

## Effects of Common Ravens on Greater Sage-Grouse in the Great Basin Region, USA

**Peter S. Coates**, Western Ecological Research Center, U.S. Geological Survey, Dixon, CA

**Shawn T. O'Neil**, Western Ecological Research Center, U.S. Geological Survey, Dixon, CA

**Joseph L. Atkinson**, Western Ecological Research Center, U.S. Geological Survey, Dixon, CA

**Brianne E. Brussee**, Western Ecological Research Center, U.S. Geological Survey, Dixon, CA

**Pat J. Jackson**, Nevada Department of Wildlife, Reno, NV

**David J. Delehanty**, Dept. of Biological Sciences, Idaho State University, Pocatello, ID

**ABSTRACT:** Anthropogenic modification to ecosystems can result in the redistribution of species at higher trophic levels. Humans have re-organized predator-prey dynamics, namely by removing top predators and subsidizing more generalist mesocarnivore species. As a result, some mid-level predator species have increased in abundance and distribution, often to the detriment of lower-level species that are not adapted to increased predation rates. One example of a native avian predator that has experienced population increase following increased anthropogenic subsidization is the common raven (*Corvus corax*; hereafter, raven). The raven is an ubiquitous predator within sagebrush ecosystems in the western U.S., and may contribute to suppressed population growth in greater sage-grouse (*Centrocercus urophasianus*) through disruptions to lekking behavior and top-down influences on nest success and recruitment. Ravens have expanded in distribution and abundance, in large part due to increased resource subsidies from human infrastructure and land use activities. Concurrently, some sage-grouse populations appear to be in decline where habitat conditions should be promoting species persistence. Using long-term monitoring data on sage-grouse and ravens in the northern Great Basin region, we show that ravens disrupt sage-grouse lekking behavior, increased raven density is associated with reduced sage-grouse nest success, and that negative trends in lek counts may be related to elevated raven occurrence and density. Taken together, these results suggest the need to address a growing problem, as ravens continue to expand their distribution, facilitated by anthropogenic subsidies. These findings are preliminary and provided to meet the need for timely best science.

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