing through, but rather, are actually residents of this area. He directed me to one small canyon in the Canelo Hills that he believed was home to a resident male and at least two females that regularly produce cubs (Grombly, Personal communication: 2006). I searched this canyon early in the summer of 2006 and found no bear sign. However, the stock tank in this canyon was dry and apparently had been dry for quite some time. I personally believe a more or less permanent water source would be necessary to support any resident population of bears in the Canelo Hills. This canyon incidentally, is located approximately two miles from the stock tank where my brother and I sighted the before mentioned bear in the fall of 2002. This tank has also been dry during the summer months in recent years.

During the course of my research I learned of five bears that were killed on highways within a twenty-mile radius of the Huachuca Mountains – well within the potential movement range of the species. In August of 1989, an automobile killed a black bear on Highway 82 in Rain Valley. In the summer of 2003, another bear was killed on the highway just north of the Mule Mountain tunnel near Bisbee. A third bear was also killed in May of 2004 on Highway 191 north of the town of Elfrida (Fulk, Personal communication: 2004). In addition, two bears – which will be discussed in more detail later in this paper - were killed on highways within the Sierra Vista city limits. All five of these black bears were adult or subadult males and thus provide evidence of bear movement to and from the Huachuca Mountains and within other mountain ranges in southeastern Arizona.

On August 11, 2003, a black bear that appeared to be wearing an orange ear tag was photographed by a remote camera at the Coronado National Memorial. In the summer of 2000, 19 bears, mostly cubs, were captured in the city of Phoenix. After being cared for at the Southwest Wildlife Rehabilitation Center for a period of time, these bears were fitted with orange ear transmitters and released in the Four Peaks area of the Mazatzal Mountains. Unfortunately these transmitters failed after four to six months. Possibly the bear photographed at the Coronado National Memorial was one of these so-called “urban cubs” although Stan Cunningham, the current main black bear biologist for AGFD, thinks this to be unlikely (Cunningham, Personal communication: 2005). AGFD does, however, place ear tags on

nuisance bears that are caught and released and it seems most likely that the bear photographed at the Coronado National Memorial might have been such an animal. Still, the origin and history of this bear remains a mystery.

Black bears also move between mountain ranges in southeastern Arizona and Mexico. In December of 2000, AGFD captured and euthanized a two-year old female bear in the town of Patagonia that had an ear tag that was thought to be of Mexican origin (Millican, Personal communication: 2004). LeCount believes that it is just “common sense” to assume that movement of bears occur between mountain ranges in southeastern Arizona, including the Huachuca Mountains, and ranges in Mexico (LeCount, Personal communication: 2004). In Mexico bears are classified as being “endangered of extinction” and are proved with legal protection – at least on paper. In reality bears in Mexico continue to suffer habitat loss and are also killed by ranchers, poachers and for illegal trade (Corona et al. 2005: 444; See also Leopold, 1959: 411-416). In January, 2003 for example, four bears were found dead on a ranch in the Sierra Cananea Mountains of Sonora less than 10 miles southwest of the Coronado Memorial. The cause of death for these bears was never determined but poisoning was suspected. These bears were cut open – possibly to remove the gall bladders which are extremely valuable for sale on the Asian black market – and left to rot (Alberti, Personal communication: 2004; 2006). Cora Varas-Nelson informed me of another bear she knows was poisoned in 2002 by ranchers in the Los Altos Mountains and has heard of other such cases (Varas-Nelson, Personal communication: 2006). The poisoning of bears under the guise of protecting livestock appears to be a rather common practice in Sonora.

The question of black bear migration between the Huachuca Mountains and other mountain ranges in southeastern Arizona and Mexico raises the issue of so-called “transient” bears. As noted earlier, AGFD factored in an “unknown” number of transient animals when estimating the bear population in Units 35 A and 35 B. But what exactly is a transient bear? Is it a bear that simply wanders through the Huachuca Mountains on its way to other locations? Is it a bear that makes a seasonal or regular yearly visit to the Huachuca Mountains in search of feeding opportunities? More will be said about transient bears later in this paper.

Black bears not only move from mountain range to mountain range in southeastern Arizona, but they undoubtedly interbreed within these ranges as well. Very little is known of the genetic relationship of bears in the sky islands. This gap in our knowledge, however, might soon be filled. Cora Varas-Nelson, a doctoral student in Wildlife and Fisheries at the University of Arizona, is currently collecting and analyzing black bear DNA samples from four Arizona sky island ranges: the Pinalenos, Galiuros, Chiricahuas, and the Huachucas, and three sky island ranges in Mexico: the Sierra Ajos, Sierra San Luis, and the Sierra los Chinos. The purpose of her research is to determine molecular genetic variation within the black bear population of these mountains. In sum, she hopes to be able to define population structure, reveal differentiation among the populations, and possibly show the gene flow from range to range (Varas-Nelson, Personal communication: 2004). Such research might help answer many critical questions including whether a specific population of bears even exists in the Huachuca Mountains. Quite possibly we may find there is one “sky island black bear population” with a genetic flow far greater than we imagined. If true, this would – or at least *should* – change the way we think about and attempt to manage black bears in southeastern Arizona. One factor that complicates,

and perhaps limits somewhat, such research is that in the past the AGFD has relocated a large number of so-called nuisance bears from one mountain range to another, thus artificially mixing the gene pool.

In Arizona, the black bear breeding season – when the females come into estrus (ready to ovulate, receptive to males, and able to become pregnant) is from May through early July (LeCount, 1984b: 2). This is earlier than in other parts of the United States and is probably due to ecological factors such as food and water availability. Habitat quality also determines if a bear will become pregnant after breeding. Black bears are “delayed implanters.” This means that an egg multiplies to about 200 cells, which are then held in suspension until November. If the female is in good physical condition, the egg is then implanted and a pregnancy occurs. Gestation continues about 90 days. If the female is in poor physical condition, the cell bundle is re-absorbed and she does not become pregnant, though she may breed again the following summer (LeCount, 1988: 17). The minimum breeding age for female black bear females is approximately four years. In Arizona, black bear females may produce cubs up to the age of 18 years, quite possibly much longer. Habitat quality also appears to be an important factor in determining the minimum and maximum breeding ages in black bears. In his 1982 study LeCount assumed that the general bear population of the Huachuca Mountains was a “stable older age structured population” that was comprised of approximately one-third subadults and two-thirds adult bears (LeCount, 1984a: 7). LeCount also estimated the total number of adult female bears in the Huachuca Mountains as being small, consisting of perhaps 8 or 9 animals – a figure that represents about one-half of the estimated total adult population (LeCount, 1984a: 9). This would also represent the total number of potential breeding females that were present.

Denning in black bears is thought to be an evolved mechanism that allows the species to survive in regions with severe winters and associated food shortages. However, in southern Arizona despite its milder winters and adequate food available almost year round, bears also den or hibernate. As part of his jaguar monitoring program using remote cameras in the Patagonia and San Luis Mountains, Jack Childs also took over 70 photographs of black bears between March 1, 2001 and March 5, 2005. Only three of these bear pictures were taken in November, and none in January through the end of March. All other bear photographs occurred April through October – a clear indication that bears go into hibernation in southeastern Arizona (Childs, Personal communication: 2005). Throughout Arizona, however, black bears are cyclic sleepers during hibernation. They periodically wake and move around outside but near the den site during the winter. It is not uncommon to find bear sign during warmer periods in the winter.

In his Central Arizona bear study, LeCount found significant differences as to when bears enter and emerge from their dens based on sex and age. Females entered their dens November 10-11th. Male bears tended to enter their dens approximately November 24-26th. Adult males, the last to enter, were the first to leave, generally emerging March 20th – a mean average of 116 days in the den. Adult females emerged April 8th, while adult females with newborn cubs emerged April 26th – a mean average of 167 days in the den. LeCount speculated that this late emergence by females with cubs is probably related to the inability of the newborn to effectively travel with their mothers (LeCount, 1983: 72-73).

The exact location of where a bear dens is also important, especially in regard to what food they utilize at specific times of the year. In LeCount's Central Arizona study he found that bears denned in three major vegetation types: desert scrub (4.4%), chaparral (91.2%), and pine-oak woodlands (4.4%). Interestingly, he found no dens in the ponderosa pine or in riparian types of vegetation. The key factors in the selection of den locale seemed to be the need for adequate cover and reliable forage in the spring (LeCount, 1983: 74). Bear dens are usually located in relatively inaccessible locations within a mountain range. Bears in the Huachuca Mountains may show the same general preferences. As I noted earlier, I found no bear sign during the month of April in riparian areas at lower elevations – despite an abundance of grasses available for early spring forage. I did, however, receive a report of a bear sighting on March 26, 2004 at Tunnel Springs, a location in the Canela Hills. Given the early date of this sighting it seems likely that this bear denned somewhere in the nearby vicinity. This area is low in elevation, but possesses thick cover, adequate water, and presumably food. Steve Grombly believes that the Tunnel Springs area might also be home to a small resident bear population (Grombly, Personal communication, 2006).

All of the bears in the LeCount's Central Arizona study denned beneath rocks shelters, a fact he believed was necessitated by the absence of large trees in the study area. Most often the rocks selected for denning were large solitary boulders. All dens were surrounded by dense vegetation that concealed the entrance. Den dimensions varied with the size and the age of the bear, and most dens contained nests that were composed of vegetative material such as leaves, sticks, and grass that were likely gathered near the den site (LeCount, 1983: 75). Black bear dens are seldom reused from year to year (Fair: 103). I was unable to find anyone who has located and examined a bear den in the Huachuca Mountains. The Huachuca Mountains also contain many old abandoned mine excavations. Considering the fact that bears have been known to den in culvert pipes and even under the porches of occupied buildings, it would be interesting to know if bears ever utilize any of the more remote and isolated mine sites for dens.

Black bears are relatively long-lived animals and some individuals in the wild may exceed 20 years of age. In their natural environment black bears in Arizona have few enemies. Occasionally a mountain lion might kill a bear cub, but this is a rare event. In truth, the only mortal enemy that black bears have in the Huachuca Mountains is man. It is to this issue that we now turn.

The History of Man and Bear in the Huachuca Mountains

The first human beings to enter the Huachuca Mountains were Paleo-Indians who lived along the San Pedro River 11,000 years ago during the Pleistocene period. These Indians were hunters of the “megafauna” that inhabited the area. Mammoths, mastodons, bison, camels, and other large herbivores were killed and eaten by these earliest Indians. Large carnivores such as lions (*Panthera leo atrox*), dire wolves, and especially the before mentioned short-faced bears provided the Paleo-Indians with competition and quite possibly limited human exploration and exploitation of the Huachuca Mountains to brief forays in search of food.

In later pre-historic times, Hohokam Indians and their Piman descendants, the Sobaipuris, cultivated corn along the San Pedro by utilizing an extensive irrigation system. Western Apache Indians also came into the area to raid the Sobaipuris and to hunt in the Huachucas. Neither the Pimans nor Apaches traditionally ate bear meat except in times of starvation, though both tribes reportedly used bear paws as medicine bags or in ceremonies, and other body parts for various reasons. Both of these tribes – in fact most of the Native people of the American Southwest – believed that bears possessed great spiritual power and could cause illness. Consequently both the Pimans and the Apaches probably took great measures to avoid coming in contact with them (Rea, 1998: 211, Opler, 1941: 224-225, 291; see also Pavlik, 1997: 479). Undoubtedly neither of these tribes hunted bears to any great extent in the Huachuca Mountains and certainly they did not have any impact on bear populations.

The first Europeans to explore the Huachuca Mountain area were the Spanish in 1539. The next year Francisco Vasquez de Coronado led a large expedition up the San Pedro River in search of gold. No references are made in the journals related to the Coronado expedition that indicate that the Spanish came in contact with bears along the San Pedro, or for that matter, that they even explored the Huachuca Mountains. In 1826 Anglo-American fur trappers searched for beaver along the San Pedro, and in 1846-48, the Mormon Battalion passed through the San Pedro River Valley on their way to California. The Treaty of Hidalgo in 1848, and more directly the Gadsden Purchase of 1853, brought the entire region under the jurisdiction of the United States government. In 1877 Fort Huachuca was established to protect travelers using the San Pedro Valley from attacking Apache Indians. The following year a rich silver strike in Tombstone resulted in the entry of prospectors into the area – including into the Huachuca Mountains. Scores of mines were soon opened in the Huachuca Mountains from which were extracted gold, silver, tungsten and other valuable minerals. Mines with names like Hamburg, Eureka, Copper Glance, and interesting, the Black Bear Mine, attracted hundreds of men and women who also built saw mills and towns within the Huachuca Mountains. Some towns, such as Palmerlee and Sunnyside had populations of over 100 people. Mining remained an important economic activity in the Huachuca Mountains until the 1940s. Meanwhile cattle ranches also began to appear along the fringes of the mountains and the surrounding grasslands. In 1912 the town of Sierra Vista, originally named Fry, was established.

The influx of people into and around the Huachuca Mountains had an immediate and adverse impact on the local wildlife. Deer, bear, and wild turkey were hunted to feed the growing human population. Bears and mountain lions were killed whenever possible to protect livestock. As noted earlier, market hunters operating out of Tombstone also hunted the Huachuca Mountains.

Prior to 1929, black bears were considered to be “predatory” animals and were given no legal protection in the state of Arizona. The same ranchers and government agents who eliminated the grizzly bear sought to do the same to its smaller relative. All bears were poisoned, trapped or shot on sight under the guise of protecting livestock. In 1924 it was estimated that only 1,500 black bears remained in the national forests of Arizona, New Mexico, southern Colorado, and southern Utah. In 1929, black bears came under a new “game code” in Arizona and were given a degree of protection as a game animal. By 1941, black bear numbers climbed to more than 3,550 – a rise that also coincided with the decline in livestock numbers and subsequent de-emphasis on lethal predator control (Brown, 1985:4). By this time the grizzlies were extinct and wolves were

all but gone in the west. Black bears began to benefit from the lessened hunting pressure. Still, black bear numbers remained low in the state. Throughout most of the 1940s bear hunting laws were liberalized and in 1945 black bears again lost their designation as game animals. From 1951 to 1953 the state held yearlong bear hunting seasons. The Arizona Game and Fish Department, perhaps realizing that full protection was not politically acceptable, decided that the best way to save bears was to again grant them status as a game animal and in doing so, bring them under some degree of hunting regulation. In 1954, bear hunting regulations became more restrictive and tags were required for the first time to kill a bear. In 1958 black bears became classified as a “small game” animal, and in 1968 they were elevated to “big game” status (Hoffmeister, 1986: 484). Hunter interest in bears also began to increase. Although little effort was made to keep accurate harvest records, from 1964 through 1980 the annual legal take of bears by hunters ranged from 131 to 313 animals. In the 1970s the state began to take a greater interest in bear management as the popularity of bear hunting grew. In 1974, the Arizona Game and Fish Department conducted its first comprehensive bear study. This study focused on the desert scrub, chaparral, and oak woodland habitat of central Arizona. In 1980, a second study of bears was initiated in ponderosa pine and mixed conifer forests of north central Arizona, and in 1987 a third study of bears began in mixed-conifer and spruce habitat of east-central Arizona. Collectively, these three studies, all under the direction of Al LeCount, represent something of a “golden age” in Arizona bear research. Based in part on the results of this research, Arizona began to move toward a much more scientifically based program to manage bear populations. In an attempt to monitor harvests more closely, the AGFD in 1980 began to implement mandatory checkout procedures for successful bear hunters. In recent years other changes have been made for bear hunting in Arizona, among these is a permit-only spring hunt and closing the season in each hunt unit when a set harvest objective has been met in terms of female bear take. In addition, baiting – the practice of a hunter luring a bear into shooting range by use of food, has also been outlawed. Hounds are still used to hunt bears in Arizona, but not in the spring hunts (Arizona Game and Fish Department, 2004: 129).

It should be stated that many of the modern day bear hunting policies and much of the current management strategies employed by the AGFD are a direct result of the research of Al LeCount. In time LeCount left AGFD and his Bear Study Team was disbanded. The last black bear research project conducted by AGFD was under the direction of Stan Cunningham in the Four Peaks area from 1996 to 2000. This project was built on the earlier work performed by LeCount, but was specifically directed at determining the impact that the Lone Fire had on black bear populations (Cunningham, Personal communication: 2004).

In the years in which they were classified as predatory animals, and later when year-round bear seasons were held, black bear numbers were decimated in the southern portion of Arizona. Bob Householder in his 1968 paper, *The Black Bear in Arizona*, quoted Arizona Game Department Region 6 Supervisor Ted Knipe as stating “There are only 12 to 18 bears in the Region and they are found in the Catalina, Rincon, Santa Rita, and Huachuca ranges. There might be a few on the Whetstones and Tanque Verdes” (Householder, 1968: 27). It is unclear how Knipe arrived at this population estimate and such numbers should not be considered as being accurate. Still, this estimate undoubtedly reflects a large degree of reality – namely that black bear numbers were dangerously low. Donald F. Hoffmeister, in his definitive book *Mammals of Arizona* (1986), added a gloomy view of bear populations in the Huachuca Mountains. “In the Huachuca

Mountains, Cochise County,” he wrote, “black bear were present until the 1950s and still may be present. Several people in these mountains told us that bears were nearly exterminated there when they were classified as a predatory species” (Hoffmeister, 1986: 484). Although such estimates seem overly pessimistic, Hoffmeister was very familiar with the Huachuca Mountains. In 1954 he published, along with W.W. Goodpaster, *The Mammals of the Huachuca Mountains, Southeastern Arizona*, a book that was based in a large part on his own field studies as well as interviews with many people who were long-time residents of the area. In this work the authors noted that black bears were at no time common in the Huachuca Mountains, though “more plentiful” prior to the 1940s (Hoffmeister and Goodpaster, 1954: 70). There are few published records of early bear hunting in the Huachuca Mountains, although one successful bear hunt conducted by the famed Lee brothers in 1942 is described in an account of Dale Lee’s life (Robert McCurdy, 1979: 67-70).

When LeCount published his study in 1984, bear hunting was not allowed in the Huachuca Mountains. Indeed, one of the purposes of the LeCount research was to determine if a huntable population of black bears existed in the Huachucas, and if so, under what conditions a hunting season could be established. The following year AGFD initiated its first hunting season for black bears in the Huachuca Mountains in two decades. The first legally harvested bear taken in the Huachuca Mountains, however, was not until 1999.

One determination made by LeCount in his report was that there was approximately 50 square miles of adequate bear habitat in the Huachuca Mountain. He arrived at this figure by plotting on a map that portion of the mountain range that appeared to have sufficient food, water, and cover to support bears. Based on the amount of suitable habitat, LeCount guessed that at approximately 25 animals, the bear population of the Huachuca mountains was at “carrying capacity”(LeCount, 1984a: 3,7-8). LeCount arrived at his estimate based on his previous experience with black bear *density* in other mountain ranges where he had conducted more thorough research. Moreover, as noted earlier, he expressed a belief that in this small population there would only be 8 or 9 adult females (LeCount, 1984a: 9). With this in mind, LeCount made several specific recommendations in regard to establishing a bear hunting season in the Huachuca Mountains:

1. If bear hunting is permitted it should be extremely conservative and aimed primarily at the male segment. Not more than one female should be removed from the population every two years since habitat conditions probably do not allow females to reach reproductive age until at least three years of age.
2. Management objectives might be accomplished with short season permit hunts at times when bears are not concentrated into small localized areas due to limited food availability or when females are less vulnerable. A short spring bear hunt might be an alternative, but not considered until early spring diets are determined. Another option might be at capture and tag nuisance bears, release them, and make them available for harvest.
3. Any management strategy should consider the entire bear population. Neither AGFD nor the U.S. Army at Fort Huachuca should consider that they have their own separate bear populations. Any long-range management strategy should be a joint effort between these two

entities and designed to maintain the bear population at the carrying capacity of the habitat (LeCount, 1984a: 9-10).

In addition, LeCount made several other recommendations:

1. Increased road development and human habitation should be avoided, especially in wet drainages.
2. Small wildfires should be allowed to burn to maintain plant diversity and to insure continued water availability from seeps and springs.
3. Excessive woodcutting of green juniper and manzanita should be avoided were these species are known to be used by bears.

LeCount concludes his report by stating: “The Huachuca bear population is small and the potential impact of any harvests on this population should be closely weighed against the advantages of adding a few bears to the statewide harvest from this mountain range.” (LeCount, 1984a: 8,10.)

The above recommendations reflect two themes that seem to be found throughout the black bear research conducted by LeCount: The need to protect bear habitat, and the need to protect the breeding population of female bears. It seems clear that LeCount saw these as being the two critical factors that needed to be considered in black bear management. He was always cautious of excessive female harvests and did not hesitate to call for reform in hunting regulations – including moratoriums - when he felt it was needed (See, for example, LeCount, 1987b: 18-20).

Unfortunately the LeCount study could not anticipate two major events that would transpire over the next two decades, events that would serve to adversely impact on the bears of the Huachuca Mountains. First was the rapid influx of people that would move into the Huachuca Mountains area; and second was that the Southwest would suffer from long periods of extended drought. Both of these events – along with the hunting seasons that would later be implemented – have served to put what is in my estimation severe pressure on the black bear population of the Huachuca Mountains.

The greatest long-term threat to black bears in the Huachuca Mountains is the loss of habitat and habitat fragmentation caused by the rapid population growth and expansion of the city of Sierra Vista and surrounding communities like Hereford. In 1980 the Sierra Vista – Fort Huachuca population stood at 24,937; by 1990 it grew to 35,086, and by 2002 there were 45,731 people living in this urban area with the greatest growth seen within the city of Sierra Vista itself. Most troubling is the “urban sprawl” which has characterized this growth, especially southward and east of the Huachuca Mountains. The building of housing developments and strip malls, and the subsequent increase of traffic along Highway 92, has effectively shut off most opportunity for animals – including bears - to migrate eastward to the San Pedro River, the Mule Mountains, and beyond. In addition, the major side-canyons leading into the Huachuca Mountains, most notably Ramsey, Carr, Miller and Ash, are now all heavily populated. It is in these canyons that most of the conflicts between humans and bears occur.

Since 1995, the Southwest has experienced lower than average precipitation, and since 1999, this region has suffered what has been deemed to be the worst drought since the 1950s. These record low rates of precipitation have also impacted the Huachuca Mountain area – and its bear population.

From 1982 through 1994 the average yearly (January through December) precipitation, as measured on Fort Huachuca, was 22.5 inches.³ From 1995 through 2003, the average precipitation measured only 12.5 inches – ten inches less. From 1999 to 2003, the average precipitation has been only 12.0 inches. This lack of precipitation is especially evident in the winter months – November through February. From 1982-1983 through 1992-1993 the average winter precipitation rate for this four-month period was 5.2 inches. From 1993-1994 through 2003-2004 the winter precipitation rate dropped to 2.8 inches. Over the past five winters, 1998-1999 to 2003-2004, the precipitation rate was even less, 1.3 inches (See Tables 1 and 2).

Table 1: Precipitation in the Huachuca Mountains, 1982 through 2002

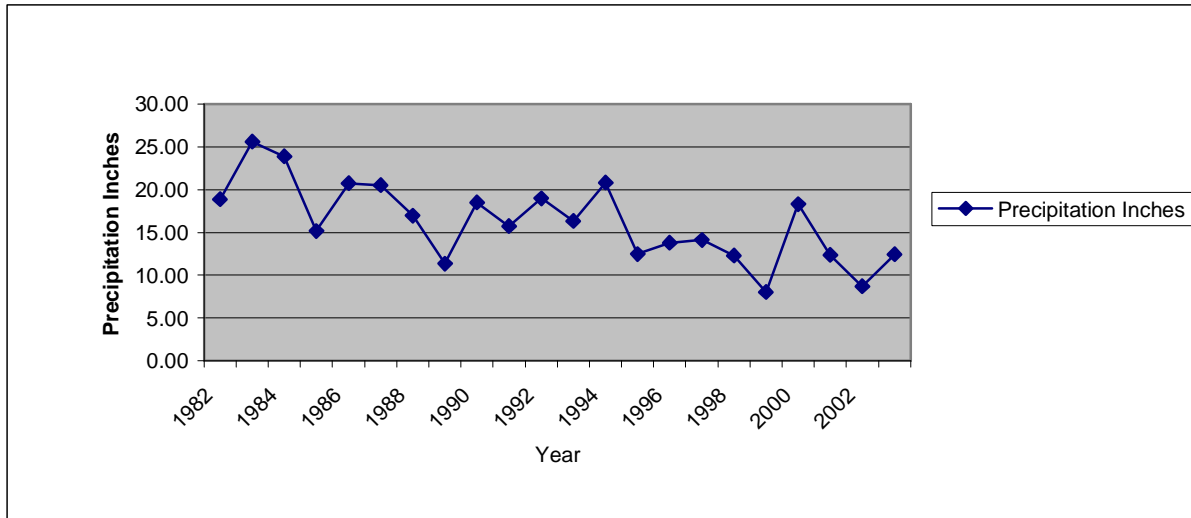
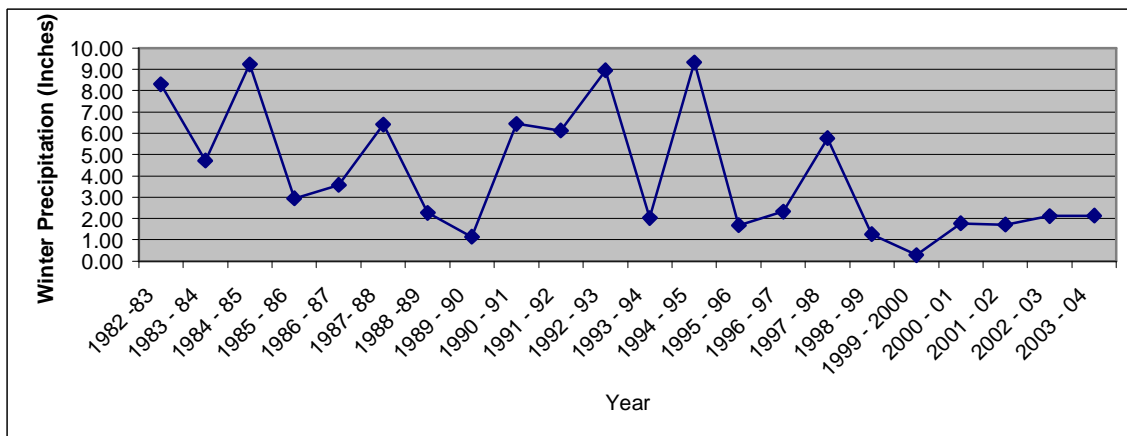


Table 2: Winter Precipitation in the Huachuca Mountains, 1982-83 through 2003-04



This dramatic drop in precipitation has adversely impacted bears in the Huachuca Mountains. The lack of rainfall during year, and especially the absence of winter rain and snowfall, dried up many water sources and served to greatly reduce the amount of mast, especially acorns, available for bears to eat. In some years even the usually dependable juniper and manzanita berry crops failed. Consequently, over the past decade bears have moved down off of the mountain in search of water and food. Often this migration has brought them into conflict with landowners. As I will show later in this paper, there appears to be a clear correlation between drought conditions, and especially the absence of winter precipitation, and bear mortality in the Huachuca Mountains.

The Management of Black Bears in the Huachuca Mountains

Before discussing black bear management in the Huachuca Mountains it is useful to revisit the question of how many bears are thought to inhabit this mountain range. As noted earlier, LeCount, based on tracks, scat, and prior experience in other mountain ranges and habitat, estimated a population of 25 bears plus or minus 5. Twenty years later AGFD officially stated a population of 50-60 resident bears, plus an unknown number of transients in the Huachuca Mountains *and* the Patagonia Mountains. John Millican, the current Wildlife Manager for Unit 35 A estimates that there are 30-50 resident bears, again with an unknown number of transient animals, now in the Huachuca Mountains and Canelo Hills. Millican's figures are based on reported bear sightings and incident reports.

Wildlife management is a numbers game. LeCount was reportedly thought by some officials within AGFD to be somewhat conservative with his bear population estimates – despite being one of the nations leading authorities on black bears (Brown, Personal communication: 2004). Most wildlife biologists I interviewed, however, tend to accept LeCount's 1982 estimates. Pat O'Brien, who was then regional game manager of Units 35 A and B for AGFD, states that he sees no reason to question LeCount's population estimate, and if anything, he tended to accept the lower range of his numbers (Pat O'Brien, Personal Communication: 2004). Moreover, most wildlife officials and biologists I interviewed still accept his numbers as being accurate today. David E. Brown states that AGFD generally believed that black bears numbers dramatically increased throughout the state in the late 1980's and early 1990s. He also believes that because of this, bear populations were probably too high to be supported by the drought conditions that came in the late 1990s (Brown, Personal communication: 2004).

Tom Waddell, another long-time black bear biologist with AGFD, does not agree that bear numbers necessarily grew prior to the onset of the drought. Instead, he believes that because of broad climatic change, bears in general are moving northward over time – in the same manner in which most biologists agree that coatis, javelinas, and other more tropical species are moving northward. Consequently, it is Waddell's theory that it is not a matter of having more bears, but rather, a matter of people simply *seeing* more bears. Moreover, Waddell believes that if anything, bear populations might very well have been declining during this time period. "The more bears you see," Waddell states, "the fewer bears you have." (Waddell, Personal communication: 2004). In other words, healthy bear populations in healthy habitats go relatively

unseen by people, whereas bears that are under stress in unhealthy habitats will leave those habitats where they will encounter and be seen by people.

The fact is that AGFD does not know how many bears there are in the state, nor do they know how many bears there are in the Huachuca Mountains. Perhaps even more important, they do not know if bear populations are increasing or declining in either the state or in the Huachuca Mountains.

Equally important to the number of bears there are, is *where* they are. LeCount conducted his 1982 Huachuca Mountains bear reconnaissance in October. At that time he found bear sign on 15 of the 16 survey routes he ran (LeCount, 1984a: 3). These survey routes, as noted earlier, covered every part of the Huachuca Mountains. Since 1989, Harley Shaw, along with Sue Morse, Sheridan Stone, and in recent years, the Sky Island Alliance, has organized a mountain lion track count survey every June on Fort Huachuca. Along with lion data, bear sign is also recorded in these surveys. Most of these survey routes – which cover wide and diverse parts of Fort Huachuca - produce bear tracks and scat almost every year (Harley Shaw, Personal communication: 2004). Consequently, it seems that bears at one time or another during any given year utilize most of the available habitat that exists for them in the Huachuca Mountains. It is only during times of water and food shortages – such the conditions caused by the recent drought – bears tend to *concentrate* in areas where these precious resources are available to them. Unfortunately these resources often tend to be associated with human habitation.

Initially, it was my hope to compile a complete list of all black bear mortalities and relocations – the capture and transfers of bears to other locations - that occurred from within the study area since 1982, the year LeCount conducted his survey. My interest in both mortalities *and* relocations was based on the reality that both actions served to take bears out of the total breeding population and consequently would have an impact on the numbers and the health of the population itself. Unfortunately, neither the AGFD nor the Fort Huachuca Wildlife Office maintains a database that documents all causes of bear mortality. In addition, no records are kept – except for the personal records of individual game managers - on bear relocations. AGFD and John Millican, Wildlife Manager for Units 35 A, and 35 B, were extremely helpful in providing me with what information they had on legal harvest and nuisance kills. Unfortunately this data was incomplete and often inconsistent from the state to the regional and to local offices. The information available on two years, 1999 and 2000, for example, illustrate the problems I encountered attempting to compile an accurate list of bears taken out of the Huachuca Mountains.

In late August of 1999, four bears, three males and one female, were definitely trapped and euthanized by AGFD in the Huachuca Mountains. This fact is documented in Millican's notes and by published articles that appeared in the *Sierra Vista Herald* newspaper. The “official” record of AGFD – the yearly report entitled *Hunting Arizona: Survey, Harvest and Hunt Data for Big and Small Game*, and computer printouts provided to me by both the state and regional offices of AGFD, *show no bears being euthanized by the Department that year*. In 2000, *Hunting Arizona* and computer printouts provided by the state and regional offices of AGFD list three bears of an *unknown sex* killed in the Huachuca Mountains under the category “AGFD Take – Non Sport.” This category is defined as bears killed by “depredation take, nuisance take,

road kills, etc.” In other words: three bears that were euthanized. Millican’s field notes, however, show only one female bear trapped and euthanized that year, one female bear legally harvested, and another female that was electrocuted. Millican states that the three bears officially listed for 2000 are indeed three of the four 1999 nuisance bears killed, but that they were euthanized and reported too late to be listed that year and so consequently are listed for the following year. Undoubtedly this is the case. However, this inaccurate data has never been corrected. Moreover, the fourth bear euthanized in 1999 seems never to be officially documented, nor are two of the three 2000 bears that Millican accounts for – the bear that was euthanized and the bear that was electrocuted. The legally harvested bear is apparently listed for the following year – 2001 – a year in which the official record shows *two* bears were legally harvested and Millican’s notes show none.

The information I was able to gather on the relocation of bears classified as nuisance animals by AGFD was based completely on the notes and memories of John Millican and other wildlife officers who worked in Unit 35 A. Neither the regional nor the state office maintains any specific records on the removal of such bears from one mountain range to another.

In addition to the problems encountered trying to piece together AGFD bear data, some difficulties were also encountered in attempting to compile bear mortality and relocation information from Fort Huachuca. For most years the AGFD publication *Hunt Arizona* listed bear harvests on Fort Huachuca separately. Since 1998, however, Fort Huachuca harvest and nuisance kill statistics have been included with the rest of Unit 35 A. Specification documentation on relocations of bears from Fort Huachuca does not seem exist. For this reason some of the Fort Huachuca data contained in this paper is based on personal communication with – and the memory of – wildlife officials who work on the fort, especially the current chief wildlife manager, Sheridan Stone.

The following information on bear mortality and relocation from the Huachuca Mountains, 1988 (the first year a bear was reported as a mortality or as being relocated) to 2004, is as accurate as the available data permitted. In compiling this data I have made every effort to reconcile all inconsistencies and to verify every individual animal listed. In sum, all of the bears I have listed as mortalities or as removals are documented to the best of my ability. Since it is clear that all bear mortalities and relocations have not been documented, the data provided in this paper must be considered incomplete and certainly conservative to some degree in regard to the final figures.

LeCount reported that an “abnormal” number of nuisance bear problems occurred in the Huachuca Mountains during the summer of 1982. Specifically he mentioned an adult with cub that had to be relocated from Ramsey Canyon, and two other female bears, an adult and subadult that had caused problems on Fort Huachuca. The adult was reportedly relocated two different times. He does not provide any further information, nor does he say if any of these bears were relocated outside of the Huachuca Mountains. LeCount attributed these problems to food shortages (LeCount, 1984:5).

In 1983 a female bear was trapped and removed from Fort Huachuca to the Catalina Mountains (Anonymous, 1983). This was the first bear relocation that I was able to document since the LeCount study. Pat O’Brien, who was the Wildlife Manager for Unit 35 A from 1975 to 1987,

states that he knows of no other bear mortalities or relocations that occurred in the Huachuca Mountains area while he worked in the area. This includes all categories: hunting, poaching, nuisance kills, highway deaths, and other natural causes. In 1982 an adult male bear was captured in the town of Elfrida – east of Sierra Vista and outside the study area of this paper – and relocated to the Huachuca Mountains. It was believed that this bear originated from the Chiricahua, Mule, or possibly even the Huachuca Mountains. Four years later this bear returned to the vicinity of Elfrida where it climbed a power pole and was electrocuted (O’Brien, Personal communication: 2004; Millican, Personal communication: 2005). Since this bear is not known to have originated within the study area, it will not be included in the data that follows.

After thoroughly reviewing information provided by AGFD and the Fort Huachuca Wildlife Office along with newspaper accounts and personal interviews I was able to identify a total of 52 bears that were removed from the population during the time period of this study (1982-2004). Mortality accounted for 36 of these bears while 16 were relocated to other mountain ranges. A total of 10 bears were killed by legal harvest, 5 during AGFD bear hunting seasons in Unit 35 A - 5 others in legal harvests on Fort Huachuca. 25 bears were captured as nuisance bears by AGFD or by the Wildlife Office in Unit 35A and Fort Huachuca. 9 of these bears were euthanized and 16 were released into other mountain ranges. In most cases AGFD carried out the relocation or euthanized the nuisance bears on Fort Huachuca. In addition, two bears were killed by vehicles on highways, two others were electrocuted on telephone poles, while another bear had entangled itself in wire on Fort Huachuca and presumably died of starvation. Two bears were killed illegally. The remaining ten bears I have classified as being “natural caused” deaths. Three of these bears were actually euthanized by AGFD when they were found to be in such poor physical condition that death seemed eminent. The other bears were found dead by biologists, hunters, and landowners. The specific cause of death for these bears is unknown. Possibly these were animals that were shot during hunting season or hit by vehicles on highways to die later of their injuries – although bears certainly die of other natural causes including the accumulated effects of old age. In sum, 42 – or 45 if one counts the three injured bears euthanized by AGFD – of the 52 cases of recorded mortality and relocation could clearly be classified as being brought about due to anthropogenic or human caused events. It should be noted that the above figures are – to the best of my knowledge - only *verified* bear mortality and removal. Undoubtedly many other bears have died and have gone unrecorded. For an overview of black bear mortality and removal from the Huachuca Mountains refer to Tables 3 and 4 below.

Table 3: Overview of Black Bear Mortality and Relocation from the Huachuca Mountains, 1983 to 2004, by Cause

	Male	Female	Unknown	Total
Legal Harvest	3	7	0	10
Nuisance: Euthanized	4	5	0	9
Nuisance: Relocated	4	9	3	16
Highway Mortality	2	0	0	2
Accidental Mortality	1	2	0	3
Natural Caused Mortality	3	6	1	10
Illegal Mortality	0	0	2	2
	17	29	6	52

Table 4: Black Bear Mortality and Relocation from the Huachuca Mountains, 1983 to 2004, by Year and Sex

Year	Males	Females	Unknown	Total
1983	0	1	0	1
1988	1	0	1	2
1989	1	0	0	1
1990	0	1	0	1
1991	0	2	2	4
1992	0	1	0	1
1993	0	2	0	2
1994	2	2	0	4
1995	1	1	0	2
1996	0	1	0	1
1997	1	0	0	1
1998	0	1	0	1
1999	5	2	0	7
2000	0	3	0	3
2001	1	2	0	3
2002	3	3	0	6
2003	0	5	0	5
2004	0	1	0	1
Unknown	2	1	3	6
Totals	17	29	6	52

In North America the leading cause of adult black bear mortality is hunting. Some data suggests that hunting accounts for between 70 to 90% of the mortality rate in adult North American black bear populations. It is estimated that there are about a half million black bears in North America and that hunters legally kill approximately 30,000 black bears each year in the continental United States and Canada – about 6% of the total population (Fair, 1990: 173; see also Bunnell and Tait, 1985). In Arizona, an average of about 4,350 bear tags are sold each year with an annual harvest of about 225 animals (Arizona Department of Game and Fish, 2004: 130). In 1985, AGFD re-initiated a hunting season for bears in the Huachuca Mountains after nearly twenty years of full protection. Today legal hunting in Unit 35 A is regulated by the AGFD, and on Fort Huachuca, it is regulated by the Fort Huachuca Wildlife Office under the ultimate authority of AGFD. Hunting is an important, although not the leading cause of mortality among bears in the Huachuca Mountains.

Before continuing this section of the paper I wish to state emphatically that I do not oppose the *ethical* hunting of bears under tightly regulated conditions. I am a hunter myself – although not a bear hunter. In most cases black bears generally tend to naturally regulate their own numbers through environmental or social mechanisms (See for example LeCount, 1993 and Rogers, 1993). Consequently, I believe that in states like Arizona that have a relatively small bear population, hunting is not a *necessary* component of a sound bear management plan. Having

said this, there is also no evidence to support the position that regulated hunting has an adverse effect on *healthy* bear populations living in *healthy* habitat. Legal sport hunting is, however, the mortality factor that is most easy to control. The ultimate issues that need to be determined in regard to bear hunting in the Huachuca Mountains are whether the bear population and the habitat is healthy enough to allow for hunting pressure, and if so, to what degree and under what circumstances.

The 2003-2004 hunting seasons can be used as an example of how the AGFD conducts its bear hunts in Unit 35 A. In that year – as in all years - AGFD published two sets of hunting regulations each year, a general set of rules that includes information about the fall hunts for all species – Commission Order 26 - and a spring hunting supplement that includes the regulations for species that are also hunted at this time of the year, most notably bear, javelina, turkey, and buffalo. The 2003-2004 *General Regulations* listed two bear hunts for Unit 35 A under the category of “Population Management Seasons” – a general hunt in which any firearm or bow and arrow can be used, and a “HAM” hunt in which a handgun, muzzleloader or bow and arrow can be used (Arizona Game and Fish, 2003a: 40).

Population management hunts are carried out when previous regular season hunts are not successful enough to reduce certain wildlife populations as determined by Department management strategies. In general, a hunter applicant pool is created to be drawn upon randomly when desired. Hunters are telephoned within a few days of the actual hunt. In the case of black bears, such hunts would most likely be for targeted individual animals deemed to be a nuisance or a threat to public safety (Arizona Game and Fish: 38).

The population management hunts extended from July 1, 2003 to June 30, 2004. Like all Arizona bear hunts, “Any bear except for a sow with cubs” – which by definition would include the killing of cubs - is considered legal game. Five permits were allowed for each of these hunts and no “female harvest objective” was listed. This meant that technically no limit was set for the number of female bears that could be potentially harvested (Arizona Game and Fish: 40). In practice, however, the total number of bears - - including females, that could be harvested is based on the number that AGFD believes needed to be and could be removed without adversely affecting the population.

Population management hunts were first initiated for the 2003-2004 hunting season. Jim Heffelfinger, AGFD Big Game Regional Manager for the area that includes the Huachuca Mountains, states that these hunts have never been implemented for bears during the time period covered in this paper (Heffelfinger, Personal communication, 2005).

In addition, a general bear hunt was also listed for the Fort Huachuca Army Garrison. This hunt extended from August 22 through October 23, 2003 and was open only to “properly licensed military and Fort Huachuca civilian personnel holding a valid Fort Huachuca post hunting permit.” The Wildlife Office at Fort Huachuca sets its own female harvest limit which must be approved by AGFD (Arizona Game and Fish: 28).

The 2004 *Spring Supplement* lists a general bear hunt for Unit 35A and 35B combined. Any legal firearm or bow could be used for this hunt which extended from March 19 through April

27, 2004. Twenty permits were allotted for this hunt. A separate hunt was also listed for Fort Huachuca with the same dates given but no set number of permits listed. A combined female harvest objective for these hunts was listed as two. This meant that these units and Fort Huachuca would be closed to bear hunting at sundown the Wednesday immediately after two female bears had been taken (Arizona Game and Fish, 2003b).

In addition, a spring archery only hunt was listed separately from the general spring hunt for Units 35A and 35B. This hunt extended from April 28 through September 27. Fort Huachuca ran a two-day archery hunt, August 28-29. Twenty permits were allotted for these archery hunts with a female harvest objective of three (Arizona Game and Fish, 2003b)

It should be noted the cost of a general hunting license – which is required before any bear permit can be applied for or purchased – is \$18.00 for residents, \$188.00 for nonresidents. A spring bear hunt permit-tag costs an additional \$25.50 for residents and \$183.00 for nonresidents. In addition to the general hunting license, only a \$5.00 application fee is required to participate in a population management hunt. One bear per calendar year is allowed per hunter (Arizona Game and Fish, 2003a: 9).

Successful bear hunters are required to contact AGFD in person or by telephone within 48 hours of killing a bear. Through this contact the hunter is expected to provide his/her name, hunting license number, the sex of the bear, and the management unit in which the bear was taken. In addition, the hunter is also required to provide the AGFD, usually through the mail, with a premolar tooth taken from the bear within 20 days of initially notifying the Department of the kill (Arizona Game and Fish: 28).

To summarize: Bear hunting in the Huachuca Mountains is *theoretically* a year-round proposition and as many as 50 permits can *theoretically* be issued. In reality, bear hunting opportunities are generally limited in the Huachuca Mountains due to female harvest limits and the flexibility given to wildlife managers to close the season when needed, the relative absence of roads going into the higher bear habitat, and period of time in which bears are in hibernation or at least remain at the higher elevations.

A problem, however, might very well exist as to *when* much of the bear hunting occurs in the Huachuca Mountains, namely the spring, and the fact that under current hunting regulations as many as *five* female bears can *potentially* be legally harvested in any given year.

As already noted, in Arizona hunters are allowed to take any bear “except sows with cubs.” Unfortunately spring bear hunts take place when females might very well have cubs. Black bear females, as noted earlier in this paper, often place their cubs in babysitter trees while they forage for food. Consequently the potential exists for a hunter to encounter a mother bear that does not have her cubs with her. This problem would seem to be compounded by the reporting system used in Arizona, one that amounts to an “honors system.” Would a hunter who kills a lactating female report it? Would most hunters even be able to identify a female who is currently nursing cubs? Would an effort be made to rescue or recover orphaned cubs? Depending on age, most cubs belonging to females killed during hunting season will in all likelihood also die. In recent years spring bear hunting has come under attack from environmentalists, and increasingly, from

many wildlife managers themselves. A number of states and provinces in Canada, most notably Quebec, have discontinued the practice. The most articulate spokesperson against spring bear hunting has been Tom Beck, a long-time black bear biologist who worked for many years with the Colorado Division of Wildlife (see Beck, 1996: 200-209, Beck et. al. 1995: 119-131. See also Beck, 1998 and Gill and Beck, 1993).⁴

Since 1999 5 bears have been legally harvested on Fort Huachuca – two males and two females. (Heffelfinger, Personal communication: 2004, Stone, Personal communication: 2004).

A degree of coordination between AGFD and the Wildlife Office at Fort Huachuca does exist and AGFD approves all seasons set by for hunts on Fort Huachuca and all harvests on Fort Huachuca are reported to communicate in regard to organizing bear hunting seasons although it is clear that the two entities communicate with each when setting seasons. The Wildlife Office at Fort Huachuca does report bear harvest information to the AGFD. In addition, the two agencies do cooperate in the removal of nuisance bears.

To summarize the impact of hunting on the Huachuca Mountains bear population: Since 1999 10 bears have been legally harvested - three of the bears were males, seven were females.

A second leading cause of bear removal in the Huachuca Mountains – in fact *the* leading cause - is the trapping and relocation of nuisance bears by wildlife officials for the purposes of what they perceive to be public safety. In all, the AGFD has trapped and removed at least 25 bears from the Unit 35 A and Fort Huachuca as nuisance bears – 9 have been euthanized and 16 others have been relocated to other mountain ranges. 14 of these bears have been females, 8 have been males, and in three cases the sex does not appear in AGFD records.

Of the 16 bears relocated by AGFD from the Huachuca Mountains, all were relocated to other sky island mountain ranges. Five of these bears were released in the Chiricahua Mountains, three into the Gailuro Mountains, three into the Santa Rita Mountains, two into the Catalina Mountains, two into the Patagonia Mountains, and one into the Pinaleno Mountains. Since AGFD states that no bears have ever been relocated from other mountain ranges to the Huachuca Mountains, all bears that fall into the category of removals are considered for the purposes of this paper as being *net losses* to the Huachuca Mountains population. I know of no bear that has been relocated out of the Huachuca Mountains has ever been documented to have returned – although it seems likely that some have. In addition, this net loss figure obviously does not take into account the unknown number of bears that naturally migrated on their own into or out of the Huachuca Mountains. I am assuming that over time this number would balance itself out. I was also able to verify six other bears that were trapped within the study area and returned back to the Huachuca Mountains. AGFD does not seem to keep any record of bears that are re-released back into the same mountain range.

Almost all bear problems handled by AGFD have occurred in the canyons of the east slope of the Huachuca Mountains, most notably in Ramsey, Miller, Carr, Ash, Mountain View, Stump, and appropriately, Dead Bear Draw. Of the 17 bears that were euthanized or removed by AGFD as nuisance bears in Unit 35 A, all but one came from the east slope of the Huachuca Mountains –

the other occurred in Lyle Canyon on the west side of the mountain – a female bear that was reportedly damaging a deer hunting camp (Millican, Personal communication: 2004).

The main cause of human-bear conflicts in the Huachuca Mountains has been the impact of the drought, along with human activities that promote negative encounters with bears. The year 1999 – a bad one for bears in the Huachucas – can be used to illustrate this problem. After several years of insufficient precipitation, especially a 1.26 inch winter precipitation in 1998-1999, manzanita and juniper berry and acorn production failed in the mountains. Consequently, bears moved down into lower elevation – into the populated canyons mentioned above – in search of alternative food sources. Household garbage left out by careless homeowners, pet food, birdseed, and hummingbird feeders all proved to be irresistible targets for hungry bears. Soon bears were breaking into chicken coops, sheds, and even attempting to enter occupied buildings in search of food. Reports of bears – and bear damage – became a daily event from the end of July into early September. AGFD Wildlife Manager John Millican, with the help of fellow wildlife officer Brad Fulk, initiated an intensive effort to educate local residents on how to discourage bear visitations. Educational packets were handed out and meetings with homeowners were held. Most people complied and cleaned up their garbage and took care not to leave food outside. Some individuals, however, were reluctant to pull their hummingbird feeders. In reality, as is almost always the case, the summer of 1999 reflected more of a “people problem” than a “bear problem.” In the end, however, four bears were captured and euthanized (Millican to Haynes, 1999; See also Hess, 1999 and Saunders, 1999).

In 2000, 43 bears were reportedly killed in Arizona under the category of “other” harvest, in other words, as nuisance bears. Twenty one orphaned cubs of the year and yearlings were also taken that year by AGFD to the Southwest Wildlife Rehabilitation Center in Scottsdale (Searles, 2006). Undoubtedly the mothers of many of these young bears were killed by AGFD as nuisance bears.⁵ In addition, the highest number of bears killed as legal sport harvests also occurred the same year, 323 – this despite the fact that there was no substantial increase in the number of tags sold. (Arizona Game and Fish Department, 2004: 130). Winter precipitation – the four-month total in the Huachuca Mountains for 1999-2000 was recorded at 0.29 inches – was the lowest winter precipitation on record. Undoubtedly there was a direct connection between the lack of precipitation and increased bear mortality. Interestingly, only one nuisance bear was killed, and one legally harvested bear were taken in the Huachuca Mountains in 2000. Possibly this was because of the large number of bears killed the previous year – 6. Quite possibly the population had not yet recovered. In other words, there were few bears left to cause problems.

As already noted, almost all of the recorded bear complaints stemming from drought conditions have occurred on the east slope of the Huachucas. Fort Huachuca also experienced some incidents, mostly bears getting into garbage. During this time period there were apparently few if any major problems that occurred on the west side of the mountains. Residents of the Parker Canyon Lake area, for example, did not even report increased bear sightings at a time when problems on the east slope of the Huachuca Mountains were at their highest level. Marilyn Bustos, who works at the Parker Canyon Lake Store and has been in the area over twenty years, states that with the exception of an occasional bear getting into a garbage can, there have been no bear problems that she can remember (Bustos, Personal communication: 2004).

It is important to note that of the 9 bears euthanized from the Huachuca Mountains by AGFD, 7 have been since 1996. Prior to that year AGFD tended to relocate nuisance bears to other mountain ranges. Of the 16 bears removed from Unit 35 A and Fort Huachuca to other mountain ranges by AGFD, 14 were relocated prior to 1996. Since that time only two bears – a 2 to 3 year old male and a female cub – have been trapped as nuisance bears and relocated to other mountain ranges. Four others were trapped and released back into the Huachuca Mountains. The increased number of euthanized bears since 1996 undoubtedly reflects a change in AGFD policy in how it deals with nuisance bears. On July 25, 1996 a 16 year-old girl, Anna Knochel, was severely mauled by a black bear in the Catalina Mountains north of Tucson. That bear had earlier been caught and removed by AGFD only to return to a populated camping area where it attacked the girl. This incident had also taken place during a drought year and local residents in nearby Summerhaven had been known to feed bears (Doug Kreutz and Adam Ramirez, 1996; Keith Bagwell, 1996). In the aftermath of this incident, the girl's family sued AGFD and the U.S. Forest Service. AGFD settled the case out of court for a reported sum of \$2.5 million. The U.S. Forest Service reportedly paid another \$400,000 (Vanderpool, 2000:19, see also Perry and Rusing, 2001; Beal, 2004). The Knochel incident had a profound effect on AGFD and its future policies towards nuisance bears (and lions). Since that time there has been a clear trend on the part of AGFD to avoid future litigation by euthanizing rather than relocating bears. In the fall of 1999, for example, AGFD announced a directive at an inter-department meeting to kill all nuisance male bears three years or older (AGFD, 1999: 6). I am unsure to what extent this order was implemented or if and when it was rescinded, but it was the following year that AGFD euthanized 43 nuisance bears – by far the highest number of bears destroyed in any one year - and three years later in 2003, another 32 bears were euthanized – by far the second highest total for any one year (AGFD, 2004: 133). From 1996 through 2004 a total of 136 bears were euthanized by AGFD statewide (AGFD, 2004: 113; AGFD, 2005: 133).

It is not my purpose here criticize or pass judgment regarding the current policy of AGFD in handling nuisance bears, but rather to point this out as a major factor impacting on the bear population statewide and in the Huachuca Mountains specifically. In dealing with nuisance bears AGFD is faced with the difficult task of maintaining public safety and protecting private property versus the welfare of an individual animal. In such cases, the bears lose every time.

It should be stressed that black bears in most cases do not pose a danger to humans. In general, black bears tend to be shy and secretive animals that almost always flee at the sight of man. Research conducted by Idaho Game and Fish officers John J. Beecham and Jeff Rohman found that even the majority of black bears caught in snares did not demonstrate aggressive behavior when approached. Based on 182 captures, only 49% of the bears showed any threatening behavior and in 40% of the time this behavior was deemed as a “low intensity reaction,” simply moaning or growling. Only 6% “bluff charged” – rushing a few feet towards the researchers before stopping, and only 3% responded with a “full charge.” In 51% of the cases the bear responded by attempting to flee, hide, submit, or showed no action at all (Beecham and Rohman, 1994: 69-71). Ed Souliere is an avid hiker who has probably seen and photographed more bears in the Huachuca Mountains than anyone over the past eight years. Souliere states that he has about 8 to 10 bear “encounters” every year, mostly in Ramsey Canyon. Often his encounters have been at relatively close range, approximately 50 feet, sometimes even less. He reports that the bears he sees generally vocalize their displeasure when he gets too close by making what he

describes as a “huffing” noise. One particular bear bluff charged him three times over a one-week period. In such cases Souliere simply backs off (Souliere, Personal communication: 2004). Similar behavior has been reported by a number of other sources and constitutes a warning or threat, not an act of aggression on the part of the bear. To the best of my knowledge no one has ever been attacked or physically harmed by a bear in the Huachuca Mountains. Stephen Herrero, perhaps the foremost authority on bear attacks, notes that sudden encounters with black bears – even with mothers that have cubs – almost never lead to injury. Black bears, however, are large, powerful animals and although remarkably tolerant towards humans, can be dangerous under certain circumstances (Herrero, 1985: 98-99; 105). Moreover, black bears, like people, are individuals. Some bears undoubtedly possess a “shorter fuse” than others and are less tolerant of human encroachment into their comfort zone. Souliere, for example, encountered one bear in Ramsey Canyon that simply stared at him, but in a way that he interpreted to be a threatening message. Souliere wisely backed away and left the area. Again, this is a particular type of warning behavior has also been documented elsewhere (Jordan, 1976: 61). In Arizona, bear attacks have been extremely rare and have almost always been initiated by human-habituated animals entering mountain campsites. Only a few incidents have occurred in southern Arizona mountain ranges. For example, a bear mauled two boy scouts in the Chiricahua Mountains on June 23, 1992. Another bear attacked a camper on April 29, 2001 in the Santa Rita Mountains (Dolak, 1992; Stauffer, 2001; and Barrios, 2001). Although the state of Arizona has never experienced a fatal bear attack, in neighboring New Mexico a 93 year-old woman was killed by a black bear that broke into her house on August 18, 2001. These events, as isolated as they may be, well illustrate the *potential* danger of bears and serve to remind us that a safe distance should be maintained between bears and humans.

In addition to bears that have been euthanized by AGFD, it is also certain that other “nuisance” bears have been killed by local landowners and not reported. One source that I consider reliable informed me that he knew of at least ten bears that had been killed by residents of the east slope canyons during the time period covered in this paper but never reported. While such a claim is certainly anecdotal, it can not be ignored. People in this area own orchards, gardens, and apiaries that are adjacent to the forest. There are also a number of people own businesses that cater to bird watchers, especially those wishing to view hummingbirds. Bears are attracted to, and occasionally destroy hummingbird feeders and thus are often seen as pests that pose a threat to an individual’s livelihood. Rather than complain to AGFD – who will more than likely request that the business owner remove or alter their feeders – some individuals would prefer to handle the matter themselves. This might mean killing the offending bear. Obviously no one wanted to go on record and discuss any illegal killing of bears. In one case, however, I received enough information regarding an illegally killed bear on the eastern slope of the Huachuca Mountains – albeit second and third-hand anecdotal reports – to justify including an added mortality to my overall data. This killing reported occurred within the past five years. In addition, Steve Grombly informed me of the skeletal remains of a bear he found in Miller Canyon 8 to 10 years that had two definite bullet holes in its skull and possibly additional gunshot wounds in other bones (Grombly, Personal communication:2006). Quite possibly this bear was killed by a landowner, although a hiker or even a hunter could have illegally shot it.

One landowner who experienced bear problems in 1999 was Tom Beatty who along with his wife and son Tom Jr. own and operate a bed and breakfast in Miller Canyon that caters to

birdwatchers. Beatty also maintains an apple orchard that in the past has attracted many bears. At one point in 1999, Beatty said that he could identify 15 different bears that were eating his apples, including a female and two small cubs. AGFD was called to the Beatty residence numerous times and over the years removed at least four problem bears. Four years ago Beatty constructed a fence around his orchard and allows his four dogs to patrol inside. Since then he has had no bear problems (Beatty, Personal communication: 2004). The Beatty experience clearly demonstrates that alternative means exist in regard to dealing with bear problems.

Arizona Revised Statute 17-302 allows for a landowner to kill any bear (or mountain lion) that has attacked or killed livestock. In order to do so the landowner must first notify the local Wildlife Manager and meet certain requirements, mostly in the form of completing the paperwork. In Unit 35 A, most ranching is carried out on the western slope of the Huachuca Mountains and adjacent grasslands. I have talked to a number of ranchers who operate in this area and they inform me that in the past black bears have posed little threat to livestock. To date no rancher has requested permission to kill a bear under this depredation law, nor have I heard any rumors of the illegal killing of bears by ranchers. While almost all bear problems in the Huachuca Mountain area has been confined to the eastern and southern slopes, there is the possibility, however, that if drought conditions persist or worsen, bears may also run afoul of landowners, including livestock ranchers on the western slope as well. Bears and livestock also utilize many of the same food resources. It is unknown what effect this competition has on the bear population in the Huachuca Mountains. Possibly the degree of grazing and the utilization of food resources by cattle on the western slope influence how bears use this part of the mountain range. If this is true, might this factor serve to encourage the increased use of the eastern and southern slopes of the Huachuca Mountains by bears, and the resulting increase of bear conflict with the humans who live there? Certainly this is an interesting possibility that deserves further research.

During the course of my research I learned of no bears that were definitely killed by poachers – illegal hunters - in the Huachuca Mountains. In 1998, one adult male bear was killed out of season by a deer hunter in the neighboring Patagonia Mountains. This individual was caught and prosecuted (Millican, Personal Communication: 2004).

In addition to legal sport harvest and nuisance bear mortality, two bears were killed by automobiles and three others fall under the category of “accidental” – though anthropogenic – deaths. One bear was struck by an automobile in 1997 near Fry Boulevard in what amounts to “downtown” Sierra Vista. Another bear was killed by a vehicle in July of 2002 on Highway 92 near Ash Canyon.⁶ Both of these bears were males. 1997 and 2002 were also dry years and it can be assumed that these bears had left the Huachuca Mountains in search of food and water. Of the three accidental deaths, one bear, an old and blind female already in poor physical condition, starved to death when she became entangled in wire on Fort Huachuca in 1993 (Stone, Personal communication: 2004). The other two bears were electrocuted on telephone poles in Miller Canyon in 2000 and 2002 (Beatty, Personal Communication: 2004).

I also recorded ten cases of what I am categorizing as “natural deaths.” As noted earlier, three of these bears were euthanized by AGFD after being found in such poor physical condition that it seemed most humane to end their pain and suffering. The others were bear carcasses found in the

forest by various individuals with no way of determining the actual cause of death. In five cases the skulls were recovered or the carcasses found intact enough to determine the sex of the bear. Two of these bears were found by Tom Beatty, Jr. in Miller Canyon. The skulls of these bears were recovered and proved to be a very large male and a female. The year these bears died could not be determined. One bear – a male – was found by Marty Teugel in Tinker Canyon in 1995, and another – a female – was found by Chris Hass in Saw Mill Canyon in 1999. In both cases the carcasses were fresh enough to determine that they had died in the years that they were found. Another bear carcass – a female – was found by John Millican in Ash Canyon in October 2001. Since this bear was found late in the year and had not decomposed to any great extent, I assume that it had also died that year. The remains of another bear – a male – were found by in 2002 by Sheridan Stone in McClure Canyon on Fort Huachuca. Another carcass of a dead bear of an undetermined sex was found by Steve Grombly approximately 15 years ago in Hunter Canyon. Grombly believes that this was an old bear that died of natural causes because of the extreme wear of the teeth (Grombly, Personal communication: 2006). Bears that die by natural causes, if indeed they are that, pose several interesting questions. To begin with, it can be assumed that the number of remains found constitute a very small percentage of the bears that die of natural causes. Most old and sick bears most certainly die in remote locations well away from where humans might later find them. Nationwide and across Arizona, the majority of black bears do not die of natural causes, but rather due to anthropogenic factors, especially hunting. In regard to hunting pressure, bears in the Huachuca Mountains have historically constituted a relatively non-exploited population. Consequently, an interesting question arises, do a higher number of bears die of disease, illness, injuries, perhaps even old age, in the Huachucas than in other mountain ranges? How should wildlife agencies factor in natural mortality when developing and implementing management policies?

What effect has the drought had on black bears in the Huachuca Mountains? Generally speaking, there seems to be at least some correlation between average yearly precipitation, and especially average winter precipitation, and bear mortality and removal. Over the last six years considered in this paper, 1999 through 2004, the average yearly precipitation was 12.06 inches, in addition, the last six consecutive winters, 1998-1999 through 2003-2004, produced the lowest amount of average precipitation on record for any similar time period – 1.54 inches. During that time the total number of known bear mortalities and relocations totaled 25 documented animals if one includes those bears that were legally killed by hunters, or 15 if one does not. The six previous years, 1993 through 1998, the average total precipitation was 14.4 inches and the average winter precipitation for 1992 through 1993 was 6.00 inches – much higher than the previous winter. With no bears legally harvested during this time period, there were 11 total deaths and relocations. Is the current drought a factor in bear mortality and removal in the Huachuca Mountains? I believe that it is. But it remains difficult to determine the *extent* of this impact. Is it the *most important* factor, or simply one of many other possible contributing factors such as increased levels of human encroachment, changes in AGFD policies and hunting regulations, or unknown components and events within the bear population itself?

Is the black bear population in the Huachuca Mountains increasing, decreasing, or remaining stable? No one knows. John Porter, a herpetologist who has been studying rattlesnakes in the Huachuca Mountains for 23 years, states that during this time period he has averaged seeing five or six bears a year. Over the past five years, however, he has averaged only one bear sighting a

year (Porter, Personal communication: 2005). Porter goes into the Huachuca Mountains 50-60 times a year, some years as many as 80 times. Mostly he does his field work in Ramsey Canyon. The time period in which he reports a decline in sightings corresponds exactly with the sharp rise in bear mortality that I have recorded in this paper. Admittedly this is anecdotal evidence, but it might very well be an important insight into the health of the bear population in the Huachucas.

Of the 52 deaths and relocations recorded, 46 of these animals can be identified by sex. 17 were male (three harvested, four euthanized, two highway mortalities, three natural deaths, one accidental death, and four relocated), and 29 were female (seven harvested, five euthanized, six natural deaths, two accidental deaths, and nine relocated). *Five* cases of female bear mortality occurred in 2003 alone – three by legal harvest, two others were euthanized (one as a nuisance bear, the other listed as a natural caused death). The large number of females killed and relocated from the population is troubling, especially since almost all of these animals were adults of breeding age. If one accepts the population estimate made by LeCount, then factors in all known and *possible* or *likely* female losses, the total number of female black bears removed from the Huachuca Mountain population is far higher than the acceptable number recommended by LeCount. Even if a larger bear population estimate than the one offered by LeCount is accepted, say 50 or 60 bears with a corresponding number of females bears, it still seems likely that far too many females are being removed from the Huachuca Mountains.

The seemingly disproportionate number of female bear mortalities and relocations in the Huachuca Mountains also seems to defy logic. One would expect male bears to be far more vulnerable to mortality – both in terms of legal harvest and as nuisance kills and relocation. Males are more active for a much greater time period than females and also travel far more extensively in search of food, mating opportunities, and perhaps even as dispersal bears pushed out of their original home areas by older and larger males. Also, hunting seasons are generally geared to harvest a greater number of males than females. Yet, despite these factors, female bears are killed or relocated at a far greater rate – almost two to one – than males. How does one explain, for example, that 70% of all legally harvested bears in the Huachuca Mountains are females? How does one explain the fact that throughout North America 80-90% of bears that are trapped as nuisance bears are males, whereas 56% of all bears killed or removed as nuisance bears from the Huachuca Mountains over the past twenty years have been female? Obviously there are factors at work that we do not recognize or understand.

What impact does the loss of these females – combined with the stress placed on surviving females by the current drought - have on cub production? Pregnant black bear females that enter hibernation in poor physical condition tend not to give birth. This is brought on by an inadequate intake of food caused by mast failures – exactly the type of situation created by the ten-year long drought we are currently experiencing. Are we simply removing too many female bears from the breeding population? Are a sufficient number of cubs even being produced in the Huachuca Mountains to replace the bears that are being lost to the population? Most importantly, should this seemingly excessive loss of female bears dictate a need on the part of AGFD and the Wildlife Office of Fort Huachuca to change bear management policies to provide further protection for this specific element of the population, females? These are the types of questions that must be answered if we are to indeed intelligently manage the black bear population in the Huachuca Mountains.

In closing, one final area of human impact needs to be discussed, namely that of illegal or undocumented aliens from Mexico and the effect this migration is having on black bears and their habitat. The U.S. Border Patrol estimates that over 175,000 illegal immigrants pass through the Douglas-Naco Sector on their way from Mexico into the United States. This sector stretches from the Arizona-New Mexico border to the western side of the Huachuca Mountains. The most used routes in this sector are the canyons and trails through the Huachuca Mountains. A conservative estimate is that no less than 100,000 undocumented aliens transverse the Huachuca Mountains yearly. The damage they cause to the environment is immeasurable. Virtually every canyon and every trail is heavily littered with trash – tons of discarded clothing, food and water containers, and other garbage that black bears routinely investigate in their never ending search for food. Food and soft drink cans quite commonly show evidence of being chewed by bears. I have also found bear scat, the contents of which included shredded pieces of plastic bags - something that is obviously not in the best health interests of the bear. In addition, bears have undoubtedly eaten food left behind by undocumented aliens. Clearly such activity is a formula for trouble, both for humans as well as bears. If bears become habituated to humans and associate people as a source for food, it will be only a matter of time until an undocumented alien or an unaware and innocent backpacker or camper experiences an aggressive encounter and perhaps a mauling. If this happens, both man and bear lose.

One brief side story to the above comments regarding the direct impact of undocumented aliens on black bears in the Huachuca Mountains: In the spring of 2003 three hikers at the Ramsey Canyon Preserve reported that they came across a group of undocumented aliens attempting to stuff a “basketball sized” black bear cub into a backpack. When the hikers yelled at them, they dropped the backpack and ran off – as did the bear cub. This cub was reportedly seen by a number of people for about a week in the canyon, always alone with no mother in evidence. Eventually the sightings ceased. In all probability this cub died of starvation.⁷

Another problem associated with the movement of large numbers of illegal immigrants through the Huachuca Mountains is the potential of a forest fire. It is no accident that the Huachuca Mountains experience more forest fires each year than any other mountain range of comparable size in the state of Arizona. The Oversight fire of 2002, which burned 2,189 acres of Huachuca Mountains, for example, was undoubtedly started by undocumented aliens. Wildfire is generally thought of as being a natural and often beneficial aspect of any forest ecosystem and can actually increase the productivity and abundance of bear food. Uncontrolled, intense fires caused by man, however, especially when they occur in key areas of the mountains, can destroy habitat and food resources and have the effect of putting additional pressure on black bear populations already stressed by drought conditions. Displaced bears must then look elsewhere for food and consequently might find themselves in conflict with man.

In a related issue, there is currently talk on the part of the United States government of building a fence along a larger stretch of the Mexican border for the purpose of slowing the tide of illegal immigration. While such plans have not yet been developed and no one knows if, when, or where this fence will be built, it is quite clear that such a project would potentially have a major adverse impact on bear and other wildlife migration between the U.S. and Mexican sky islands mountain ranges. Hopefully a full environmental assessment will be mandated before any such plans are implemented.

Recommendations

1. That a joint Black Bear Management Team be established for the southeastern sky island mountains with representation from the AGFD, the Wildlife Office of Fort Huachuca, and possibly from the U.S. Forest Service and the National Park Service.

Comments: The main purpose of this management team would be to coordinate all activities that impact the black bear population in the southeastern mountain ranges. This recommendation is premised on the fact that the black bears utilize more than one mountain range in southeastern Arizona, and that in the case of the Huachuca Mountains, one single population inhabits this range and cannot be managed effectively without the coordination of all jurisdictional agencies. One task of this committee would be coordinate their knowledge and recommend bag limits and hunt regulations that take into account the interests of both the State of Arizona and Fort Huachuca, and especially the bear populations that inhabit this area.

2. That research be conducted to determine a more accurate estimate of the black bear population in the Huachuca Mountains.

Comments: It is impossible to implement any effective management program for black bears (or any species) without an accurate estimate of the population itself. It is the belief of this writer that by aggressively collecting scat and hair samples (utilizing hair snares), then employing DNA analysis, a far more accurate count of black bear numbers by sex can be reached in the Huachuca Mountains. Such a research project would be both non-obtrusive and much more cost efficient.

3. That until a more accurate Huachuca Mountain population of black bears is made by sex, that the combined jurisdictional take (AGFD and Fort Huachuca) female bears should be enforced at the level recommended by LeCount in his 1994 study – one every two years. This acceptable female level should include mortality and removal from *all* anthropogenic causes: legal harvest, nuisance kills and removals, and highways deaths.

Comments: I believe that the material I have compiled for this paper clearly indicates a mortality rate for female bears that far exceeds what LeCount deemed acceptable in his 1984 report. Given the low reproductive rate of black bears under the best of conditions, and factoring in the adverse impact of the current drought, it seems highly likely that the current mortality rate among female bears may lead to long-term and perhaps irreparable harm to the overall population of bears in the Huachuca Mountains. In sum, I believe that at this point every step should be taken to conserve the female black bear population in the Huachuca Mountains. Restraint should be exercised in euthanizing or relocating female “problem” bears. Only those female bears that pose a threat to public safety – not simply a threat to private property – should be euthanized. All other females captured as problem bears should be re-released back to the Huachuca Mountains, rather than euthanized or relocated to other mountain ranges. In addition, AGFD might also consider the possibility of re-locating female black bears from other mountain ranges *into* the Huachuca Mountains.

4. That a moratorium be placed on spring bear hunting in the Huachuca Mountains.

Comments: Again, this recommendation stands until such time that an accurate estimate of the Huachuca Mountains bear population is made. Spring bear hunts were originally created as a means to deal with problem bears. In recent years, however, there have been no problem bears and hence no need for a spring bear hunt. Moreover, spring bear hunts in Arizona – and elsewhere - are generally aimed at the male segment of the population. Just the opposite, however, has occurred in the Huachuca Mountains with more females than males being harvested. Considering the questions that I believe exist in regard to the population of female bears and cub production, the loss of females in a spring bear hunt and the possibility of orphaning and losing cubs cannot be justified.

5. That all legally harvested bears be brought in for examination by wildlife agents, and that a state-wide data base be created for all categories of black bear mortality.

Comments: We know very little about black bear populations, not only in the Huachuca Mountains, but for the most part, in the state of Arizona in general. The fact that no bear database currently exists, and that we lack even accurate harvest numbers, strongly suggests that black bears are low on the priority list of game animals in the state. Considering the importance of black bears in the ecosystems they inhabit, the level of public interest they generate, the value of the species as a game animal, and the potential adverse impact of man-bear interaction, this is unacceptable. Black bears need to be elevated to the level of a priority species within the state. As a starting point, AGFD should seek to acquire every piece of information on the sex, weight, and general health of every bear harvested in the state. Moreover, the personal examination of harvested bears by AGFD officials might serve to discover the killing of any lactating females during the spring hunts and lead to any orphaned cubs being located and potentially saved. In neighboring New Mexico, a state that is similar in almost every respect to Arizona, successful bear hunters have one week to have their animal personally examined by a wildlife officer. If a wildlife officer cannot visit the hunter, the hunter must bring the bear in to the Department of Game and Fish for inspection. As part of this inspection an upper premolar tooth is extracted to determine the age of the bear. A tag is also affixed to the pelt. Without this tag the hunter is in violation of the law and the bear cannot be transported nor will a taxidermist accept it (Winslow, Personal communication: 2004). Arizona currently requires a successful hunter to telephone in only the most basic information – sex and where the bear was killed – with 48 hours, then mail in a premolar tooth within 20 days. This requirement represents a very low threshold in terms of attempting to acquire data on the bears that are harvested.

6. AGFD should initiate an ongoing educational program to increase the public's knowledge in the Huachuca Mountains area about bears and to increase an awareness of how to reduce human-bear conflicts.

Comments: With no end in sight to the current drought, it is important that the effort to educate local residents should be ongoing, not simply when human-bear problems have reached a problem situation. Brochures should be developed and workshops held to teach landowners how to discourage bears from coming into populated areas. Quite possibly the

AGFD could enlist the aide of local environmental groups to promote bear education in the Huachuca Mountain area. Moreover, AGFD should provide assistance to the U.S. Border Patrol in an effort to educate undocumented immigrants who enter the country through the Huachuca Mountains as to the dangers of contact with black bears and how they might avoid such contact.

7. AGFD – with the cooperation of the Wildlife Office of Fort Huachuca – and with input from the general public - should develop a standing “Plan of Action” - a protocol - to deal with bear issues.

Comments: As noted earlier in this paper, in the year 2000, Arizona experienced a sudden and unexpected increase in the number of bear incidents throughout the state. An unprepared AGFD responded by killing 43 bears and receiving a great deal of public criticism for their actions. In 2004, AGFD was once again caught off-guard and received an even greater amount of criticism – a near-rebellion actually - for the manner in which they handled the Sabino Canyon mountain lion controversy. In the aftermath of this public relations disaster, the Department responded by soliciting the help of some of the top mountain lion experts in the country, holding a series of public hearings to receive input and garner support, and eventually developed a much improved protocol for dealing with future human-mountain lion conflict which included categories of risks and the appropriate response to each. The same needs to be done with black bears, a species which is far more sensitive to factors like the current drought and thus more likely to come into contact and conflict with people, and are of far more interest and receive a much higher degree of support from the general public than do mountain lions. I might add that in 2005, the top mountain lion experts in North American collaborated to produce a comprehensive volume entitled *Cougar Management Guidelines* – an incredibly valuable publication that can be used by wildlife agencies throughout the United States and Canada as they struggle to develop their own policies for dealing with that species. Hopefully a group of black bear biologists and naturalists will come together and write similar guidelines for a species that is in even greater need for a more enlightened management approach.

8. That wildlife corridors leading to and from the Huachuca Mountains be identified and protected from further human development.

Comments: The health and possibly even the survival of black bear populations in the Huachuca Mountains might very well depend on maintaining the connectivity of the Huachucas to other adjacent sky island ranges in Arizona and Mexico. Again, this is especially important as we continue to struggle through what some experts believe might become the worst drought on record. An area of particular concern is the east and south slopes of the Huachuca Mountains where the developmental sprawl of Sierra Vista is shutting off the mountains from the critically important – in terms of water, food, and as a movement corridor – San Pedro River. Wildlife corridors *must* be maintained to allow bears and other wildlife access to the San Pedro, and from there, to other mountain ranges such as the Chiricahuas, Mules, and ranges in Mexico. Wildlife ecologist Chris Hass has identified 12 washes on the east and south slopes that may act as potential wildlife corridors from the Huachucas to the San Pedro, five of which she has classified as being “most suitable” for the

purpose of wildlife movement (Hass, 2000: 26). More research in this area is needed and the city officials and urban planners in Sierra Vista and other nearby communities must incorporate the findings of this research into their future development plans. In sum, all land use decisions need to take into account their impact on the needs of bear and other wildlife.

9. Habitat quality, and subsequently food availability for black bears and other wildlife in the Huachuca Mountains must be determined and monitored on a yearly basis.

Comments: It is clear that habitat quality directly influences not only the health of black bear populations, but their behavior as well. In a mountain range such as the Huachucas, which are situated so near a major area of human habitation, it seems absolutely vital to monitor the health and condition of the surrounding ecosystem. AGFD, possibly with the help of local environmental organizations such as the Sky Island Alliance – which already carries out similar programs on a smaller scale – need to conduct a thorough study of habitat inventory of the Huachuca Mountains, and then yearly updates to determine what changes are occurring in terms of the availability of food and water for wildlife. It makes little sense to attempt to manage bears in any given location – or any other species – without first having a thorough understanding of the conditions that are impacting that specific population. Management strategies more often reflect the behavior of bears rather than the habitat conditions that dictate that behavior. In such cases that management strategy, whether it be the establishment of female harvest numbers or the decision to remove a nuisance bear, tend to be reactive rather than proactive. One wonders, for example, if it would have been necessary to kill and capture no less than 64 nuisance bears and dependent cubs statewide in 2000 if more was known, or better yet, *anticipated*, about habitat conditions throughout the state. If more is known about habitat quality, quite possibly some degree of preventative measures might first be taken such as the construction of water tanks or perhaps even the establishment of supplemental feeding stations.⁸

Closing Comments

In the spring of 2004 I attended the Biodiversity and Management of the Madrean Archipelago II Conference that was held in Tucson. At this conference I listened to a young graduate student from the University of Arizona who presented a paper entitled “Genetic Variation in Springsnails of the Lower Colorado Drainage.” In brief, her work involved making a comparative analysis of the DNA in springsnails throughout the United States. One of her subspecies came from the Huachuca Mountains. The presentation was extremely well done and I found myself fascinated by her work. As I listened to this paper, however, it dawned on me that thanks to the work of this young woman, we probably now know more about springsnails in the Huachuca Mountains than we do about black bears. Most of what we know about black bears is basic biology. It is largely information gathered by wildlife biologists working for AGFD for the sole purpose of maintaining bear populations for recreational hunting. Certainly this is valuable knowledge to a certain point. But it does not tell us much about, say, the role of bears in a particular ecosystem like the Huachuca Mountains. Ecosystems are like massive jigsaw puzzles. In the Huachuca Mountains, bears – and springsnails for that matter – are pieces in that puzzle. Each piece has its place and each piece has its importance. Missing pieces mean that the puzzle is incomplete.

Bears, for example, undoubtedly disperse the seeds of the plants they eat across a wide area through their scat deposits. Research conducted by Lynn Rogers in Minnesota actually shows that seeds that pass through a bear's digestive system are more likely to germinate than those that are not (Rogers, 1983: 310-311). How important is this to the health of the Huachuca Mountains ecosystem? We don't know.

Bears have been described as the “archetypal *flagship species* – species so charismatic that they can become the symbol and leading feature of an entire conservation program” (Simberloff, 1999: 22). In this capacity they serve as symbols of wilderness for many people – a symbolic status that is well deserved. We know that bears, including black bears, are also important *umbrella* and *indicator species* in any ecosystem they live in. They are a species that require high quality habitat that is relatively free of the adverse impact of human disturbance. They are particularly sensitive to ecological changes be it natural events, such as drought, or anthropogenic events, such as over-hunting and over-development. In effect, black bears serve as classic “miner's canaries” in an ecosystem like the Huachuca Mountains. A black bear population that is in trouble might very well reflect an entire ecosystem that is at risk (See especially, The Wildlands Project, 2000: 100-101).

The AGFD and the Wildlife Office at Fort Huachuca both operate under the assumption that a healthy, viable, and consequently huntable population of black bears resides in the Huachuca Mountains. This was certainly true ten years ago and it might have been true even five years ago, but it may very well not be true today.

As I have documented in this paper, no less than 25 bears – 9 males, 16 females - have been removed from the Huachuca Mountains population since 1999. This figure does not count bears that might have died of natural causes during this time period or unreported cases of bear mortality and relocation. It is the opinion of this writer that this number is excessive. While I believe that the population might very well sustain this loss of males, *it is my opinion that it cannot sustain the number of females that have been lost to the population over the past five years*. Such a statement is certainly based on speculation, an “educated guess” if you will. However, any statement to the contrary is equally based on speculation. We simply do not know. In the absence of creditable data regarding bear populations, and especially female populations, it is always far better to error on the side of the bears. As Al LeCount noted over twenty years ago, any harvest of this population – or in this case the – possible over-harvest of female bears – should be closely weighed against the supposed advantages of adding a few more bears to the overall state harvest.

One of the comments given by an AGFD official after reviewing an early draft of this paper was that it was impossible to manage bears separately in every mountain range, and in fact, it was unnecessary to do so. I disagree with this position. The very nature of the geography of mountain ranges in southern Arizona – the relative isolation of each sky island range - lends itself to the possibility of the individual mountain management of wildlife. Moreover, there is a definite need to do so – if one accepts the premise that every individual population or related populations of bears are important. Certainly we need to manage every bear population with the same level of science, professionalism, and care used to currently manage every individual population of deer, elk, or pronghorn. As long-time game manager and hunting ethicist Tom

Beck has pointed out, we have long managed bears as second-class animals (Beck, 1998: 22). Hopefully we can turn this practice around.

It is clear that expansion of the city of Sierra Vista and the current drought has put tremendous pressure on the black bear population of the Huachuca Mountains. It is also quite clear that Sierra Vista will continue to grow, and that the drought will continue into the foreseeable future. Consequently, conflicts between humans and bears will also continue. Bears tend to be more tolerant of people, than people are of bears. It is the hope of this writer that the human element in this interplay continues to show the patience and common sense needed to minimize future problems and to insure the immediate health and safety of both species.

As I complete this paper, the drought continues in the Southwest. Although the winter of 2004-2005 was relatively wet with a good production of juniper and manzanita berries, and even an acorn crop, the winter of 2005-2006 was far drier. Hopefully the habitat conditions will be adequate enough to keep the bears in the mountains and away from people except for the occasional hiker who might be fortunate enough to catch a glimpse of one. Occasional rains, however, represent only a reprieve and not an end to the dry conditions that have plagued the west for so long. In effect, the minimal amounts of moisture we have received only serves to buy time for what promises to be more dry years ahead of us. It is my hope that we take the opportunity to re-examine and adjust policies and actions that impact upon the black bears of the Huachucas. Only through the efforts of all of us will it be insured that this magnificent animal will continue thrive in this sky island mountain range for another 20,000 years.

Acknowledgments

The first draft of this paper was originally written for and presented at the Biodiversity and Management of the Madrean Archipelago Conference, Tucson, Arizona, May 11-15, 2004. I would like to thank the organizers of this conference for providing me with an excuse to undertake this project, and the first opportunity to present the data and ideas that were developed along the way. While many people made important contributions to the actual contents of this paper, the author would like to specifically thank John Millican and Jim Heffelfinger - who not only provided me with data, but were also kind enough to review and critically comment on an earlier draft - as well as Brad Fulk and Mark Zornes of the Arizona Game and Fish Department. All of these individuals went out of their way to provide me with material and an insight derived of many years of field experience. Although there are a number of areas in this paper that these representatives of AGFD strongly disagree with, they gave me their full cooperation for which I am immensely grateful. I should add that I have always had the greatest respect for the Department and the people who work in it. They are attempting to do a difficult and often thankless job in a highly politicized environment.

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The author alone assumes all responsibility for the content, analysis, and opinions offered in this paper.

Addendum

Black Bear Population Suffers Potentially Devastating Losses in the Summer and Fall of 2006

November 27, 2006

The summer and fall of 2006 has proven to be the worst period on record for human-bear conflicts in the Huachuca Mountains area – and the most devastating in terms of the number of bears that have died or been relocated. No less than twenty-four bears were killed or captured and relocated from the Huachuca Mountains from June 23 through December 1, a period of a little more than four months (See Table 5 below). Additional bears have also been taken from the nearby Patagonia Mountains as well. Steve K. Ferrell, Deputy Director and Robert Fink, Wildlife Program Manager of AGFD, were kind enough to provide me with the most recent accounting of their bear reports and subsequent action. Based on this information as well as newspaper accounts, and personal interviews, I have at this time documented 17 definite bear mortalities this summer and fall (ten males, seven females). Another 7 bears have been positively relocated (four males, three females). The mortalities include five bears that were killed during special population management hunts – including one bear that was captured, relocated to the Patagonia Mountains, and returned to the Huachucas where it was killed by a hunter, five that were captured and euthanized by AGFD – including two that were first relocated to other areas only to be recaptured and then destroyed, three that were killed by property owners, two that were electrocuted on telephone poles, and one bear that was killed by an automobile. Three of the relocated bears were cubs that were taken to the Southwest Wildlife Rehabilitation Center and hopefully can be released in the spring. 23 of the 24 mortalities and relocations occurred from the eastern slope canyons.

In contrast, since 2004 – the end of the research period for this paper – and this summer, I know of only two bear mortalities in the Huachuca mountains, both due to legal harvest in Unit 35 A. In the spring archery season of 2005 a three year old male was taken in Miller Canyon, and in the spring archery season of 2006, a female was also killed.

It is my opinion that the large number of bears that have been killed or relocated from the Huachuca Mountains in the calendar year 2006 – perhaps one-half of the total population – and most importantly no less than ten females, 6 of breeding age – far exceeds the percentage that is deemed acceptable by any responsible wildlife manager and constitutes a catastrophic loss which the population can not sustain. It is also my opinion that the time has now come when AGFD *must* re-evaluate their black bear policies and procedures as they apply to the Huachuca Mountains. As a starting point, the 2007 spring bear hunt should be cancelled in Unit 35 A and on Fort Huachuca. Although bear tags have already been issued, hunters can be given a tag in another area or perhaps the opportunity to hunt in the Huachuca Mountains in another year. In addition, AGFD should seriously consider ending all future bear hunting in the Huachuca Mountains until the population has an opportunity to recover. In sum, AGFD must take immediate and bold emergency steps to protect the bears that remain in the Huachuca Mountains. This might very well include implementing an experimental supplemental feeding program along the lines of what I have discussed elsewhere in this paper, if it appears that natural

food will again be insufficient next spring and summer (see footnote 8, page 51). The City of Sierra Vista and the adjacent town of Hereford must also take action by developing – and enforcing – ordinances specifically directed at the residents of the eastern slope valleys that mandate that residents bear-proof their personal property, do not feed wildlife, and that they especially set out their trash in bear proof containers or at a time of the day when bears are less likely to get into them. To the best of my knowledge no one has ever been given a citation or fined for any action that has led to the bear problems in the east canyons of the Huachuca Mountains. This has to change.

A review of the bear reports provided to me by AGFD offer an interesting look into the complex problems – and the frustrations - encountered by wildlife officials as they attempt to carry out their duties. It is quite clear from reading these reports that – as noted earlier in this paper – the so-called “bear problem” is in reality a “people problem.” In almost every incident described in these reports it was the ignorance of people who caused the death or relocation of the bear. The privilege of living in bear country brings with it the moral responsibility of acting in a manner that insures the welfare of not only bears, but all wildlife. Since a public safety issue might also be involved, there is a legal responsibility as well. While many residents of the eastern slope sincerely respect wildlife and do act in a responsible manner, many do not, and their actions are directly resulting in human-bear conflicts.

In closing there is one positive piece of news to report that will hopefully benefit bears in the long run throughout the state of Arizona. Since this paper was completed, AGFD released its *2006-2007 Arizona Hunting and Trapping Regulations* which includes a greatly improved procedure for the reporting of harvested black bears. Under the revised regulations successful hunters must now contact an AGFD office in person or by telephone within 48 hours of taking a bear. This report shall include the hunter’s name, hunting license number, tag number, sex of the bear taken, management unit where the bear was taken, and telephone number at which the hunter can be reached to obtain additional information. Most importantly, within ten days of taking a bear, the hunter now must present the bear’s skull, hide, and attached proof of sex for inspection. This increased standard for reporting is more in line with the recommendation I made earlier in this paper (see Recommendation 5, page 41) and will provide AGFD with far more information upon which to build its bear management plans and policies.

Hopefully we will continue to have bears to manage in the Huachuca Mountains.

Table 5: Overview of Black Bear Mortalities and Relocations by Cause and Sex from the Huachuca Mountains, 2006

	Male	Female	Unknown	Total
Legal Harvest: Regular Hunts	0	1	0	1
Legal Harvest: Population Management Hunts⁹	3	2	0	5
Nuisance: Euthanized	3	2	0	5
Nuisance: Relocated	4	3	0	7
Killed by Property Owners	3	0	0	3
Highway Mortality	0	1	0	1
Electrocution	1	1	0	2
Totals	14	10	0	24

Notes

¹ The term “Sky Islands” was first coined by Weldon F. Heald in his book *Sky Island* published in 1967, later reprinted in an expanded version as *The Chiricahuas Sky Island* (Tucson: Marguerite Bantlin Publishing, 1993). It has only been in recent years that uniqueness of this special land has been discovered and that people have fought to preserve it. Leading the way in this effort is the Sky Island Alliance based in Tucson. This organization was founded in 1992 and has initiated and participated in a multitude of programs designed to preserve and enhance the wilderness areas of southern Arizona and New Mexico. The Sky Island Alliance is especially active in the area of wildlife monitoring using a cadre of volunteer and well-trained “citizen-conservationists.” Since 2000 the Sky Island Alliance has coordinated the annual Fort Huachuca Lion and Black Bear Track Count. Also playing a vital role in preserving the Sky Island region has been the Wildlands Project which is also based in Tucson.

² The best general resource work on black bears is *The Great American Bear* written by Jeff Fair and Lynn Rogers (1990). This book, which unfortunately suffers from the absence of footnotes, index, and a bibliography, is based on the research being carried out by Rogers and his associates on a population of black bears in Minnesota. Rogers – perhaps the foremost black bear authority in North America – gains his knowledge from close and often intimate work with wild bears. While his work is viewed as being controversial by many more orthodox bear researchers, there is little doubt that he has opened a new chapter not only on our understanding of bears, but also of the man-bear relationship. Rogers has also published a brief (15 pages) but very useful brochure for the U.S. Forest Service entitled *Watchable Wildlife: The Black Bear* (1992) for anyone who interested in “just the facts” about black bear biology and behavior. From a purely biological standpoint, the most valuable general reference on western black bears is John J. Beecham and Jeff Rohman’s *A Shadow in the Forest: Idaho’s Black Bear* (1994). Beecham, like Rogers, is considered one of the “deans” of black bear studies in North America. For those interested in really understanding the behavior,

personality and emotional life of the black bear, Stephen Stringham's *Beauty Within the Beast: Kinship With Bears in the Alaska Wilderness* (2002) falls under the "must read" category. In this book Stringham, a highly respected bear biologist, relates his experience raising and returning to the wild three orphaned black bear cubs. The wealth of information found in this book is indeed impressive. Complete citations for these resources can be found in the bibliography of this paper.

³ The precipitation data for this paper was collected at the Libby Army Airfield at Fort Huachuca. This location is at 4721 feet elevation. Precipitation obviously varies somewhat throughout the Huachuca Mountains. I wish to thank Kyle Molloy for providing, EPG Contractor at Fort Huachuca for providing this data.

⁴ Increasingly, special public interest groups have risen throughout the United States to speak out on behalf of wildlife and to serve as "watchdogs" over the policies and actions of state and federal wildlife agencies. Often these groups become quite knowledgeable and influential. Bears are frequently the focus of such organizations. Most commonly these bear advocates work to reduce conflict between people and bears through the production and distribution of educational materials, and occasionally by providing and erecting bear-proof garbage containers at parks and other camp grounds which the potential for problems exist. In many cases they work cooperatively on such projects with state wildlife agencies. In New Mexico one such group – the Sandia Mountain Bearwatch – headed by Jan Hayes has become an especially outspoken critic of spring bear hunting and the use of hounds to hunt bears. There is little doubt that this group has an influence in bear management in New Mexico. The Sandia Mountain Bearwatch has also published a very useful book entitled *A Guide to Wildlife Stewards: How to Coexist With Our Wildlife*. Similar bear advocacy groups can be found in Colorado, Minnesota, Nevada, Wisconsin, and in other states as well as throughout Canada.

At this time there are no bear advocacy groups in Arizona. For a number of years the North American Bear Society – an organization comprised primarily of hunters – was based in Phoenix. Most of the work carried out by this organization greatly benefited bears and had little to do with hunting. In September 1992, for example, they purchased and installed 12 bear-proof trash containers for Coronado National Memorial.

⁵ The story of the 23 orphaned black bear cubs and yearlings that were taken to the Southwest Wildlife Rehabilitation Center by AGFD in 2000 represents one of the great success stories in the field of wildlife rehabilitation. Four of these bears died and another would be kept in captivity. The 16 others, however, were induced into hibernation that winter and eventually released back into the wilderness the next spring thanks to the dedication and skill of director Linda Searles and her volunteer staff.

⁶ This second highway death serves as an excellent example of the lack of accurate data regarding black bear mortality and difficulty in gathering such data. An automobile struck this bear at approximately 11:00 pm. The Arizona Department of Highway Safety (DPS) – the Highway Patrol – responded to the call. Arizona Game and Fish were *never* notified and have no record of this incident. Nor was this mortality ever brought to the attention of AGFD. Under Arizona law the husband of the driver of the automobile was permitted to remove the

carcass, which he did. Fortunately this incident was reported in a very brief one-paragraph article that appeared the next morning in the *Sierra Vista Herald*. Tom Beatty first drew my attention to this incident – although he could not remember when it occurred. I was able to track the article down by doing a search of the microfilm at Cochise College. No information was given in this article about the bear or the driver. Subsequently, I called DPS and found out the name of the responding officer. He remembered the incident well – it was the only highway bear mortality he had ever responded to – but remembered nothing about the bear. He did, however, provide me with the accident report number. I then sent a written request to the main DPS office in Phoenix which was kind enough to send me the accident report. The driver's name was given along with her physical home address, but no telephone number. I then drove to the Hereford area where she lived and was very fortunate to find her at home where I interviewed her. I was also able to examine the tanned hide of this bear, which appeared to be a subadult. Her husband, who was a hunter, had skinned the animal and verified its sex, a male. Although a salvage permit is required by AGFD, there are undoubtedly other bears killed on the highway, picked up, and never reported. Perhaps even more common are bears that are struck by vehicles and stagger or crawl off to die later in the bush.

⁷ It is interesting to speculate why this cub was alone and apparently abandoned by its mother. As noted, this incident occurred in the spring of 2003. Five female bears were killed that year: three by legal harvest, two as nuisance bears. The possibility exists that one of these females was the mother of this cub. Another strong possibility is that the mother simply abandoned her cub when confronted with human presence. Contrary to what most people believe, black bear mother almost never defend their cubs against human intrusion. Cub defense is almost exclusively a characteristic of grizzly bears.

⁸ The question of providing artificial sources of food and water to wildlife is controversial, and I wish to make it clear that I am not advocating such practices. I do suggest, however, further investigation into the feasibility of doing so in times of extreme habitat degradation. If drought conditions reach a critical point, for example, it would be important for wildlife managers to fully understand all of the options that are available to them. Artificial water sources are already being provided in the form of stock tanks that have been built for cattle throughout the Huachuca Mountains, and AGFD has historically provided water for threatened game species such as Desert bighorn sheep. Feeders have also been erected in the Huachuca Mountains to enhance the reintroduction of Gould's turkeys. So the precedence does exist for providing temporary water and food to wildlife when needed. In regard to black bears, key concerns would have to be addressed, particularly how to prevent the bears from becoming conditioned to human food sources. Some bear biologists, most notably Lynn Rogers, has been studying this issue through his Wildlife Research Institute based in Ely, Minnesota. Rogers believes that in some situations judiciously placed supplemental food stations can serve as a buffer against bear problems when natural food is scarce. Roger's work has also demonstrated that supplemental feeding does not necessarily result in either conditioning to human food or in habituation. One such experimental supplemental feeding program is currently being used in western Washington in an effort to keep bears from damaging commercial trees. The results of this program – which uses pellets set out at established feeding stations – has been extremely successful and deemed “a viable tool to alleviate damage” to timber resources (Ziegler and Nolte, 2001: 67).

⁹ The category of Population Management Hunt includes one bear that was harvested under the new “Special Big Game License Tag” program passed by AGFD in 2005. In this program two bear tags were donated to the Arizona Bow Hunters Association and Safari Club International which were then auctioned off as fundraisers for these respective organizations. These tags are “special” in that they are valid for hunting 365 days a year and can be used for hunting statewide as opposed to any specific hunt unit. I have decided to include this bear – reportedly a very large male – as a Population Management Hunt kill because this bear was target animal for which AGFD specifically notified the hunter to come and harvest. The hunter’s winning bid for this special tag was reportedly \$1800.

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Steve Pavlik teaches Native American Studies and Native Science at Northwest Indian College, Bellingham, Washington. This paper was originally published on the Wildlands Project website (2006).