Landscape and cumulative effects of oil and gas development on ecosystems in the Williston Basin.

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Several U.S. Geological Survey projects in the Williston Basin are evaluating the cumulative effects of energy development on terrestrial and aquatic ecosystems. Specifically, these projects address data compilation and access needs, land use change, produced water toxicity, and potential contamination of aquatic resources. For studies examining energy development in the Williston Basin, researchers and decision makers need to have access to ancillary datasets that include oil and gas infrastructure, aquatic and terrestrial resources, and ecosystem layers. As a step in this direction, we are creating a one-stop location where internal and external partners can obtain consistent datasets. We will then demonstrate the use of these databases in a series of assessments targeting landscape change and biological resources. We are currently quantifying the amount of agricultural land and native habitat that has been converted within the Williston Basin due to well pad construction. Likewise, we are developing spatial statistical models to investigate the cumulative effects of oil and gas development on population trends in breeding birds. We plan to extrapolate the land use and bird modeling results across a range of future development scenarios that will help inform land and wildlife managers. We are also developing landscape scale assessments of the vulnerability of wetlands to possible contamination from oil and gas development. Lastly, we will provide preliminary results on an approach designed to integrate laboratory and field studies to enhance the understanding of the possible effects of salts from produced water on aquatic resources.