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## **EFFECTS OF OIL AND GAS DEVELOPMENT ON MULE DEER POPULATIONS IN WESTERN NORTH DAKOTA AND EASTERN MONTANA**

Jesse L. Kolar\*, Dept. of Fisheries and Wildlife Sciences, University of Missouri, Columbia, MO

Bruce A. Stillings, Big Game Biologist, North Dakota Game and Fish Department, Dickinson, ND

Joshua J. Millspaugh, Dept. of Fisheries and Wildlife Sciences, University of Missouri,  
Columbia, MO

Oil and gas production are becoming a significant part of the economy and landscape of western North Dakota and eastern Montana. Much of the areas being developed overlap with mule deer ranges. Our ongoing research aims to identify and quantify the direct and indirect effects of oil and gas energy development on mule deer abundance, survival, recruitment, movements and resource selection. Since February, 2013, we have deployed 240 GPS collars in three main areas of breaks habitat: 1) in North Dakota along the Little Missouri River; 2) the east side of the Yellowstone River; and 3) just south of Culbertson, MT. These collars are being used to collect spatial data about mule deer distributions and monitor survival across areas of low, medium, high energy development. We will also use digitized aerial survey data to estimate abundance and recruitment across various levels of development. To date we

have collared 99 adult females and 110 fawns, gathering more than 300,000 deer locations, conducted 39 lab necropsies on full and partial carcasses, and conducted biannual aerial surveys in North Dakota (2 years) and Montana (1 year). Our research will address potential impacts to mule deer populations, but will also provide mitigation strategies to help minimize disturbances from further development.