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Reducing irrigation return flow contributions to rural drinking water supply and drainage to the Yellowstone River

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Abstract Text:

Buffalo Rapids Irrigation District is dependent on irrigation water derived from the Yellowstone River and the domestic water supply is dependent on shallow groundwater which is recharged from irrigation-related sources. In 1998, an environmental assessment of the district-based watershed identified sediment, nutrient, and bacterial impaired water quality in the Yellowstone River and surface and groundwater in the watershed, less than optimum irrigation management, and excessive irrigation induced erosion to the irrigated cropland as problems in the watershed. Since the EA, significant efforts and funds have been devoted to implementation of Best Management Practices (BMPs) in the district. These efforts create an opportunity for research and quantification of water quality improvements resulting from BMP implementation. Quantifiable documentation of BMP implementation at the watershed scale will aid in science based decision making regarding future BMP implementation. Study results would be delivered to irrigators within the district and to the public through a series of extension and education activities.

Impact Statement:

Improved water quality will be facilitated through this project by 1) determining if BMPs implemented in an irrigated agriculture dominated watershed lead to measurable surface and groundwater quality improvements through watershed monitoring, 2) projecting expanded BMP implementation water quality effects through modeling efforts, and 3) using results to develop recommendations and educational programs that lead to improved water quality and agricultural sustainability. Additionally, by providing producer-driven extension education to irrigators in the project, we will introduce methods and economic incentives for conserving water and thereby improving in-stream flows. MSU and Montana Watercourse will also promote general public awareness and involvement through creation of a volunteer monitoring program and community tours.