Greater Sage Grouse Population Response to Energy Development and Habitat Loss

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Modification of landscapes by energy development may alter both habitat use and vital rates of sensitive wildlife species. Greater sage grouse (*Centrocercus uroplwsianus)* in the Powder River Basin (PRB) of Wyoming and Montana are expriencing widespread, rapid changes to habitat due to recent coal-bed natural gas (CBNG) development. We analyzed lek-count, habitat, and infrastructure data to test how CBNG development and other landscape features influenced sage-grouse population trends and lek status in the PRB. From 2000-2005 leks in CBNG fields showed lower trends in population indices and 11-55 percent fewer males per active lek than leks outside CBNG development. Among lek complexes of known status in 2004-2005, only 34 percent remained active within CBNG fields, compared to 82-83 percent ofleks adjacent to or outside CBNG, and all remaining large and medium-sized leks (iY 25 males) occurred outside CBNG. Lek-complex persistence was positively influenced by the proportion of sagebrush habitat and negatively influenced by the proportion of tillage agriculture at large scales around leks. After controlling for habitat loss, lek-complex persis-tence was also negatively influenced by the extent of CBNG development at all scales, with the strongest effects occurring within 0.8 km. Maintaining sage grouse populations in areas with CBNG likely will be difficult without a major shift in mitigation strategies toward spatial, rather than temporal restrictions on development, and rapid implementation of enhanced industry-wide standards for mitigation. Our findings also emphasized a need for government agencies to set population goals for conservation and conduct landscape-scale conservation planning for sensitive wildlife species prior to energy development.