Assessing the Status of Black Bears in Rocky Mountain National Park

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The black bear (Ursus americanus) is found throughout most of the western United States and is one of Rocky Mountain National Park's (RMNP) most identifiable species. Despite this, little is known about the park's bear population, though it is believed to be very small.

One of the basic tenets of the National Park Service is preservation of such populations. Previous to our research, bears were studied in RMNP from 1985-1991 by Dr. Henry McCutchen. This investigation yielded insights into population dynamics, diet and habitat selection by bears in the park. However, many questions were left unanswered and greater detail was needed for others. An investigation was initiated in 2003 to further expand our knowledge of this charismatic omnivore.

Initial efforts focused on capturing and collaring bears in the park. Modified Aldrich foot snares were used for most captures, though one was captured in a large cage trap. Foot snares provided portability into backcountry sites while maintaining low levels of injury. Once captured, bears were sedated and size, weight, and body fat measured. After data collection was concluded (usually one hour), bears were given a reversal drug and typically were mobile in 10-30 minutes.

Capture efforts the first year focused on the east side, due to logistical constraints, and resulted in 8 total captures (2 males, 6 females). Three additional bears (1 male, 2 females) were captured on the east side during 2004 and 2005, bringing the total number of individuals captured on this side of the park to 11. During subsequent years greater effort was applied to catching bears on the west side of the Continental Divide, but unfortunately has yielded only one bear capture. The reason for this lack of success is difficult to determine, though it is likely related to the small number of bears located on this side of the park.

Once collared, bears were tracked to assess areas utilized. Such information can be used to determine the animal's home range, or the area most commonly used for normal activities. Home range sizes have varied considerably across years for both males (57.4-167.3 km2) and females (6.8-91.7 km2). This variation is likely the result of differing levels of food abundance across years. During 2004, rainfall was abundant resulting in increased food levels, while 2003 and 2005 were intermediate in precipitation accumulation.

Greater abundance of food usually results in smaller home ranges, as was observed in 2004. Nonetheless, the size of female home ranges in RMNP is typically larger than that observed in other localities, suggesting that overall habitat is of low quality for bears in RMNP compared to their lower elevation counterparts.

Reproductive characteristics are important factors to consider when assessing the health and potential productivity of animal populations. These characteristics include numbers of cubs per litter, intervals between successful litters, ages when females first give birth to cubs, and cub survival.

Unfortunately, determining many of these reproductive characteristics requires a large number of reproductive females. For such a small population of bears, as is found in RMNP, determining these values can be difficult. Nonetheless, when examining data from the current and previous study conducted at RMNP, we're able

Researcher with large adult male during early winter, 2005. *(Photo by Brock Hoenes)*

to get a general feel for some of these characteristics. Unfortunately, what we're finding is that most of these factors are at the lower end of reported bear populations, thereby reducing the likelihood of population expansion. In short, reproductive output appears to be minimal and provides further evidence that habitat in RMNP is marginal for bear populations.

Assessing the quality of bear habitat in RMNP and their influence on subsequent body condition and reproductive output are a major component of this investigation. To date, data collection is only partially complete and analyses are yet to be conducted. However, we have assessed body condition at various den sites since 2003 using bioelectrical impedance analysis (BIA). To assess body condition, sedated bears are connected to a BIA machine that allows us to determine percent body fat. We can then compare these fat levels to respective habitats used in our assessment of the overall importance of different habitat characteristics. Initial results suggest that bears are entering hibernation in relatively good condition (28-41% body fat), however, many of the bears sampled have had ready access to human foods, which may be a major factor in their overall body condition. Further analysis should help clarify this.

Another primary component of interest to RMNP staff is an accurate assessment of bear population size. Various techniques have been employed by researchers to estimate the number of bears in a population including bear captures, use of heat and motion sensing cameras, and hair snaring, a technique which involves analyzing DNA extracted from hair follicles to identify individual bears. These procedures typically result in a number of individuals who are initially identified, and a certain percentage of them who are observed at subsequent times. This circumstance is known as a mark-recapture or mark-resight

technique and provides an estimate of population size. This procedure requires a relatively high number of bear resightings, which unfortunately does not typically occur with small population sizes. For such small populations it may be more feasible to combine techniques to attempt to identify all individuals in a population. Therefore, we've used capture, remote-sensored cameras, and direct observation to identify bears in RMNP. Initial results from the current investigation indicate 20 bears in the park with approximately 65% located east of the Continental Divide. The previous investigation suggested a population size ranging from 25-35 individuals. This could indicate a reduction in overall population size or could signify a shift of some bear ranges into urban or lower elevation areas. Such a shift in bear ranges has been observed in other areas (e.g., Lake Tahoe region) and may be

Immobilized yearling female during den work, late winter 2004. This bear is attached to bioelectrical impedance analysis (BIA) machine to determine percent body fat.

occurring in RMNP, as bear sightings have increased around Estes Park in recent years.

Additional information needs to be obtained and analyzed to further clarify the status of RMNP's most charismatic omnivore, though preliminary results suggest that this population is limited by its existence in high elevation or low productivity habitat. Nonetheless, this investigation will provide baseline information on which to compare future population dynamics and should yield insight into factors that can be managed to improve the quality of habitat available in RMNP.

RMNP Spring Research Conference Held in Estes Park

Rocky Mountain National Park held its biennial research conference April 4-5, 2006 in Estes Park.

The purpose of the conference was to allow researchers to discuss their methods and results with their colleagues and park staff. All park investigators over the last 3 years were invited to present their research in either a 20-minute talk or via an informational poster.

Research projects were blocked by topic. The wildlife block included research on mountain lions, bears, amphibians, and deer. Other sections focused on birds, geology, history, social science and air quality.

The conference was presented by the Continental Divide Research Learning Center, based in Rocky Mountain National Park, whose mission is to support park research activities, to synthesize results as an aid to decision-making, and to engage the public in research-related educational opportunities.