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MORTALITY OF AN ADULT COUGAR DUE TO A FOREST FIRE --

Mortality from natural causes has been documented throughout the range of the cougar (*Puma concolor*), including California (Beier and Barrett 1993), Canada (Ross et al. 1995), Florida (Taylor et al. 2002), Idaho (Hornocker 1970), Nevada (Ashman et al. 1983), New Mexico (Logan and Sweanor 2001), and Utah (Gashwiler and Robinette 1957, Lindzey et al. 1988). Intraspecific killing by adult males is the most common cause of death in un hunted populations; adult males have killed kittens, subadults, and adults of both sexes (Beier and Barrett 1993, Maehr 1997, Logan and Sweanor 2001, Taylor et al. 2002). Other mortality factors include other carnivores such as the gray wolf (*Canis lupus*) (Boyd and Neale 1992) and coyote (*Canis latrans*) (Logan and Sweanor 2001), injuries from prey (e.g., North American porcupine [*Erethizon dorsatum*; Robinette et al. 1959], deer [*Odocoileus spp.*; Lindzey et al. 1988], elk [*Cervus elaphus*], and bighorn sheep [*Ovis canadensis*; Ross et al. 1995]), starvation, accidents (Lindzey 1987), parasites, disease (Dixon 1982, Logan and Sweanor 2001), old age (Hornocker 1970), and snakebites (Logan and Sweanor 2001). We report the death of an adult female cougar from a forest fire in the Black Hills, South Dakota.

The Jasper fire was the largest in the Black Hills since the region was colonized by Euro Americans in the 1800's (USDA Forest Service 2001). The fire was started on 24 August 2000 at approximately 1430 hrs, south of U.S. Highway 16 between Newcastle, Wyoming, and Custer, South Dakota. It burned 338 km² over six days. The greatest area (196 km²) burned on 26 August, between 0600 hrs and 1800 hrs. Overall, the intensity of the burn was ranked as high in 39%, moderate in 32%, low in 24%, and unknown in 5% of the burned area. The fire was contained on 8 September 2000 at 1800 hrs (USDA Forest Service 2001).

The Black Hills form an 8,400 km² (Fecske et al. 2002) isolated mountain range in western South Dakota and northeastern Wyoming. The climate of the Black Hills is semi-arid continental with mountain climate type influences (Froiland 1990). Elevation ranges from 973 to 2,202 m and annual precipitation ranges from 45 to 66 cm (Orr 1959). Mean daily maximum and minimum temperatures for the northern, central, and southern Black Hills are 13.8°C and -0.9°C, 13.2°C and -3.3°C, and 16.9°C and 0.7°C, respectively (Froiland 1990). Three forest complexes characterize the region: the Rocky Mountain coniferous forest complex dominated by ponderosa pine (*Pinus ponderosa*), the northern coniferous complex dominated by white spruce (*Picea glauca*) forests, and the deciduous forest complex. Interspersed among the forests are parklands composed of short and mid-grass prairie grasses, forbs, and shrubs (Froiland 1990).

As part of a study to document distribution and abundance of the cougar in the Black Hills, we captured, immobilized, affixed transmitters to (Telonics Inc., Mesa, Arizona), and released 12 cougars (7 males and 5 females) during the winters of 1998 through 2001. Cougar #8 (F8) was a 41 kg adult female, approximately 3 to

4 years of age (Anderson and Lindzey 2000) at the time of her capture on 31 January 2000. We located radio-collared cougars weekly by using aerial telemetry techniques.

On 2 September 2000, during the first relocation flight after the Jasper fire, we located F8's radio collar in its mortality mode. The carcass was in a draw 3.4 km south of and within the northern perimeter of the burn. Her death likely occurred 26 August when strong winds from the south directed the fire northward at an average rate of 24.3 km per hour, trapping F8 in the draw where she died. Seventy five percent of F8's 205.9 km² annual home range (90% Adaptive Kernel estimate, n = 26 locations) was encompassed within the perimeter of the Jasper fire.

The carcass of the cougar was taken from the field to South Dakota State University and frozen until it was necropsied on 1 November 2000. All of F8's toes, plantar pads, and foot hair were burned. Her facial vibrissae also were burned, but little (< 5%) of her pelage was singed. A black soot coating in F8's mouth, trachea, and lungs indicated that she asphyxiated. The cougar appeared otherwise healthy. Although F8 had an empty digestive tract, she was in good condition based on fat reserves surrounding the internal organs, and she was pregnant with two near-term fetuses (Sharon Seneczko, DVM, Custer, South Dakota, personal communication).

Deaths of individual cougars from fires could impact population dynamics in relatively small and isolated cougar populations like that of the Black Hills. Large-scale, high-intensity fires could temporarily suppress cougar population growth through direct mortality of females and their offspring and by reducing carrying capacity from a reduction of prey habitat quality. Cougar population suppression due to fires could be incorporated into population models by allowing for stochastic processes and temporarily decreasing habitat quality in burned areas.

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