Mapping the Future of Oil and Gas Development in Relation to the Conservation of Greater Sage Grouse

Richard S. Sojda*, Department of Computer Science, Montana State University, Bozeman, MT
Frederick, Robert B., Department of Biology, Eastern Kentucky University, Richmond, KY
Matthew Heller, Great Northern Landscape Conservation Cooperative, USDI – Fish and Wildlife Service, Bozeman, MT
Greg Watson, Office of Landscape Conservation, USDI – Fish and Wildlife Service, Denver, CO

The effects of oil and gas development on the conservation of greater sage grouse (*Centrocercus urophasianus*) is of concern in the Northeastern portion of their current range that coincides partially with grouse Management Zones I, II, and IV. Although some research has reported on these effects, much remains uncertain. This is often the case with ecological studies where cause-effect relationships are complex, multivariate, and involve landscape perspectives. Gaining an understanding of the effects of the development on grouse requires predicting where that development is expected to occur on a landscape level. We gathered the "reasonable foreseeable development" spatial data from the USDI's Bureau of Land Management that were available for Montana, North Dakota, South Dakota, Wyoming, and Northwestern Colorado. These data were disparate across the study area, and we standardized them across mapping units to establish consistent and quantitative categories. We describe the GIS processes used to accomplish that and to display the number of wells per township as projected in the BLM data. The data were then overlain with the priority areas for conservation for greater sage grouse. Our data, metadata, and data processing (standardization) documentation will be made available on the web via the Landscape Conservation Management and Analysis Portal (LCMAP— https://www.sciencebase.gov/ catalog/?community=LC+MAP+-+Landscape+Conservation+Management+and+Analysis+Portal). Companion research to model the risk to greater sage grouse from oil and gas development has also begun. This uses artificial intelligence and Bayesian belief network software to represent knowledge and its uncertainty as presented in the scientific literature, and we present our conceptual model.