ADAMS, L. G., STEPHENSON, R. O., DALE, B. W., AHGOOK, R. T. and DEMMA, D. J. (2008), Population Dynamics and Harvest Characteristics of Wolves in the Central Brooks Range, Alaska. Wildlife Monographs, 170: 1–25.

ABSTRACT Our understanding of wolf (*Canis lupus*) population dynamics in North America comes largely from studies of protected areas, at-risk populations, and wolf control programs, although most North American wolves experience moderate levels of regulated harvest. During 1986–1992, we investigated the population dynamics and harvests of wolves in the newly created Gates of the Arctic National Park and Preserve in northern Alaska, USA, where wolves were harvested by local residents. Our objectives were to determine wolf abundance, estimate important vital rates (i.e., productivity, survival, emigration), and characterize wolf harvests. We monitored 50 radiocollared wolves in 25 packs over 4 years (Apr 1987–Apr 1991) to assess patterns of dispersal, emigration, survival and mortality causes in the wolf population. We determined pack sizes, home ranges, and pups per pack in autumn (1 Oct) for instrumented wolf packs, and calculated wolf densities in autumn and spring (15 Apr) based on the number of wolves in instrumented packs and the aggregate area those packs inhabited. We also gathered information from local hunters and trappers on the timing, location, methods, and sex-age composition of wolf harvests during 6 winter harvest seasons (Aug 1987–Apr 1992).

Wolf densities averaged 6.6 wolves per 1,000 km^2 and 4.5 wolves per 1,000 km^2 in autumn and spring, respectively, and spring densities increased by 5% per year during our study. On average, pups constituted 50% of the resident wolf population each autumn. An estimated 12% of the population was harvested annually. Natural mortality, primarily intraspecific strife, equaled 11% per year. Young wolves emigrated from the study area at high annual rates (47% and 27% for yearlings and 2-yr-olds, respectively), and we estimated the emigration rate for the population at ≥19% annually. Yearlings and 2-year-olds were lost from the population at rates of 60% per year and 45% per year, respectively, primarily as a result of emigration; mortality was the principal cause of the 26% annual loss of wolves ≥3 years old.

On average, 47 wolves were harvested each winter from our study population, or twice the harvest we estimated from survival analyses of radiocollared wolves (23 wolves/yr). We suggest that the additional harvested wolves were transients, including local dispersers and migrants from outside the study area. Trapping harvest was well-distributed throughout the trapping season (Nov-Apr), whereas shooting harvest occurred mainly in February and March. Of 35 individuals who harvested wolves in the area, 6 accounted for 66% of the harvest.

We analyzed information from North American wolf populations and determined that annual rates of increase have an inverse, curvilinear relationship with human-caused mortality ($r^2 = 0.68$, $P < 0.001$) such that population trends were not correlated with annual human take ≤29% ($P = 0.614$). We provide evidence that wolf populations compensate for human exploitation ≤29% primarily via adjustments in dispersal components (i.e., local dispersal, emigration, and immigration), whereas responses in productivity or natural mortality have little or no role in offsetting harvests. Given the limited effects of moderate levels of human take on wolf population trends and biases in assessing wolf populations and harvests resulting from the existence of transient wolves, the risks of reducing wolf populations inadvertently through regulated harvest are quite low.