

Evaluating Apparent Competition in Limiting the Recovery of Endangered Bighorn Sheep

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ABSTRACT Predation can disproportionately affect endangered prey populations when generalist predators are numerically linked to more abundant primary prey. Apparent competition, the term for this phenomenon, has been increasingly implicated in the declines of endangered prey populations. We examined the potential for apparent competition to limit the recovery of Sierra Nevada bighorn sheep (*Ovis canadensis sierrae*), a U.S. federally endangered subspecies. Using a combination of location, demographic, and habitat data, we assessed whether cougar (*Puma concolor*) predation on bighorn sheep was a consequence of their winter range overlap with abundant mule deer (*Odocoileus hemionus*). We found that bighorn sheep populations with higher spatial overlap with deer exhibited higher rates of predation, which in turn had additive effects on adult bighorn sheep survival. Indeed, bighorn sheep killed by cougars were primarily located within deer winter ranges. Variation in sympatry between bighorn sheep and deer appeared to be largely driven by differences in habitat selection among bighorn herds. Herds experiencing the highest predation rates and greatest overlap with deer also exhibited the strongest selection for low elevation habitat. Although predator-mediated apparent competition may limit some populations of Sierra Nevada bighorn sheep, it is not the primary factor limiting all populations, suggesting that the dynamics of different herds are idiosyncratic.

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