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Abstract

We conducted a large-scale, controlled experiment to study the responses of declining woodland caribou (Rangifer tarandus), moose (Alces alces), and Dall sheep (Ovis dalli) to a 5-year reduction in wolf (Canis lupus) numbers in the Aishihik area in the southwestern Yukon. We monitored 10 contemporary controls including 3 caribou herds and 3 moose, 1 Dall sheep, and 3 wolf populations. We tested the hypothesis that wolf predation was the main factor limiting recruitment, adult survival, and population size for the 3 ungulates. Caribou productivity, winter forage quality, disease prevalence, snow depth, snowmelt phenology, harvest, and migration were also assessed. For moose, we also examined harvest, snow depth, and spring and summer growing seasons. Treated moose and caribou populations showed the greatest differences in changes in rates of increase during wolf treatment compared to controls, supporting the wolf predation hypothesis. We found evidence that wolf predation strongly limited recruitment of caribou and moose, and survival of adult moose. We found no evidence that adult survival of caribou improved when wolf numbers were reduced, nor did we find evidence that Dall sheep recruitment or adult numbers responded to lower wolf numbers. Wolf predation and human hunting were probably the main causes of caribou and moose declines before our study. The combination of reduced hunting and lowered predation by wolves was the primary factor causing the increase in the treated Aishihik caribou herd. Lowered predation by wolves, especially upon adult moose, was more important than harvest reduction to the moose increase in the Aishihik area. We hypothesize that woodland caribou herds are linked to the population dynamics of low-density moose in the Yukon. We conclude that natural predation is the main force maintaining low abundance of moose, and that maximum harvest rates should be set conservatively at 2% for caribou and 5% for moose. We recommend that managers use habitat enhancement and public wolf trapping to sustain higher ungulate densities and avoid the need for reactive broad-scale wolf control. We found that wolf fertility control was effective in reducing the rate of increase of wolves and that it was more publicly acceptable than lethal control. We evaluate large-scale wolf-prey experiments as an adaptive management approach.