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## **SOD-BUSTING AND SAGE GROUSE: ESTIMATING HISTORICAL IMPACTS AND PLANNING FOR THE FUTURE**

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A conservation strategy for Greater sage grouse (*Centrocercus urophasianus*) in the Great Plains, where conversion of native rangeland to cropland is an accelerating agent of land use change, must anticipate impacts of future sod-busting on populations. We use resource selection functions (RSF) to estimate the scale and magnitude of the effect of sod-busting on the distribution of sage-grouse leks in the Great Plains Management Zone and estimate impacts of future cropland expansion. Active leks were used to develop a distribution envelope based on topographic and climatic variables from which random pseudo-absences were drawn to fit a used-available RSF. Models with proportion cropland at scales from 800 m to 8.5 km were compared using AICc to determine the most supported scale at which cropland influences lek occurrence. Finally, we develop a buildout scenario based on a cropland

suitability model to estimate potential impacts of future sod-busting on known leks. Negative effects of cropland on lek occurrence were evident at all scales tested. The 6.4 km scale was most supported, and impacts were severe, with the relative probability of lek occurrence falling by 50% when about 20 percent of the landscape within 6.4 km was in cropland. These results, which highlight the large scale and magnitude of impacts of cropland on sage grouse populations, are needed to evaluate the potential contribution of conservation easements and land-use policy to local and range-wide sage-grouse conservation goals. Population-level benefits of targeted conservation implementation are explored.