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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:

Buffalo Rapids Irrigation District (BRID) has been identified by the NRCS as a unique, identifiable watershed. The agriculture of the watershed is dependent on irrigation water derived from the Yellowstone River and the domestic water supply is dependent on shallow, alluvial 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 as less than optimum irrigation management. Additionally excessive irrigation induced erosion to the irrigated cropland was identified as a problem.

Since the EA, significant efforts and funds have been devoted to implementation of BEPs and BMPs. These efforts on the part of the NRCS, BRID, and landowners, have created an opportunity for research and quantification of water quality and water conservation improvements resulting from BMP implementation. In 2006, MSU was awarded an USDA Integrated Research, Extension, Education grant to work with BRID. MSU Extension Water Quality Program (MSUEWQ) and MSU Watershed Analysis Laboratory have partnered to quantify water quantity and quality responses to BMP implementation in the district, and to develop a watershed scale predictive model. Quantifiable documentation of BEP and BMP implementation at the watershed scale and calibration of the SWAT model will enable science based decision making regarding future BMP implementation, both within BRID and throughout the western U.S. To further community awareness of water quality issues, MSUEWQ has partnered with Montana Water Course to implement a volunteer monitoring program with area high schools. Additionally, study results will be delivered to irrigators within the district and to the public through extension workshops, demonstration sites, and formal education opportunities. The ultimate goal of the project is to advance practices which lead to improved water quality and water conservation in the Yellowstone River.

Impact Statement:

Along with research goals and objectives centered on assessing irrigation BMPs within BRID, specific extension and education objectives were emphasized. An agricultural water management workshop was held to discuss goals of the project along with water conservation. Additionally BRID members were sent nitrate test strips. Twenty-six percent responded and of those, eleven percent had nitrate levels greater than 10 ppm. Based on these results, MSU offered and subsidized a well testing program. Of the wells tested, 2% exceeded the coliform bacteria standard, 4% exceeded the nitrogen, nitrate+nitrite as N standard, and 93% had objectionable TDS results. Based on individual well results, interpretative fact sheets were sent to well owners. Through partnership and collaborative efforts with the Montana Watercourse, MSUEWQ worked with local high school science classes to train high school teachers in developing a voluntary water quality monitoring program. A monitoring workshop was held which included a "Know Your Watershed" tour and a volunteer monitoring training program. Evaluations were positive and indicated that the participants gained water quality knowledge and monitoring skills. Additionally, activities from the BRID project facilitated the development of four newspaper articles in local newspapers as well as a feature in a larger regional publication.

Category: Watershed Assessment and Restoration

Type of Presentation: Poster Presentation