USDA-CSREES 2005 National Water Quality Conference

Muddy Creek Flow and Sediment Study

Abstract:
SITUATION: Muddy Creek, located in North Central Montana, is a tributary of the Sun River. Greenfield's Irrigation District (GID) irrigates 50,000 acres within the Muddy Creek drainage. Muddy Creek and the Sun River below Muddy Creek are listed on Montana's 303(d) list, both unable to meet their designated uses, mostly due to excessive sediment loads, fluctuating flows, and fisheries habitat modification.

OBJECTIVES: The primary goal of this project was to determine the sources and amounts of flow and sediment coming into Muddy Creek. A second objective was to determine relationships between Muddy Creek and tributary discharges and sediment.

METHODS: Flow and sediment measurements were made at 13 sites before, during, and after the irrigation season.

PARTNERSHIPS: Bureau of Reclamation, Sun River Watershed Group (SRWG), Muddy Creek Task Force, Greenfields Irrigation District

RESOURCES: USGS gauging stations

INTEGRATION OF RESEARCH, TEACHING, AND EXTENSION: Information was presented at watershed meetings as guidance relative to where and how to manage and define a water management plan specific to Muddy Creek. It has also been used to target specific sections of Muddy Creek and tributaries where the watershed group and landowners can focus remediation efforts.

RESULTS: Monitoring revealed that flow was influenced the greatest by inflows of water from tributaries originating within the GID boundary. Of the water diverted from GID contributing to the flow in the study area, it was determined that 13% was operational spills, 22% was farm field seepage and return flow and 65% was plant consumptive use.
*   The majority of sediment measured originated downstream from the tributaries and reaches of the creek directly influenced by GID discharge. It was determined that the sediment carrying capacity of Muddy Creek is increased more than three-fold, due almost in total to a six-fold increase in flow volume from inflows originating within GID boundaries.*

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