
(27) COYOTE-MEDIATED INTERACTIONS AMONG SNOWSHOE HARES AND ALTERNATIVE PREY

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Abstract: We studied the foraging behavior and population dynamics of coyotes (*Canis latrans*) in the Alaska Range during the peak and decline of a snowshoe hare (*Lepus americanus*) population cycle (1999–2002). We predicted that snowshoe hare abundance would indirectly affect alternative prey, such as Dall sheep (*Ovis dalli*), via shared coyote predation. Previous research identified coyotes as a major predator of lambs and we therefore hypothesized that hare abundance would influence coyote predation on Dall sheep due to prey switching or a numeric response by coyotes. Coyote diet was determined from scat analysis and snow tracking, and we compared diet to prey availability to examine the response of coyotes to the hare decline and test for changes in prey selection. Variation in coyote diet was best explained by changes in snowshoe hare abundance ($R^2 = 0.7–0.99$) and was not strongly related to changes in alternative prey density. Coyotes responded to the hare decline by increasing selection for hares and porcupines, whereas selection for carrion, voles, ground squirrels, and Dall sheep lambs did not change. Although per-capita coyote predation on Dall sheep was not related to hare density, total coyote predation on radiocollared Dall sheep lambs was highest during peak coyote numbers, indicating that snowshoe hare abundance indirectly affected Dall sheep populations by inducing a numeric response among coyotes. Resident coyote pairs did not produce pups during the 3 years following the hare decline. Conversely, porcupine populations were primarily affected by changes in coyote foraging behavior: per-capita consumption of porcupines increased 25-fold during the decline in hare numbers. Coyote predation may cause secondary population cycles in these alternative prey populations.

