

## Climate Induced Wolf Prey Selection in Yellowstone National Park, 1995-2015

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### Abstract

Prey selection by wolves has been a fundamental and long-term topic of interest for wolf-prey studies. Virtually all studies conclude the selectivity of wolf predation and typically identify what made an individual vulnerable. Vulnerability, however, varies for multiple reasons and emerging research is discovering climate induced effects on prey forage altering condition and selective advantage of migration. We present data from a twenty year study of wolf-elk predation in Yellowstone National Park (YNP) which found bull elk killed more frequently in early winter after years with less snowfall compared to years with normal snowfall. Snowfall impacted summer forage, which impacted bull elk condition going into the autumn rut, which weakened elk prematurely post-rut causing them to be selected by wolves in early rather than late winter, and possibly caused more bulls to be killed overall. Bull elk ratios have declined over the last 20 years (from 40-60 to 10-15 bulls/100 cows; lower outside YNP), which has led to calls for a reduced human harvest on bulls which has been met with significant resistance. Understanding the interaction between climate, forage and wolf predation on bull elk (and other sex/age classes) will help guide management decisions and potentially sustain hunting of bulls in the long term as well as protect natural management objectives within YNP. Results will be of widespread value as they may suggest changing predator-prey dynamics across North America by making some otherwise healthy prey vulnerable to predation.

### Douglas W. Smith background

Douglas W. Smith PhD is a Senior Wildlife Biologist at Yellowstone National Park. He has been an employee of Yellowstone since 1994 and was hired to reintroduce, manage, and research wolves in the park. He also supervises the elk, bird and aviation programs for his park Division, The Yellowstone Center for Resources. He has focused the park wolf program on long-term wolf-prey monitoring, population dynamics, genetics and disease monitoring as well as creating a positive image for a controversial carnivore.