Water and Sediment Yield
Monitoring Item 17

OBJECTIVES: Validate prediction models and monitor compliance with State and Federal water quality standards and BMPs.

DATA SOURCES: Flow and sediment sampling before and after project activities. Additional sources used: Water monitoring stations (water column monitoring of flow and sediment); Stream surveys (channel shape, composition, stability, and productivity); precipitation and snow pack information; coordination with State Department of Environmental Quality (DEQ) relative to water quality standards, 303(d) listing, and TMDL development; the State of Montana Department of Forestry for BMP compliance; and internal BMP audits.

FREQUENCY: Annually (six streams representing major geologic types).

REPORTING PERIOD: 2014 and 2015.

VARIABILITY: Twenty percent variation from predicted sediment increases and changes in water quality.

EVALUATION:

General

The 2001 and 2002 Forest Plan Monitoring and Evaluation Reports, Item 17, discuss the results of fourteen years of monitoring "streams representing major geologic types" as identified in the Forest Plan. To summarize, these results were highly variable and dependent upon levels of flow. While we may continue to collect this data for other purposes, it has provided limited usefulness in directly addressing the objectives of this monitoring item to validate prediction models. Additional monitoring methods, along with ongoing evaluation of relevant scientific literature, are now being used to better address this monitoring item's objectives. Focus of this item was shifted to tracking progress towards meeting TMDL goals, BMP compliance, and substrate monitoring to judge effectiveness of these practices.

EVALUATION:

Compliance with Federal and State Water Quality Standards

This water resource monitoring component documents how the Bitterroot National Forest is minimizing non-point source pollution through implementation of watershed restoration plans and Best Management Practices (BMPs). Items tracked are the implementation and effectiveness of the recent *Water Quality Restoration Plan and Total Maximum Daily Loads for the Bitterroot Headwaters Planning Area* ("Headwaters TMDL", MT DEQ 2006), the Bitterroot Watershed Total Maximum Daily Loads and Water Quality Improvement Plan ("Mainstem TMDL" MT DEQ 2014) and BMPs for on-going timber harvest and road projects.

The 2006 and 2014 TMDL's provide a landscape-scale assessment of water quality and human impacts in the area upstream of the East and West Fork Bitterroot River confluence and the mainstem of the Bitterroot River below that confluence. Much of the Headwaters study area is on the Bitterroot National Forest and the TMDL included sediment-reduction guidance for the Forest's road system while the Mainstem study area includes the valley floor and private lands as well as national forest lands.

The Bitterroot National Forest is not formally required to monitor stream conditions for the Headwaters TMDL. However, East Fork Pebble counts will be performed annually, as budget allows, providing substrate trend information for both DEQ and the Forest. Other monitoring related to effectiveness of TMDL improvements can occur to document sediment reductions and completed watershed improvements to provide information that would support removal of streams from the State Impaired Waters (303(d)) List. In addition, monitoring occurs to document changes from and/or effectiveness of restoration not tied to the TMDL but ultimately benefiting the water resource.

In 2014, Meadow Creek and Overwhich Creek were reassessed for sediment impairment. The assessment found that due to recent restoration efforts by the Bitterroot National Forest these streams no longer impaired by

sediment. The document Meadow Creek and Overwhich Creek Sediment Assessments, dated May 2014 (Document Number C01-TMDL-03a-aF) prepared by Montana Department of Environmental Quality provides details and results of the assessment.

Reimel Creek was also reassessed for sediment impairment in 2014. Findings of that assessment indicate that all reasonable land, soil and water conservation practices have been implemented by the Forest. The analysis of data collected in 2013 against current sediment targets indicated that water quality is improving but does not yet meet standards. DEQ recommended continued monitoring and maintenance followed by reassessment at a later date. The complete report, titled Reimel Creek TMDL Implementation Evaluation was released in August of 2014 by DEQ.

Several projects have recently been implemented to reduce the effect and quantify of road contributed sediment to streams on the Bitterroot National Forest. This includes the watershed portion of the Lower West Fork project, Martin Creek Watershed Restoration project, the watershed portion of Trapper Bunkhouse, the watershed portion of the Three Saddle Vegetation Management project and the Darby Lumber Lands project. These projects stored or decommissioned roads not needed for current forest access or management to reduce compaction, improve infiltration and improve vegetative cover. Please refer to Item 19 for additional information on the implementation, progress, and monitoring results of these projects.

Debris flows in Deep Creek (Idaho) that were a result of intense rainstorms on hydrophobic soils in the Gold Pan Fire area occurred in August 2014 and necessitated reconstruction of NFSR 468 at several ephemeral, intermittent, and perennial stream crossings. The recently replaced fish passage culvert on Scimitar Creek was plugged, overtopped and is no longer usable; a bypass was installed. Other plugged culverts were replaced, sections of road graveled and debris fans seeded and fertilized to improve vegetative cover in early October of 2014. Watershed monitoring in the spring of 2015 found that these depositional areas were greening up from the seeding efforts.

Streamside roads were graveled during this reporting period. Fourteen miles of the Lost Horse Road, NFSR 429 was graveled in 2014. Other roads graveled include NFSR 5703-1.5 miles, NFSR 75-4 miles, NFSR 429-14 miles, NFSR 5669-1 mile and NFSR 6223-6 miles. Gravel hardens the road surface, making it resistant to erosion and helps to maintain the driving surface. Sections of these roads are within sediment contributing distance to streams and gravel on the travel way reduces the risk of erosion of the road surface and sediment contributions to adjacent streams.

PROJECT MONITORING:

Water Quality Restoration Plan and Best Management Practices

To support the Headwaters and Mainstem Water Quality Restoration Plans (TMDL's), the Forest Service locates and treats active sediment sources with the long-term goal of reducing the overall chronic sediment load within the TMDL planning areas as funding permits. As recommended in the TMDL, this includes stream crossing improvements, road and crossing decommissioning and storage, riparian area fencing, and other applicable treatments to reduce connected disturbed areas, these activities are often considered best management practices. Sediment/erosion reduction projects accomplished in the TMDL planning areas during the 2014-2015 period are listed in Table 1, below.

Table 1 – 2014 and 2015 Watershed Projects that Address TMDL's and Best Management Practices

5.3 miles of road decommissioned and 2.3 miles stored in the Martin Creek Watershed Restoration Project	7 miles of Lost Horse Road graveled
Reconstruction of Deep Creek Road following debris flows. Gravel sections near stream.	Roto-mill and grade Elk City Road to improve drainage
Maintain and gravel the Road to Paradise, NFSR 6223, where unstable and/or contributing sediment to streams (14 miles).	Maintain drainage on Reimel Creek Road, NFSR 727.
Repair road instabilities and grade Laird Creek Road, NFSR 370 and Gilbert Creek Road NFSR 5732.	Repair washouts and grade Sula Peak Road, NFSR 5727.
Seed and slash user created OHV trail in Reynolds Creek.	Clean ditches on Sula Peak Road, grade road.
Begin implementation of the Darby Lumber Lands project, including 24.5 miles of roads stored and 24.5	Three Saddle Vegetation Management Project decommissioned 9.5miles of road, re-contoured

miles decommissioned by both force account and partnership contracts.	approximately 2 miles of non-system road after use and 3.6 miles of decommissioned system roads. The project also completed BMP upgrades on FR428, FR428A and FR62374

Best Management Practices were monitored a number of ways. The following table lists several projects that were monitored for effectiveness using site visits, photo point monitoring and protocols identified in monitoring plans resulting from environmental analysis. The Forest also monitored several activities using protocols in the National Best Management Practices for Water Quality Management on National Forest System Lands (2012).

Table 2 – Watershed Monitoring Sites

Project Name	Type of Project	Period of Operation	Units/Roads Monitored/Purpose
Meadow Tolan Allotment	Livestock grazing	Grazing Season	14 long term monitoring sites reviewed 2014 and 2015
Lower West Fork Culvert Removal NFSR 13411, 13828	Watershed Improvement	Implemented Summer 2013	Reviewed culvert removal and effectiveness and vegetation recovery, 2014, 2015
Lost Trail Ski Area	Ski Area Expansion, timber harvest and ski run construction, Ski Area Special Use	Implementation began 1998, continued through 2003	Compliance with EA Mitigation, identify addition needs for revegetation of drain field and other disturbed soils in the vicinity of the yurt.
Three Saddle, Burned Area Recovery, Martin Sleeping Child, Lower West Fork	Watershed Improvement, road restoration	Various roads implemented prior to 2014	Eighteen roads evaluated for effectiveness monitoring during 2014 2015.
Camp Waugh Allotment	Livestock grazing	No use in 2014/2015	Six sites reviewed for trampling and cross section trends in 2015.
Lower West Fork Watershed Restoration	Watershed Improvement	Roads stored and decommissioned 2013 and 2014	Review of vegetation recovery on roads stored and decommissioned.
BMP Audit using the national protocols	Water uses, yarding systems, ski area construction and run operation, boat launch construction, prescribed fire, grazing, road decommission	Implementation and Effectiveness Monitoring	Lost Horse Diversion, Trapper Bunkhouse, Lower West Fork, Lost Trail Ski Area, Como Boat launch, School Point Ecoburn, North Sleeping Child, Road 74006

Review of application of Forest Best Management Practices and their effectiveness was completed by reviewing the environmental analysis documents, unit logs (implementation monitoring documents) sale administrator's notes and recollections (verbal transfer of information), the Bitterroot NF BMP's, and field review of the area.

Findings of the Audits

Refer to Item 19, for discussion of monitoring results for Lost Trail Ski area, Meadow Tolan Allotment, and the culvert removals.

The National Protocols include multiple BMP's for the various resource specialties such as planning, aquatic systems, chemical use (herbicides), minerals management, wildland fire management, facilities, recreation, to name a few. It is the agency's nonpoint source pollution control program for achieving and documenting water resource protection. The BMP program intended to support and assist the States in their efforts to ensure compliance on NFS lands. Each forest is assigned several specific BMP's to monitor and randomly select activities that meet the criteria to review. The intent of the National BMP's is to improve water quality and restore impaired waters, improve NEPA analysis and compliance with federal laws, improve agency ability to use adaptive management and improve relationships with other agencies and the public. Results are reported in a database to facilitate documentation and reporting on a national scale.

In summary, field reviews of projects found that projects complied with the:

Clean Water Act – Survey results suggest BMPs were appropriately applied and sufficiently effective.

- Executive Order 11988 – this Executive Order was fully supported, no detrimental activities in floodplains.
- Executive Order 11990 – this Executive Order was fully supported, no loss or lasting effects to wetlands.

REFERENCES

DEQ-PPA-WQPB-WPS, 2014. Reimel Creek TMDL Implementation Evaluation

Montana DEQ and US EPA Region 8, 2014. Draft Meadow Creek and Overwhich Creek Sediment Assessments, Helena, MT: Montana Department of Environmental Quality; US Environmental Protection Agency, Region 8.

MT DEQ 2011. Bitterroot Temperature and Tributary Sediment Total Maximum Daily Loads and Framework Water Quality Improvment Plan. Helena, MT, Montana Department of Environmental Quality. http://deq.mt.gov/wqinfo/TMDL/finalReports.mcp

MT DEQ 2006. Water Quality Restoration Plan and Total Maximum Daily Loads for the Bitterroot Headwaters Planning Area. Montana Department of Environmental Quality, Helena, MT. http://deq.mt.gov/wqinfo/TMDL/finalReports.mcpx

USDA Forest Service, 2012. National Best Management Practices for Water Quality on National Forest System Lands, Volume 1: National Core BMP Technical Guide