



Title: TMDL - Extension Leadership in Objective Baseline Data Collection and Assessment

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Organization: Montana State University

State: MT **Region:** Northern Plains and Mountains

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Theme: Water Conservation and Agricultural Water Management

Situation: The TMDL process, upon introduction into state environmental quality department programming, involves participation and can have impact on county extension programming, conservation district partners, landowners, and numerous other entities. Often the players lack the knowledge, leadership, objectivity, or resources to gather and process the information needed to complete the TMDL. The Sun River in Montana and its tributary Muddy Creek appear as impaired, high priority water bodies of the 303(d) list. As the lead organization in defining the protocol, data collection and analyses procedures for the Muddy Creek TMDL, MSU Extension has focused efforts on educating and involving landowners, irrigation district managers, and watershed coordinators in the Muddy Creek and Sun River watersheds.

Objectives: The objectives of this Extension water quality effort are to: 1) provide guidance to the watershed coordinator, irrigation project manager, watershed landowner group, and DEQ staff in establishing credible data collection protocols, 2) provide leadership to the on-the-ground baseline data collection, analyses and summary, 3) communicate findings, recommendations, and water and agricultural land BMPs that will help achieve the TMDL, and 4) define and implement follow-up impact assessment of effectiveness of BMP implementation.

Methods: The primary approach to addressing this need of Extension has been to initially identify key stakeholders and bring those individuals together into open discussion and contribution to the TMDL definition process. Subsequently, a two year sampling, analyses, summary protocol was defined addressing stream flow, irrigation return flows, sediment, and land use relationships. Routine sampling was completed at 16 locations within the Muddy Creek watershed impacted by irrigation return flows from the Greenfields Irrigation District in north central Montana. Subsequently, data analyses were completed, reports prepared and shared with all parties for review and subsequently modified to address stakeholder concerns. The culmination of this project will be determination of TMDLs for return flow, sediment, and other water constituents and recommendations for land use practices to achieve the target TMDLs within the next 3-5 years.

Partnerships: This project is a partnership between the Montana State University Extension Service, the Cascade and Teton (MT) county soil and water conservation districts, the Sun River Watershed Group, the Montana Department of Environmental Quality, the Montana Department of Natural Resources and Conservation, and the USDI-Bureau of Reclamation – Upper Missouri Division.

Research: This project has served as a focal point of investigating the relationship between conversions of flood irrigated land parcels to center pivots; the relationship between stream flow modifications and stream channel erosion; and the relationship between on-field irrigation water management and water use efficiency. Two M.S. graduate students and one-undergraduate honor student, under leadership of the Extension Water Quality Specialist, have completed Field investigations. Outreach has been an integral component of this project through regularly held watershed group meetings, planning committee briefings, and educational workshops for irrigators within the watershed boundaries.

Resources: Funding has been provided by a multitude of resources including the USDA-regional water quality program, the USDI-Bureau of Reclamation, the Montana Department of Environmental Quality (which now completes all laboratory analyses), the Sun River Watershed Group. Recently the Montana State University Extension Water Quality Program was jointly awarded a \$30,000 EPA RGI grant to complete an additional year of monitoring and impact assessment, cooperative with the Sun River Watershed Group.

Results: Results have consisted of a host of public educational meetings, briefing meetings with planning committee and watershed working group committees, two annual progress completion reports, which have in part contributed to the 'draft' TMDL for the Sun River watershed. One of the most significant outcomes of this effort has been an increase in level of credibility and objectivity assigned to the TMDL process. It is also anticipated that the implementation of recommended BMPs will result in reduction of sediment discharge to the Sun - Missouri River system of approximately 25,000 tons of sediment annually, savings of 25,000 acre feet of water per year, which will ultimately be retained within the Sun River, thereby enhancing the existing fishery and recreational opportunities of the Sun River proper.



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