

# Evidence for the Use of Vocalization to Coordinate the Killing of a White-Tailed Deer, *Odocoileus virginianus*, by Coyotes, *Canis latrans*

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Among the social canids, howling is largely accepted as playing a role in territory maintenance. However, its role in communication within packs, such as announcing departures from den and rendezvous sites and coordinating reunions or movements, remains largely speculative. We report an observation where a radio-collared adult male Coyote (*Canis latrans*) and his mate seemed to summon two other Coyotes (presumed to be their offspring) from ~700 m away to join in the successful pursuit of an adult male White-tailed Deer (*Odocoileus virginianus*). Our observation suggests that Coyotes can use vocalization as an effective means of coordinating social activities such as the hunting of large prey.

Key Words: Eastern Coyote, *Canis latrans*, predation, vocalization, social organization, Nova Scotia.

Auditory communication serves an important role in the social ecology of the Canidae (Harrington and Mech 1978, 1979; Theberge and Falls 1967; Gese and Ruff 1998). Howling is a means of long-distance communication that apparently can be heard at distances of > 6 km (McCarley 1975; Harrington and Mech 1979). Among Coyotes (*Canis latrans*) and Wolves (*Canis lupus*), howling is largely accepted as playing a role in territory maintenance (Joslin 1967, Harrington and Mech 1978, 1979; Gese et al. 1988). Intrapack communicatory roles, such as announcing departures from den and rendezvous sites, and coordinating reunions or movements remain largely speculative (Theberge and Falls 1967; Mech 1970; Harrington and Mech 1978). Bender et al. (1996) suggested that howling among Coyotes might serve to reunify packs to facilitate the hunting of ungulates. Herein we report a case where a breeding pair of Coyotes in pursuit of a large White-tailed Deer (*Odocoileus virginianus*) was able to entice two other Coyotes to join the pursuit from ~700 m away.

## Observation

We interpreted the details of the chase while snow-tracking a radio-collared Coyote and his mate on 27 February 1994 as part of a study of the effects of the distribution and abundance of Snowshoe Hares, *Lepus americanus*, and White-tailed Deer on the life history of Coyotes in Nova Scotia (Patterson and Messier 2000, 2001; Patterson et al. 1998). The actual event probably occurred during the previous night.

Radio-collared Coyote AM3 and his mate were traveling west on a snow-covered (10-15 cm) secondary road 1 km east of Kejimikujik National Park (44°20'N,

65°15'W) when they abruptly veered due north. Lengthened strides indicated that their pace increased, and after 40 m the pair jumped three deer, of which two headed west and the other east. Both Coyotes chased the deer that ran to the east. After 280 m the two Coyotes split up, with the larger radio-collared male chasing the deer down a steep bank into a bowl-shaped depression. AM3 then swung wide to the left of the deer, apparently in an attempt to steer the deer into the path of the other Coyote that had remained on the rim of the depression. The second Coyote circled the depression and ran down the opposite side in front of the deer. We interpreted this as an effort to prevent the deer from leaving the depression.

Within 3 m of the second Coyote's resumption of the chase, both Coyotes attacked the deer and drew hair but no blood. The deer escaped and again attempted to run up the side of the depression when AM3 swung to the right and turned the deer back down into the depression, where the second Coyote was waiting and again resumed the chase. The Coyotes attacked the deer again at 383 m where a larger area of snow was trampled down than during the first attack. There was more hair strewn about, but still no blood. At this point two more Coyotes became involved in the chase. At 390 m more hair was detected as well as blood, indicating another attack. The deer broke away once more only to be attacked again at 397 m. After escaping yet again the deer made a long run across the middle of the depression. Considerable amounts of blood and hair strewn about a 20 × 30 m packed-down area at 590 m indicated a more serious struggle. The deer made one final escape and was pulled down by the front end at 630 m, with tracks indicating that the deer was drag-

ging at least two of the Coyotes, which appear to have been hanging off its sides. After dragging the Coyotes for 40 m the deer was killed at the 670 m mark.

Examination of the carcass revealed that the deer was a large 3.5 year old buck that showed no obvious debilitations and was apparently in good health (>80% femur marrow fat content and other visible body fat reserves). We believe that the deer would likely have escaped if it could have got out of the depression. The two Coyotes initially involved in the chase appeared to have trouble drawing blood from the deer until the other two Coyotes joined them. Backtracking later revealed that the two Coyotes that joined the chase in progress had been traveling in another direction when they abruptly turned and trotted 690 m in a direct line to join the chase. Forest cover was dense, precluding any possibility that these Coyotes observed the chase prior to joining in. AM3 and his mate were typically accompanied by two of their young of the year when traveling in winter 1994 (Patterson and Messier 2001). We believe that the two Coyotes that joined the chase "in progress" were probably these same juveniles that had been temporarily disassociated from their parents. We speculate that they must have heard AM3 or his mate howling or yipping and were able to determine that it would be to their benefit to join the breeding pair promptly.

## Discussion

Although we can not verify that howling was used to draw the other two Coyotes to the scene of the chase, we can think of only one other means by which two Coyotes ~700 m away in forested cover may have been able to so directly and rapidly locate the scene of the chase. White-tailed Deer can snort loudly when alarmed, but snorts are generally only given when a deer perceives danger but does not feel directly threatened (Hirth and McCullough 1977; Marchinton and Hirth 1984). Furthermore, snorts are more likely to be given by maternal family groups than by bucks (Hirth and McCullough 1977). Thus it seems unlikely that snorting by the buck alerted the other two Coyotes to the chase.

Among forest-dwelling eastern Coyotes increased reproductive fitness and inclusive fitness for juveniles before dispersal seem to be the ultimate factors influencing group living (Messier and Barrette 1982; Patterson and Messier 2001). Increased efficiency at using large prey appears to be a secondary benefit (Gese et al. 1988; Messier and Barrette 1982; Patterson and Messier 2001). Coyotes in Nova Scotia were more successful at killing deer when thick snow cover impeded deer movements (Patterson and Messier 2000). There was only 10-15 cm of snow on the ground during the event described here and our observations suggest that in this particular incidence the snow cover may have been a hindrance to the Coyotes, thus benefiting the

deer. It was clear that AM3 and his mate were having difficulty subduing the deer on their own. We believe that they would not likely have been able to make physical contact with the deer if it had not entered the depression. Although Patterson and Messier (2000) did not detect a consistent increase in deer killing rates for groups of 2-5 Coyotes, groups of >4 Coyotes killed proportionately more deer (Patterson 1999). We suspect that larger group sizes may be more advantageous in hunting large prey in the absence of other contributing factors such as thick snowcover or glare ice. The proximate mechanism is likely an increase in the probability of at least one member of the group making physical contact with the deer and slowing it down enough for other group members to assist in dispatching it. Our observation supports this idea and suggests that Coyotes can use howling as an effective means of coordinating social activities such as the hunting of large prey.

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