

Precious topsoil is being eroded and deposited by storm water and seasonal drainage into the Missouri River, causing even bigger problems there. The delta forming in the Missouri River is negatively affecting water quality and reservoir operations.

# Whitmore Ravine

*An Erosion Crisis Threatens the Missouri River*

## What is the Ravine?

The Whitmore Ravine is a mile long coulee that transports storm water from the surrounding areas, including Malmstrom Air Force Base, into the Missouri River on the eastern fringe of Great Falls, Montana.

The Ravine consists of three distinct forks that flow together just above its confluence with the Missouri River. Storm water and season flows have caused extreme erosion problems, which

have become more pronounced over the past several years. With each passing day, the Ravine grows deeper, the unintended delta forming in the Missouri River grows larger, and the cost to repair the Ravine increases.



## Looking Forward

In 2009, Cascade County Conservation District (CCCD), Malmstrom Air Force Base, Affected Landowners, and Recreational Trails, Inc. signed a “*Memorandum of Understanding*” committing the stakeholders to work together towards a solution to address the Ravine issues. The next hurdle is securing the necessary funding to make this project a reality.



**Dangerous depths of as much as 50 feet of vertical slopes create hazards for humans and animals roaming in the area.**



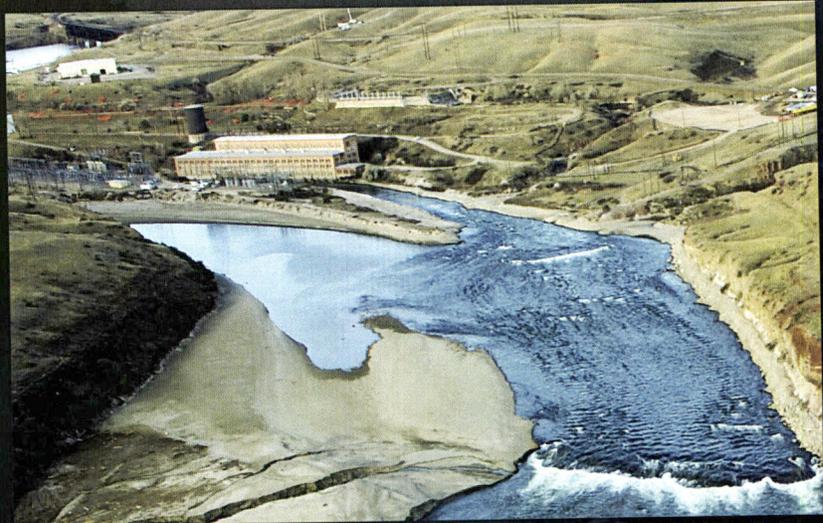
**Drainage in the Whitmore Ravine is damaging recreational trails and affecting the landscape once traveled by the Lewis and Clark Corps of Discovery.**



**The erosion is taking precious soil out of production and is preventing land from supporting native plant species and wildlife.**

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*Over 500,000 tons of sediment have been discharged into the Missouri River thus far.*



**The Whitmore Ravine delta reduces the volume of water in Cochrane Reservoir and interferes with reservoir operations. During reservoir drawdown in late 2009 to facilitate maintenance at the Rainbow Dam hydroelectric facility, the delta promoted increased sediment load in the Missouri River and caused an unplanned shutdown of the Cochrane Dam hydroelectric facility for several weeks, representing a significant loss of power production.**

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## *Timeline and Project Cost Projections*

Project Detail	Date	Project Cost (Funding Needed)
West Fork Pipeline (includes bypass pipeline, energy dissipation structure, erosion control and reseeded, temporary access road, wetlands mitigation, permitting, and administration/engineering costs)	2011	\$3,888,197
Middle Fork Pipeline and Fencing (includes bypass pipeline, energy dissipation structure, erosion control and reseeded, temporary access road, pond construction, wetlands mitigation, easement purchase, permitting, and administration/engineering costs)	2012	\$2,903,228
West Fork Ravine Restoration (includes: excavation, fill, erosion control and reseeded, permitting, and administration/engineering costs)	2012	\$4,720,400
<b>TOTAL</b>		<b>\$11,511,825</b>

Cascade County Conservation District in association with



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