

Factors Influencing Common Raven Occurrence and Density Across Cold-Desert Sagebrush Ecosystems of the Southwestern U.S.

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ABSTRACT: Common ravens (*Corvus corax*) are a predator of eggs and chicks of numerous species including greater sage-grouse (*Centrocercus urophasianus*). Raven abundance and distribution is increasing within sagebrush ecosystems as a result of anthropogenic resource subsidies. Despite concerns about subsequent predation pressure on sage-grouse, broad-scale spatial information about raven populations remains lacking. We used hierarchical occupancy and distance sampling models to map raven density and distribution in response to natural and anthropogenic landscape covariates using >15,000 point count surveys occurring within the Great Basin region since 2007. Anthropogenic factors contributing to greater raven occurrence included increased road density, presence of transmission lines, agricultural activity, and presence of roadside rest areas. Natural landscape characteristics included lower elevations with greener vegetation (NDVI), greater stream and habitat edge densities, and lower percentages of big sagebrush (*A. tridentate* spp.). Many of these same environmental factors influenced spatial variation in raven density, although the effects varied by field site. Both raven occurrence and density tended to increase in valleys with networks of agricultural fields, ranches, roads, and distribution lines. These features likely subsidize local raven populations, which then move into more remote shrubland environments with negative consequences for sage-grouse populations. We used the relationships identified in our model to make predictions of raven density and distribution across the Great Basin landscape. We show how these model outputs can be used to guide management decisions where raven distributions overlap with breeding sage-grouse concentration areas. Findings are preliminary and provided for timely best science.

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