

Northern Harrier, *Circus cyaneus*, Attacks on Greater Sage-Grouse, *Centerocercus urophasianus*, in Southern Alberta

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The Greater Sage-Grouse (*Centerocercus urophasianus*) is an endangered species in Canada, making it critical to understand all known causes of mortality. We report the first recorded observations of female Northern Harrier (*Circus cyaneus*) attacks on male Greater Sage-Grouse. Although no attacks were successful, our observations suggest that Northern Harriers are predators of Greater Sage-Grouse.

Key Words: Greater Sage-Grouse, *Centerocercus urophasianus*, Northern Harrier, *Circus cyaneus*, endangered species, lek, predation, Alberta

Northern Harriers (*Circus cyaneus*) are opportunistic predators that use visual and auditory cues to locate their prey (MacWhirter and Bildstein 1996). Rodents, passerines, small water birds, reptiles and frogs are the principal prey of harriers (Collopy and Bildstein 1987); however, prey choices are ultimately limited only by the size, formidability, and availability of prey (MacWhirter and Bildstein 1996). Northern Harriers are a sexually dimorphic species with females (432-621 g) being larger than males (308-387 g) (MacWhirter and Bildstein 1996), making them more capable of capturing larger prey items. The largest known avian prey taken by Northern Harriers weigh < 1300g [Sharp-tailed Grouse (*Tympanuchus phasianellus*) – 880 g (Connelly et al. 1998); male Ring-necked Pheasants (*Phasianus colchicus*) – 1250 g (Dale 1956)]; approximately twice the weight of a female Northern Harrier. As most studies of harrier prey selection are based on observations of prey delivery to nests (MacWhirter and Bildstein 1996), the relative importance of prey too heavy to carry back to the nest may be underestimated.

The Greater Sage-Grouse (*Centerocercus urophasianus*) is an endangered species in Canada. Golden Eagles (*Aquila chrysaetos*), Ferruginous Hawks (*Buteo regalis*), Red-tailed Hawks (*Buteo jamaicensis*), Swainson's Hawks (*Buteo swainsoni*), Gyrfalcons (*Falco rusticolus*), Northern Goshawks (*Accipiter gentilis*), and Great Horned Owls (*Bubo virginianus*) are known avian predators of adult sage-grouse (Schroeder et al. 1999; CLA personal observation). Northern Harriers are known to prey on the chicks of Greater Sage-Grouse, but there are no known records of predation on adults (Schroeder et al. 1999). Here we report predation attempts by female Northern Harriers on adult male sage-grouse. Male sage-grouse have an average mass of 3122 g (n = 48, Aldridge 2000) in southeastern Alberta, suggesting that potential prey of harriers may be almost three times heavier than previously reported.

Observations

Breeding displays of male Greater Sage-Grouse take place at both dawn and dusk at breeding arenas (leks), with the most intense displays occurring in the hour immediately surrounding sunrise (Jenni and Hartzler 1978). As part of ongoing research on Greater Sage-Grouse in southeastern Alberta, we conducted morning lek censuses between 24 March and 24 May 2001. Each census consisted of observing the breeding activities for 20 to 40 minutes. We repeatedly observed all seven known active leks for an average of 23 ± 6.6 visits to each lek. During the course of these counts, we made the following observations.

On 8 April 2001, the carcass of a male Greater Sage-Grouse was found on a lek. The sage-grouse was decapitated and most of the carcass was consumed. The feathers were plucked, and exhibited crimp marks. Raptors often pluck the feathers of their prey, crimping the shaft, and commonly decapitate the prey item, selecting the neck and breast meat of the bird (Einarsen 1900).

Two days later on the same lek (10 April 2001), a female Northern Harrier attempted an attack on several male Greater Sage-Grouse. As the harrier approached the lek, all nine males present stopped displaying and crouched down. The harrier dove at one sage-grouse, which responded by flying from the lek when the harrier was ca. 5 m away. The harrier pursued the grouse for about 10 m, but the attack was unsuccessful. The harrier then turned and flew back to the center of the lek causing the remaining eight sage-grouse to fly from lek. The male sage-grouse did not return to the lek and breeding activities were interrupted for the remainder of the morning.

A similar incident occurred at a second lek site on 4 May 2001, when a female harrier swooped over male sage-grouse on the lek site without diving or focusing an attack on a single individual. In response, nine of the 23 males that were displaying flew from the lek,

and the remaining 14 sage-grouse stopped displaying and crouched close to the ground.

Discussion

Our observations suggest that Northern Harriers may be predators of adult male Greater Sage-Grouse. Furthermore, the defensive behaviours exhibited by male sage-grouse in response to Northern Harrier attacks parallel sage-grouse responses to attacks by Golden Eagles (Hartzler 1974; Ellis 1984), indicating that Greater Sage-Grouse recognize Northern Harriers as predators.

Northern Harriers appear to be potential predators of adult Greater Sage-Grouse and may frequent lek locations to exploit high concentrations of grouse during the breeding season. Harriers in Scotland display similar behaviours, selectively hunting in habitats with high abundances of Red Grouse (*Lagopus lagopus*; Redpath 1992). Given that most sage-grouse populations are declining and that predation is considered the primary source of mortality for prairie grouse (Schroeder and Baydack 2001), the identification of predators is essential to conservation and population management efforts, especially for the endangered Canadian Greater Sage-Grouse population.

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