

## Upper Lolo Sediment TMDL Implementation Evaluation



*Bottomless Arch on Lost Park Creek; Hendrickson, 2010*

**May 2011**

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## **PREPARED BY**

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## **ACKNOWLEDGEMENTS**

Information for this report was compiled by Laura Andersen, Water Quality Specialist with Watershed Protection Section of DEQ. Information for specific implementation activities was provided by Taylor Greenup and Shane Hendrickson with the Lolo National Forest, Brian Sugden with the Plum Creek Timber Company and Doug Compton with the Montana Department of Transportation. Information about the Lolo Watershed Restoration Plan was provided by Wendy Sturgis with the Lolo Watershed Group.

The involvement of all the reviewers lead to substantial improvements to this report and were greatly appreciated.

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**Suggested citation:** DEQ-PPA-WQPB-WPS. 2010. Upper Lolo Sediment TMDL Implementation Evaluation. Helena, MT: Montana Dept. of Environmental Quality.

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## ACRONYMS

<b>Acronym</b>	<b>Definition</b>
BMP	Best Management Practices
CWAIC	Clean Water Act Information Center (DEQ)
DEQ	Department of Environmental Quality (Montana)
EA	Environmental Assessment
EPA	Environmental Protection Agency (US)
FRS	Facility Registry System
LWG	Lolo Watershed Group
MDT	Montana Department of Transportation
MT	Montana
NA	Not Applicable
NGO	Non Governmental Organization
PPA	Planning, Prevention and Assistance Division (DEQ)
TMDL	Total Maximum Daily Load
TPA	TMDL Planning Area
US	United States
WPS	Water Protection Section
WQPB	Water Quality Planning Bureau (DEQ)
WRP	Watershed Restoration Plan





## EXECUTIVE SUMMARY

The Water Quality Restoration Plan and Total Maximum Daily Loads [TMDL] for the Upper Lolo Creek TMDL Planning Area (Mathieus, 2003) was completed on April 14, 2003 and approved by EPA on June 24, 2003. The document contains EPA approved TMDLs for sediment applied to five different streams within the Upper Lolo Creek TMDL Planning Area (TPA) which were found to be only partially supporting their designated beneficial uses of aquatic life and cold-water fisheries (**Appendix E**). The restoration plan also addresses other issues outside of the TMDL requirements, such as fish passage barriers at stream crossings. The Upper Lolo Creek TPA includes the Lolo Creek headwaters in the Bitterroot Mountains above Lolo Hot Springs. Lolo Creek flows into the Bitterroot River south of Missoula, Montana.

This Upper Lolo Creek Sediment TMDL Implementation Evaluation (referred to as Evaluation) summarizes efforts to date that have been made to address the water quality issues identified in the 2003 TMDL document, specifically sediment. The TMDL document provides load allocations for two primary sources of sediment in the Upper Lolo TPA, forest roads and US Highway 12 (see **Appendix C** for TMDL targets and load allocations). This Evaluation provides additional recommendations for restoration and monitoring activities within the Upper Lolo TPA. These recommendations are generally associated with either forest roads and silviculture or US Highway 12, as these are the two major sources of excess sediment in the Upper Lolo TPA. Additional recommendations focus on other issues such as fish passage.

The Lolo National Forest has replaced 37 culverts and decommissioned over 60 miles of forest roads in the Upper Lolo TPA to improve water quality and fish passage. While the forest service has been actively replacing culverts, work is still needed to implement forestry Best Management Practices (BMPs) throughout the TPA (Greenup and Mickelson, 2010).

The Montana Department of Transportation (MDT) has also taken significant action to improve water quality by reducing the amount of total traction sand applied to US Highway 12 during the winter maintenance season (Montana Department of Transportation, 2009).

Since the TMDL was approved, little water quality monitoring has been completed in the Upper Lolo; monitoring is needed to determine if measurable progress has been made towards meeting TMDL targets.

Since 2003, the Watershed Management section at the Montana Department of Environmental Quality (DEQ) has gathered and evaluated information for the Lower Lolo Creek watershed to facilitate sediment TMDL development for the Bitterroot TPA. Sediment TMDLs for the Lower Lolo Creek watershed will be included in the Bitterroot TPA TMDL document which is in draft stages at the time of this evaluation. As development of the Bitterroot TPA TMDL document progresses it has the potential to lead to future target modifications for Upper Lolo Creek based on more knowledge of reference conditions and their application towards setting targets.

DEQ recommends that the Lolo National Forest and the Montana Department of Transportation continue to implement the activities outlined in the TMDL document. Based on the nature and extent of restoration work done thus far, it is possible that water quality is improving; however monitoring is needed to determine if and to what extent water quality is improving.



## 1.0 BACKGROUND

The following impaired waterbodies are included within the boundaries of the Upper Lolo TMDL Planning Area (TPA) (**Appendix B**):

- East Fork Lolo Creek
- Granite Creek
- Lee Creek
- Lost Park Creek
- West Fork Lolo Creek

Pollutants of concern include the following (**Appendix C**):

- Sediment

Within the Upper Lolo TPA, the most significant pollutant sources include (**Appendix E**):

- Forest roads
- US Highway 12

At the time that the TMDL was written, there were only two major landowners in Upper Lolo TPA: the U.S. Forest Service (Lolo National Forest) and Plum Creek Timber Company. Between 2008 and 2010, ownership of nearly all the Plum Creek land in the Upper Lolo TPA was transferred to the Lolo National Forest through a major land purchase and transfer known as The Montana Legacy Project. The transfer was facilitated by The Nature Conservancy and The Trust for Public Land (The Montana Legacy Project, 2010).

In 2005, the Lolo National Forest signed a Decision Notice, allowing the Forest to implement an Environmental Assessment (EA) with the commitment to remove or replace 22 culverts, decommission 58 miles of roads, and do BMP upgrades on 35 miles of major roads (Greenup and Mickelson, 2010). Most of the watershed restoration that has been completed thus far was completed following the EA for Upper Lolo Watershed Restoration.

The Lolo Watershed Group (LWG) is the main non-governmental organization (NGO) dedicated to watershed restoration in the Upper Lolo TPA. The LWG currently has a Section 319 grant to develop a Watershed Restoration Plan (WRP). The WRP will outline sources of impairment, management actions, estimated load reductions, estimated technical and financial assistance that will be needed for restoration and provide an estimated time frame to complete specific projects. It is expected that this plan will be completed by June 30, 2011 (Sturgis, Wendy, personal communication 11/1/2010).



## 2.0 TMDL-RECOMMENDED ACTIVITIES

The TMDL document recommends specific restoration activities for addressing sediment within the Upper Lolo TPA. These recommendations were made based on the TMDL load allocations for forest roads and US Highway 12 (**Appendix C**). In addition, the TMDL document made recommendations for fish passage. These recommendations are as follows:

- Upgrade remaining forest roads to meet Montana Forestry BMPs,
- Reclaim forest roads that are surplus to the needs of forest land managers,
- Improve inspection and maintenance of existing culverts,
- Implement Montana's Forestry BMPs on all timber harvest operations,
- Upgrade undersized culverts over time to better accommodate large floods,
- Further reduce sediment delivery from US Highway 12 through improved use and maintenance of sediment traps, plowing techniques, and guardrail cleaning, and,
- Correct priority fish passage barriers that are significantly affecting the connectivity of native fish habitats.

The TMDL's water quality-monitoring plan has the following objectives:

1. Document water quality trends associated with proposed implementation efforts.
2. Establish additional permanent monitoring sites and collect additional data within the TPA to help better define water quality targets.
3. Monitor progress towards meeting water quality targets.
4. Conduct an adaptive management strategy to fulfill requirements of [the TMDL].

To help achieve these objectives the TMDL document recommends the following types of monitoring activities:

- Establish permanent bench-marked cross-sections where channel pattern, dimension and profile can be tracked through time using Rosgen Level II parameters (width/depth ratios, entrenchment ratios and sinuosity) and techniques,
- Collect additional parameters (pool frequency, pool residual depth),
- Particle size distribution data should be collected using Wolman pebble count procedures through riffles at the established cross-sections,
- Conduct a road sediment assessment using the Forest Road Survey (FRS) for select watersheds in which recent forest management activities have taken place,
- Monitor for fish redds and fine sediment, and associated documentation of the results, on a yearly basis,
- Monitor population status of native salmonid species and report finding to DEQ,
- Update an assessment of channel conditions and other geomorphic indicators for the whole length of the Lolo Creek Watershed to help determine existing conditions and help track potential future impacts to this important waterbody and to tie in with future downstream TMDL development,
- Track the effectiveness of BMPs on forest roads and US Highways 12 and other mitigation measures at meeting targets. This could be done by comparing existing instream data to data following upgraded practices and mitigation measures,
- Develop a database using the Forest Service's significant amount of stream data on potential reference reaches with the TPA to help guide future target setting and evaluation for waterbodies in Lolo Creek and elsewhere in the Bitterroot Basin, and,

- Use data and information to assist the current Clark Fork/Bitterroot model efforts that are being developed.

## 3.0 INDICATORS OF PROGRESS

Indicators of progress towards achieving Upper Lolo TMDL targets generally fall into one of three major categories: 1) Restoration, 2) Monitoring, and 3) Planning.

### 3.1 RESTORATION

The extent of completed restoration work and how it compares to the TMDL load allocations represents a significant indicator of progress towards meeting TMDL targets.

In 2006, Plum Creek demonstrated a 9% reduction in road sediment delivery to Granite Creek between 1998 and 2005 (Sugden, 2010). Reductions between 2005 and 2009, when Plum Creek sold its lands to The Nature Conservancy, were not accounted for in this evaluation. Plum Creek Timber Company completed the sale of lands in the Upper Lolo TPA to The Nature Conservancy by February 2009. At that time Plum Creek had upgraded 95% of the roads in the Granite Creek, East Fork Lolo Creek and West Fork Lolo Creek drainages to meet state BMP standards and decommissioned 0.4 miles of forest roads. Plum Creek also corrected numerous fish passage barriers in cooperation with the Lolo Nation Forest as a cost-share partner (Sugden, 2010).

The Lolo National Forest has done a significant amount of restoration in the Upper Lolo TPA. This restoration work was completed based on the commitment outlined in the 2005 Decision Notice from the Lolo National Forest. Work completed through the spring of 2010 includes the removal of 37 culverts, and decommissioning 64.89 miles of forest roads within the TPA, which exceeds the 2005 commitment for road decommissioning and culvert removal. Work yet to be completed includes BMP upgrades to an additional 35 miles of major roads and improving an additional 11 culverts (Greenup and Mickelson, 2010). The decommissioning of roads should bring forest roads closer to the designated TMDL load allocations for sediment. The removal or replacement of culverts should improve fish passage, and as of 2010, has made over 10 miles of upstream habitat accessible (Greenup and Mickelson, 2010).

The Montana Department of Transportation (MDT) has also taken action to implement the TMDLs for the West Fork Lolo Creek, by decreased application of road sand and increased sand recovery from US Highway 12 during the winter maintenance season. During the 2002-2003 winter maintenance season, MDT estimated that 1,238 tons of road sand were applied to US Highway 12 in the Upper Lolo TPA. This was compared to an estimated 3,300 tons in the 1999-2000 season (Montana Department of Transportation, 2004). In 2008, 778 tons of road sand were applied, while 480 tons were recovered, resulting in 298 net tons of road sand applied to US Highway 12 during the 2008 winter maintenance season (Montana Department of Transportation, 2009). MDT also began using ditch blocks of river cobble and coarse gravel to slow runoff and allow suspended solids to settle out (Montana Department of Transportation, 2004) ( **Appendix D**).

An environmental assessment (EA) was completed in April 2010 for the Kearl Module Transport Project which would require modifications to US Highway 12, by Imperial Oil, in the Upper Lolo TPA to accommodate oversized loads (Tetra Tech, 2010). At the time of this evaluation, MDT is not anticipating using additional traction sand on US Highway 12 during the winter maintenance season due to oversized loads. In addition, Imperial Oil's contractor would be required to utilize appropriate BMPs during

construction activities to eliminate or minimize sediment discharge (Compton Doug, personal communication, 4/25/2011).

### **3.2 MONITORING**

At this time, there is little new monitoring data available for the Upper Lolo TPA. Plum Creek Timber Company conducted McNeil core monitoring in 2000-2006, 2008 and 2010, which suggested improvement in East Fork Lolo Creek relative to North Fork Granite Creek (Sugden, 2010). Additional monitoring data is needed to determine if water quality is improving and if TMDL targets are met (see **Appendix C** for TMDL targets).

It is important to note that fine sediment targets within the Upper Lolo TMDL document differ from the targets recently set for the lower segments of Lolo Creek in the Bitterroot TPA TMDL document. Current literature suggests a lower threshold effect on aquatic life for percent fines. A recent 5-year study on 557 US western mountain streams indicates that a minimum-effect sediment level (for pebble count fine sediment  $\leq 2$  mm) for four sediment sensitive salmonid species, including bull trout and cutthroat trout, is 13%. This same study also found a minimum-effect level (for pebble count fine sediment  $< 2$  mm) of 10% for macroinvertebrates (Bryce et al., 2010). However, DEQ recognizes that target values may be limited to achievable and/or reference conditions.

### **3.3 PLANNING**

As stated in Section 1, The Lolo Watershed Group is committed to watershed restoration in the Upper Lolo. The WRP that is currently under development will be the main guidance document for restoration projects within the Upper Lolo TPA (Sturgis, Wendy, personal communication 11/1/2010).

In November 2005, the Lolo National Forest issued a Decision Notice following an Environmental Assessment for Upper Lolo Watershed restoration activities. The Decision Notice outlines a restoration commitment from the Forest Service for work in the Upper Lolo TPA. Restoration activities include culvert removal or replacement and road decommissioning (Pittman, 2005). Currently, over fifty-percent of the restoration commitment has been achieved (Greenup and Mickelson, 2010).

Since the Upper Lolo Creek TMDL was approved in 2003, the Watershed Management section of DEQ has gathered and evaluated information for the Lower Lolo Creek watershed to facilitate sediment TMDL development in that area. TMDLs for the Lower Lolo Creek watershed will be included in the Bitterroot TPA TMDL document. As development of the Bitterroot TPA TMDL document progresses it has the potential to lead to future target modifications for the Upper Lolo watershed based on more recent knowledge of reference conditions and their application to setting targets.



## 4.0 RECOMMENDATIONS FOR ADDITIONAL WORK

Suggestions for additional restoration work are outlined below:

- Continue to implement recommendations as outlined in the TMDL and summarized in Section 2 of this evaluation; specifically, reclaiming surplus forest roads, and implementing BMPs on forest roads and timber harvest operations. After BMP implementation, consider an assessment that estimates reductions of road sediment.
- Continue implementation of the Forest Service's 2005 Decision Notice; specifically, culvert replacement and forest road BMPs.
- Increase monitoring activities as outlined in the TMDL document and summarized in Section 2 of this evaluation, and report findings to DEQ.
- Complete the watershed restoration plan for the Lolo Watershed.
- Continue implementation of BMPs from the TMDL for US Highway 12 and report findings to DEQ.
- Continue to document winter maintenance activities on US Highway 12 by MDT. Submit annual reports to DEQ summarizing these activities and specifically address any changes in management and how those compare to the maintenance activities, BMPs and loads set forth in the TMDL document.



## 5.0 CONCLUSIONS

This TMDL implementation evaluation concludes that progress is being made in conducting the restoration activities recommended in the Upper Lolo Creek TMDL document. However, more implementation activities, including culvert replacements, road reclamation, road BMPs, monitoring, and time are needed to achieve water quality standards.

At this time it is recommended that the forest service continues to implement the activities outlined in the TMDL and 2005 Decision Notice. Based on the nature and extent of restoration work done thus far, it is possible that water quality is improving; however additional monitoring is needed to determine if and to what extent water quality is improving.

In addition, it is recommended that the Lolo Watershed Group take into consideration the lack of recent monitoring data when drafting the WRP for the Lolo Watershed. Volunteer monitoring may be able to provide useful data in making a more in-depth determination of water quality improvements.

With the use of US Highway 12 for oversized load travel it is recommended that MDT specifically evaluate what potential impacts this increased and change in use of the highway will have on West Fork Lolo Creek.

Please see **Appendix A – Conclusions Table** for a detailed explanation of conclusions reached as a result of the Upper Lolo TMDL Evaluation of Progress.



## 6.0 SOURCES OF INFORMATION

A wide variety of information sources were consulted during the preparation of the Upper Lolo TMDL Implementation Evaluation. Sources included reports, databases, and websites, and personal communications. A complete list can be found in **Appendix F – Additional Consulted Sources**. Information from stakeholders was sought, in part, using the template letter found in **Appendix G – Information Request Template**. Detailed questions concerning the construction and content of the Upper Lolo TMDL Implementation Evaluation should be directed to Robert Ray, Section Supervisor, Montana DEQ Watershed Protection Section, (406) 444-5319, or rray@mt.gov .



## 7.0 REFERENCES

- Bryce, S. A., G. A. Lomnický, and Philip R. Kaufmann. 2010. Protecting Sediment-Sensitive Aquatic Species in Mountain Streams Through the Application of Biologically Based Streambed Sediment Criteria. *North American Benthological Society*. 29(2): 657-672
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## APPENDIX A – CONCLUSIONS TABLE

Table A-1: Conclusions.

Course of Action	Yes/No	Rationale
I) Implementation of a new or improved phase of voluntary reasonable land soil and water conservation practices is necessary	No	Some of the conservation practices called for in the TMDL have been implemented; however, continued effort is necessary.
II) Water quality is improving but a specified time is needed for compliance with water quality standards	Unknown	Water quality may be improving based on restoration work done so far, but monitoring data to support this possibility is not currently available.
III) Revisions to the TMDL are necessary to achieve applicable water quality standards	No	Additional monitoring is necessary to determine current water quality in relationship to TMDL targets. Development of the Bitterroot TPA TMDL document has the potential to lead to future Upper Lolo TMDL target modifications based on more recent knowledge of reference conditions and their application to setting targets.
IV) Formal reassessment of one or more of the pollutant/waterbody impairment listings is now recommended	No	Although more monitoring data is needed it is reasonable to wait until more BMPs are implemented before a formal reassessment is conducted.
V) More monitoring data is needed in order to determine whether or not progress has been made towards improving water quality	Yes	The emphasis thus far has been on restoration and not monitoring. At this time more monitoring data is needed.
VI) Work is believed to have been done, but information on the nature and extent of the work is unavailable.	No	Work has been completed and summarized to DEQ.
VII) Little or no work has been completed to address one or more pollutant/waterbody combinations	No	Significant work has been done to address multiple pollutant/waterbody combinations.



## APPENDIX B – UPPER LOLO TMDL PLANNING AREA MAP

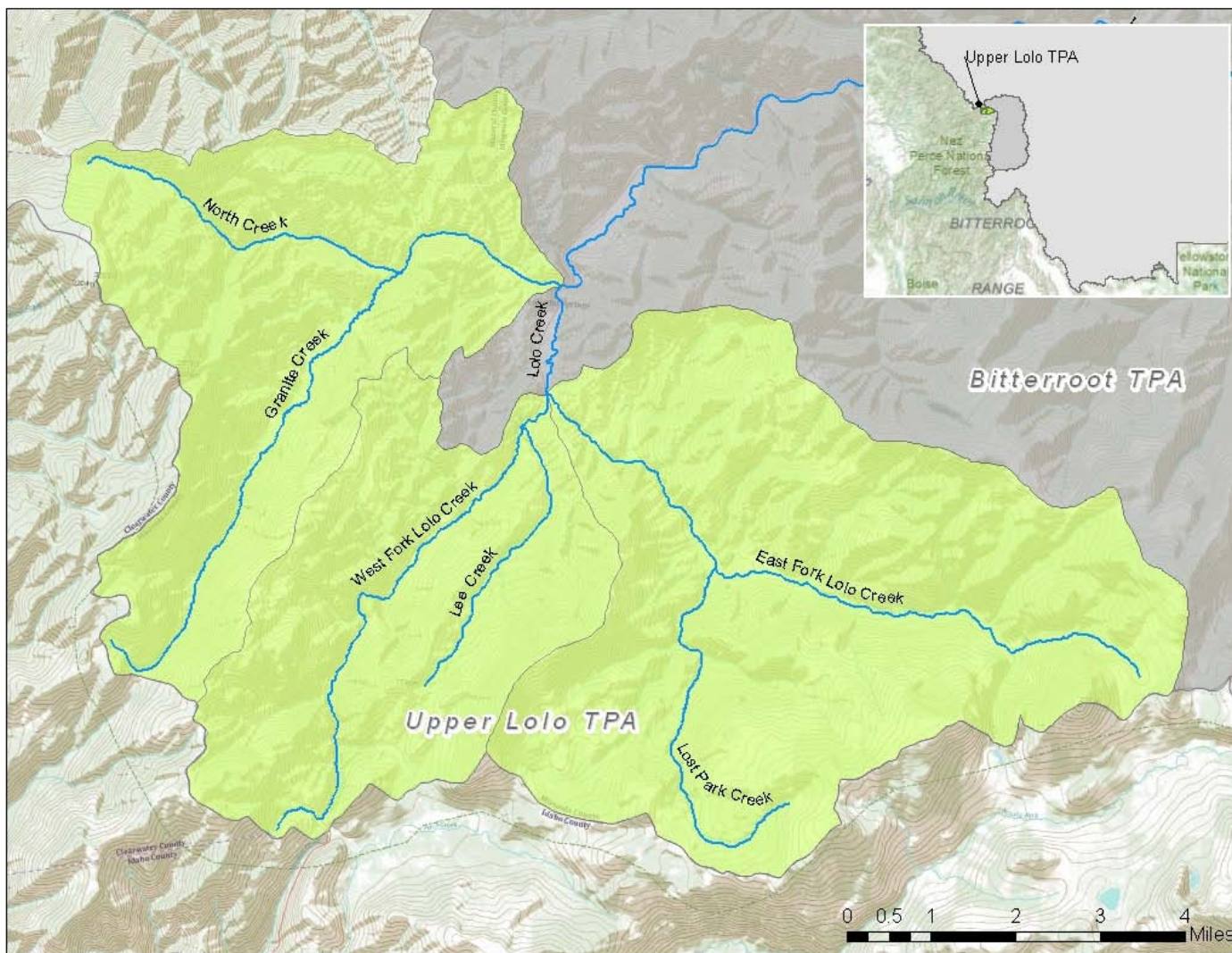


Figure B-1: Upper Lolo TMDL Planning Area Map.



## APPENDIX C – TMDL TABLES

**Table C-1: (TMDL Table E-1) Waterbodies and Pollution Sources\***

Segment Name	Waterbody Number	Length (mi)	Probable Causes	Probable Sources
West Fork Lolo Creek	MT76H005_05	6.8	Other habitat alterations, Siltation	Silviculture- habitat modification-other than bank or shoreline modification hydromodification/destabilization; Highway maintenance and runoff
East Fork Lolo Creek	MT76H005_04	7.4	Other habitat alterations, Siltation	Silviculture-logging road construction/maintenance
Granite Creek	MT76H005_03	8.5	Other habitat alterations, Siltation	Silviculture-logging road construction/maintenance
Lee Creek	MT76H005_07	3.8	Other habitat alterations, Siltation	Silviculture- logging road construction/maintenance; Habitat modification-other than bank or shoreline hydromodification/destabilization
Lost Park Creek	MT76H005_06	5	Other habitat alterations, Siltation	Silviculture- logging road construction/maintenance

\*TMDL Table E-1 can be found on page v of the final TMDL document.

**Table C-2: (TMDL Table 12) In-stream Targets for the Upper Lolo TPA\***

Life Stage & Channel Stability	Parameter	Targets	
		Stream Type**	
Embryo Development	Percent fines < 2 mm	A	22%
		B	16%
		C	21%
Emergence	Percent fines < 6 mm	A	31%
		B	21%
		C	30%

\*TMDL Table 12 can be found on page 36 of the final TMDL document.

\*\* Based on Rosgen stream type classification (Rosgen, 1996).

**Table C-3: (TMDL Table 13) Performance-Based In-Stream Targets for the Upper Lolo TPA\***

Life Stage & Channel Stability	Parameter	Targets
Rearing	Pool Frequency	Established following both reference and response reach data collection*
Channel Structure/Stability	V**	
Channel Structure/Stability	Entrenchment Ratio	
	Width/Depth Ratio	
	Sinuosity	

\*TMDL Table 13 can be found on page 37 of the final TMDL document.

\*\* Explanation of data collection is outlined in Section 8-of the TMDL document

**Table C-4: (TMDL Table 15) Load Allocations and Percent Reductions\***

<b>Pollutant: Sediment Waterbody</b>	<b>Source</b>	<b>Existing Load (tons per year)</b>	<b>Allocation (tons per year)</b>	<b>Load Reduction</b>
West Fork Lolo Creek	Forest Roads, Highway 12	690-783	543-605	33%
East Fork Lolo Creek	Forest Roads	649	630	36%
Granite Creek	Forest Roads	545	471	52%
Lee Creek	Forest Roads	104	97	65%
Lost Park Creek	Forest Roads	213	199	43%

*\*TMDL Table 15 can be found on page 42 of the final TMDL document.*

**APPENDIX D – SUMMARY OF MDT TRACTION SANDING****Table D-1: MDT Traction Sand Summary for US Highway 12, West Fork Lolo Creek**

<b>Year</b>	<b>Applied (tons/year)</b>	<b>Recovered (tons/year)</b>	<b>Net (tons/year)</b>
2003	1,238	765	473
2004	930	649	281
2005	700	327	373
2006	863	358	505
2007	628	15	613
2008	778	480	298





## APPENDIX E – CWAIC SUMMARIES

Table E-1: 2010 Water Quality Information – East Fork Lolo Creek

Water Information						
<b>Waterbody Id</b>	MT76H005_040		<b>Water Type</b>	RIVER		
<b>Name</b>	East Fork Lolo Creek		<b>Hydro Unit</b>	17010205 - Bitterroot		
<b>Size (Miles/Acres)</b>	9.1		<b>Basin</b>	Columbia		
<b>Ecoregion</b>	Idaho Batholith, Northern Rockies		<b>Watershed</b>	Upper Clark Fork		
<b>County</b>	MISSOULA		<b>Use Class</b>	B-1		
<b>TMDL Planning Area</b>	Upper Lolo		<b>Trophic Status and Trend</b>	NA		
<b>Location</b>	EAST FORK LOLO CREEK, headwaters to mouth (Confluence with Lolo Creek)					
<b>Water Quality Category</b>	4A - All TMDLs needed have been completed.					
Beneficial Use Support Information						
Use Name	Fully Supporting	Partially Supporting	Not Supporting	Threatened	Insufficient Information	Not Assessed
Agricultural						✓
Aquatic Life		✓				
Coldwater Fishery		✓				
Drinking Water						✓
Industrial						✓
Primary Contact Recreation						✓
Impairment Information						
Probable Causes	Probable Sources		Associated Uses		TMDL Completed	
Alteration in stream-side or littoral vegetative covers	Forest Roads (Road Construction and Use)		Aquatic Life		NO	
	Highway/Road/Bridge Runoff (Non-construction Related)		Coldwater Fishery			
Fish-Passage Barrier	Forest Roads (Road Construction and Use)		Aquatic Life		NO	
	Highway/Road/Bridge Runoff (Non-construction Related)		Coldwater Fishery			
Sedimentation/Siltation	Forest Roads (Road Construction and Use)		Aquatic Life		YES	
	Highway/Road/Bridge Runoff (Non-construction Related)		Coldwater Fishery			
	Silviculture Activities					

**Table E-1: 2010 Water Quality Information – East Fork Lolo Creek**

Assessment Information		
Assessment Type	Associated Uses	Confidence
BIOLOGICAL	Aquatic Life Coldwater Fishery	GOOD
HABITAT	Aquatic Life Coldwater Fishery	EXCELLENT
Assessment Method	Associated Uses	
Calibrated models (calibration data are less than 5 years old)	Aquatic Life Coldwater Fishery	
Ecological/habitat surveys	Aquatic Life Coldwater Fishery	
Fish surveys	Aquatic Life Coldwater Fishery	
Land use information and location of sources	Aquatic Life Coldwater Fishery	
Quan. measurements of instream parms, channel morphology, floodplain; 1-2 seasons; by prof	Aquatic Life Coldwater Fishery	
Comments		
<b>Overall Assessment</b>		
NA		
<b>Use</b>	<b>Comment</b>	
NA	NA	
<b>Cause</b>	<b>Comment</b>	
NA	NA	
<b>Source</b>	<b>Comment</b>	
NA	NA	

Table E-2: 2010 Water Quality Information – Granite Creek

Water Information						
<b>Waterbody Id</b>	MT76H005_030		<b>Water Type</b>	RIVER		
<b>Name</b>	Granite Creek		<b>Hydro Unit</b>	17010205 - Bitterroot		
<b>Size (Miles/Acres)</b>	9.4		<b>Basin</b>	Columbia		
<b>Ecoregion</b>	Idaho Batholith, Northern Rockies		<b>Watershed</b>	Upper Clark Fork		
<b>County</b>	MISSOULA		<b>Use Class</b>	B-1		
<b>TMDL Planning Area</b>	Upper Lolo		<b>Trophic Status and Trend</b>	NA		
<b>Location</b>	GRANITE CREEK, headwaters to mouth (Lolo Creek)					
<b>Water Quality Category</b>	4A - All TMDLs needed have been completed.					
Beneficial Use Support Information						
<b>Use Name</b>	<b>Fully Supporting</b>	<b>Partially Supporting</b>	<b>Not Supporting</b>	<b>Threatened</b>	<b>Insufficient Information</b>	<b>Not Assessed</b>
Agricultural	✓					
Aquatic Life		✓				
Coldwater Fishery		✓				
Drinking Water						✓
Industrial	✓					
Primary Contact Recreation						✓
Impairment Information						
<b>Probable Causes</b>	<b>Probable Sources</b>		<b>Associated Uses</b>	<b>TMDL Completed</b>		
Alteration in stream-side or littoral vegetative covers	Forest Roads (Road Construction and Use) Silviculture Activities		Aquatic Life Coldwater Fishery	NO		
Fish-Passage Barrier	Forest Roads (Road Construction and Use)		Aquatic Life Coldwater Fishery	NO		
Sedimentation/Siltation	Forest Roads (Road Construction and Use) Silviculture Activities		Aquatic Life Coldwater Fishery	YES		
Assessment Information						
<b>Assessment Type</b>	<b>Associated Uses</b>		<b>Confidence</b>			
BIOLOGICAL	Aquatic Life Coldwater Fishery		GOOD			
HABITAT	Aquatic Life Coldwater Fishery		EXCELLENT			
PHYSICAL/CHEMICAL	Aquatic Life Coldwater Fishery		LOW			
PHYSICAL/CHEMICAL	Agricultural Industrial		FAIR			

**Table E-2: 2010 Water Quality Information – Granite Creek**

<b>Assessment Method</b>	<b>Associated Uses</b>
Fish surveys	Aquatic Life Coldwater Fishery
Land use information and location of sources	Aquatic Life Coldwater Fishery
Non-fixed station physical/chemical monitoring (conventional pollutant only)	Agricultural Aquatic Life Coldwater Fishery Industrial
Quan. measurements of instream parms, channel morphology, floodplain; 1-2 seasons; by prof	Aquatic Life Coldwater Fishery
Sediment analysis	Aquatic Life Coldwater Fishery
Visual observation, use of land use maps, ref. conditions, prof. not required	Aquatic Life Coldwater Fishery
<b>Comments</b>	
<b>Overall Assessment</b>	
NA	
<b>Use</b>	<b>Comment</b>
NA	NA
<b>Cause</b>	<b>Comment</b>
NA	NA
<b>Source</b>	<b>Comment</b>
NA	NA

Table E-3: 2010 Water Quality Information – Lee Creek

Water Information						
<b>Waterbody Id</b>	MT76H005_070		<b>Water Type</b>	RIVER		
<b>Name</b>	Lee Creek		<b>Hydro Unit</b>	17010205 - Bitterroot		
<b>Size (Miles/Acres)</b>	3.8		<b>Basin</b>	Columbia		
<b>Ecoregion</b>	Northern Rockies		<b>Watershed</b>	Upper Clark Fork		
<b>County</b>	MISSOULA		<b>Use Class</b>	B-1		
<b>TMDL Planning Area</b>	Upper Lolo		<b>Trophic Status and Trend</b>	NA		
<b>Location</b>	LEE CREEK, headwaters to mouth (West Fork Lolo Creek)					
<b>Water Quality Category</b>	4A - All TMDLs needed have been completed.					
Beneficial Use Support Information						
<b>Use Name</b>	<b>Fully Supporting</b>	<b>Partially Supporting</b>	<b>Not Supporting</b>	<b>Threatened</b>	<b>Insufficient Information</b>	<b>Not Assessed</b>
Agricultural	✓					
Aquatic Life		✓				
Coldwater Fishery		✓				
Drinking Water						✓
Industrial	✓					
Primary Contact Recreation	✓					
Impairment Information						
<b>Probable Causes</b>	<b>Probable Sources</b>		<b>Associated Uses</b>	<b>TMDL Completed</b>		
Alteration in stream-side or littoral vegetative covers	Forest Roads (Road Construction and Use) Silviculture Activities Streambank Modifications/destablization		Aquatic Life Coldwater Fishery	NO		
Sedimentation/Siltation	Forest Roads (Road Construction and Use) Silviculture Activities Streambank Modifications/destablization		Aquatic Life Coldwater Fishery	YES		
Assessment Information						
<b>Assessment Type</b>	<b>Associated Uses</b>		<b>Confidence</b>			
BIOLOGICAL	Aquatic Life Coldwater Fishery Primary Contact Recreation		FAIR			
HABITAT	Primary Contact Recreation		FAIR			
HABITAT	Aquatic Life Coldwater Fishery		EXCELLENT			
PHYSICAL/CHEMICAL	Aquatic Life Coldwater Fishery		LOW			
PHYSICAL/CHEMICAL	Agricultural Industrial Primary Contact Recreation		FAIR			

**Table E-3: 2010 Water Quality Information – Lee Creek**

<b>Assessment Method</b>	<b>Associated Uses</b>
Benthic macroinvertebrate surveys	Aquatic Life Coldwater Fishery
Biological/habitat data extrapolated from upstream or downstream waterbody	Agricultural Aquatic Life Coldwater Fishery Industrial Primary Contact Recreation
Ecological/habitat surveys	Agricultural Aquatic Life Coldwater Fishery Industrial Primary Contact Recreation
Non-fixed-station monitoring (conventional during key seasons and flows)	Agricultural Aquatic Life Coldwater Fishery Industrial Primary Contact Recreation
Comments	
<b>Overall Assessment</b>	
NA	
<b>Use</b>	<b>Comment</b>
NA	NA
<b>Cause</b>	<b>Comment</b>
NA	NA
<b>Source</b>	<b>Comment</b>
NA	NA

Table E-4: 2010 Water Quality Information – Lost Park Creek

Water Information						
<b>Waterbody Id</b>	MT76H005_060		<b>Water Type</b>		RIVER	
<b>Name</b>	Lost Park Creek		<b>Hydro Unit</b>		17010205 - Bitterroot	
<b>Size (Miles/Acres)</b>	5.1		<b>Basin</b>		Columbia	
<b>Ecoregion</b>	Idaho Batholith, Northern Rockies		<b>Watershed</b>		Upper Clark Fork	
<b>County</b>	RAVALLI		<b>Use Class</b>		B-1	
<b>TMDL Planning Area</b>	Upper Lolo		<b>Trophic Status and Trend</b>		NA	
<b>Location</b>	LOST PARK CREEK, headwaters to mouth (Confluence with East Fork Lolo Creek)					
<b>Water Quality Category</b>	4A - All TMDLs needed have been completed.					
Beneficial Use Support Information						
<b>Use Name</b>	<b>Fully Supporting</b>	<b>Partially Supporting</b>	<b>Not Supporting</b>	<b>Threatened</b>	<b>Insufficient Information</b>	<b>Not Assessed</b>
Agricultural						✓
Aquatic Life		✓				
Coldwater Fishery		✓				
Drinking Water						✓
Industrial						✓
Primary Contact Recreation						✓
Impairment Information						
<b>Probable Causes</b>	<b>Probable Sources</b>		<b>Associated Uses</b>		<b>TMDL Completed</b>	
Alteration in stream-side or littoral vegetative covers	Forest Roads (Road Construction and Use) Silviculture Harvesting		Aquatic Life Coldwater Fishery		NO	
Fish-Passage Barrier	Forest Roads (Road Construction and Use) Silviculture Harvesting		Aquatic Life Coldwater Fishery		NO	
Sedimentation/Siltation	Forest Roads (Road Construction and Use) Silviculture Harvesting		Aquatic Life Coldwater Fishery		YES	
Assessment Information						
<b>Assessment Type</b>			<b>Associated Uses</b>		<b>Confidence</b>	
BIOLOGICAL			Aquatic Life Coldwater Fishery		FAIR	
HABITAT			Aquatic Life Coldwater Fishery		EXCELLENT	
PHYSICAL/CHEMICAL			Aquatic Life Coldwater Fishery		LOW	

**Table E-4: 2010 Water Quality Information – Lost Park Creek**

Assessment Method	Associated Uses
Calibrated models (calibration data are less than 5 years old)	Aquatic Life Coldwater Fishery
Ecological/habitat surveys	Aquatic Life Coldwater Fishery
Fish surveys	Aquatic Life Coldwater Fishery
Land use information and location of sources	Aquatic Life Coldwater Fishery
Quan. measurements of instream parms, channel morphology, floodplain; 1-2 seasons; by prof	Aquatic Life Coldwater Fishery
Comments	
<b>Overall Assessment</b>	
NA	
<b>Use</b>	<b>Comment</b>
NA	NA
<b>Cause</b>	<b>Comment</b>
NA	NA
<b>Source</b>	<b>Comment</b>
NA	NA



Table E-5: 2010 Water Quality Information – West Fork Lolo Creek

Water Information						
<b>Waterbody Id</b>	MT76H005_050		<b>Water Type</b>		RIVER	
<b>Name</b>	West Fork Lolo Creek		<b>Hydro Unit</b>		17010205 - Bitterroot	
<b>Size (Miles/Acres)</b>	7.4		<b>Basin</b>		Columbia	
<b>Ecoregion</b>	Idaho Batholith, Northern Rockies		<b>Watershed</b>		Upper Clark Fork	
<b>County</b>	MISSOULA		<b>Use Class</b>		B-1	
<b>TMDL Planning Area</b>	Upper Lolo		<b>Trophic Status and Trend</b>		NA	
<b>Location</b>	WEST FORK LOLO CREEK, headwaters to mouth (Lolo Creek)					
<b>Water Quality Category</b>	4A - All TMDLs needed have been completed.					
Beneficial Use Support Information						
<b>Use Name</b>	<b>Fully Supporting</b>	<b>Partially Supporting</b>	<b>Not Supporting</b>	<b>Threatened</b>	<b>Insufficient Information</b>	<b>Not Assessed</b>
Agricultural	✓					
Aquatic Life		✓				
Coldwater Fishery		✓				
Drinking Water						✓
Industrial	✓					
Primary Contact Recreation						✓
Impairment Information						
<b>Probable Causes</b>	<b>Probable Sources</b>		<b>Associated Uses</b>		<b>TMDL Completed</b>	
Alteration in stream-side or littoral vegetative covers	Forest Roads (Road Construction and Use) Streambank Modifications/destablization		Aquatic Life Coldwater Fishery		NO	
Sedimentation/Siltation	Forest Roads (Road Construction and Use) Highway/Road/Bridge Runoff (Non-construction Related) Streambank Modifications/destablization		Aquatic Life Coldwater Fishery		YES	
Assessment Information						
<b>Assessment Type</b>			<b>Associated Uses</b>		<b>Confidence</b>	
BIOLOGICAL			Aquatic Life Coldwater Fishery		FAIR	
HABITAT			Aquatic Life Coldwater Fishery		EXCELLENT	
PHYSICAL/CHEMICAL			Aquatic Life Coldwater Fishery		LOW	
PHYSICAL/CHEMICAL			Agricultural Industrial		FAIR	

**Table E-5: 2010 Water Quality Information – West Fork Lolo Creek**

Assessment Method	Associated Uses
Calibrated models (calibration data are less than 5 years old)	Aquatic Life Coldwater Fishery
Ecological/habitat surveys	Aquatic Life Coldwater Fishery
Fish surveys	Aquatic Life Coldwater Fishery
Land use information and location of sources	Agricultural Aquatic Life Coldwater Fishery Industrial
Non-fixed station physical/chemical monitoring (conventional pollutant only)	Agricultural Aquatic Life Coldwater Fishery Industrial
Occurrence of conditions judged to cause impairment	Aquatic Life Coldwater Fishery
Quan. measurements of instream parms, channel morphology, floodplain; 1-2 seasons; by prof	Aquatic Life Coldwater Fishery
Surveys of fish and game biologists/other professionals	Aquatic Life Coldwater Fishery
<b>Comments</b>	
<b>Overall Assessment</b>	
NA	
<b>Use</b>	<b>Comment</b>
NA	NA
<b>Cause</b>	<b>Comment</b>
NA	NA
<b>Source</b>	<b>Comment</b>
NA	NA

## APPENDIX F – ADDITIONAL CONSULTED SOURCES

Montana Department of Transportation. 2006. Winter Maintenance Activities in the Upper Lolo Creek TMDL Planning Area 2004-2005. Helena, MT: Montana Department of Transportation.

Montana Department of Transportation. 2006. Winter Maintenance Activities in the Upper Lolo Creek TMDL Planning Area 2005-2006. Helena, MT: Montana Department of Transportation.

Montana Department of Transportation. 2008. Winter Maintenance Activities in the Upper Lolo Creek TMDL Planning Area 2006-2007. Helena, MT: Montana Department of Transportation.

Sylte, Traci and Jennifer Mickelson. 2008. Watershed Improvement Tracking Lolo National Forest – Executive Summary. Missoula, MT: Lolo National Forest.  
[http://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/fsm9\\_021397.pdf](http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsm9_021397.pdf)

United States Department of Agriculture. 2005. Upper Lolo Watershed Restoration – Environmental Assessment. Missoula, MT: Lolo National Forest – Missoula Ranger District.



## APPENDIX G – INFORMATION REQUEST EXAMPLE

Thank you for taking the time to speak with me earlier. As I explained, I am currently working on a TMDL Evaluation of Progress for the Upper Lolo Watershed TPA (TMDL Planning Area). There are two sections of the evaluation that I need to gather information on:

- Implementation Activities Specific to MDT: “Further reduce sediment delivery from US Highway 12, through improved use and maintenance of sediment traps, plowing techniques, and guardrail cleaning”
- Monitoring and Information-Gathering Activities Specific to MDT: “Track the effectiveness of BMPs on forest roads and US Highways 23 and other mitigation measures at meeting targets. This could be done by comparing existing instream data to data following upgraded practices and mitigation measures”.

What I need to know from MDT is what actions have been taken towards implementing these activities. (Please know that this is not a regulatory document, we are simply evaluating what has been done to improve water quality in the Upper Lolo Watershed and where we need to go from here.)

Please let me know if you need any more information. I’m inserting some additional text from the original TMDL document that is specific to MDT. The whole TMDL can be found here:  
<http://deq.mt.gov/wqinfo/TMDL/UpperLolo/FinalUpperLolo.pdf>

I had an original deadline of December 31 for this evaluation, but that has been moved up to the middle of November. I understand that this may not be a practical request, any information would be wonderful and more detail to follow would be just fine. Again, please just let me know what I can do to make this easier.

Thank you,  
-Laura

### **“7.3.5 Montana Department of Transportation**

Accurate estimates of the sediment loading from both the cut and fill slopes and runoff carrying traction sand are difficult to achieve because of the historical sediment control and revegetation of these areas and the incomplete sand application and removal records. Additionally, there has not yet been sufficient effectiveness monitoring of BMP application to show whether current practices are working as expected.

MDT has initiated a detailed research project that will identify the most effective designs and maintenance procedures for keeping road sand from impacting nearby bodies of water. As the results of this research are identified, MDT will continuously incorporate these findings into management procedures in order to increase the effectiveness of its road sand management. In addition, results from a recent field study conducted by Maxim Technologies will help determine where upgrades and mitigation are needed most. The purpose of that study was to identify all fish passage barriers and to develop a map that depicts sections of the highway and their level of risk to impacting the stream channel.

Measurement procedures instituted by MDT for the 2002-2003 winter driving season are designed to develop a more accurate estimate of road sand usage and recovery and will be used to gauge the level of success of maintenance BMPs that have been developed. Additionally, MDT is planning to develop a statewide traction sand maintenance and application protocol following their current study. The

outcome of this plan is expected to promote protection of both the motorists and the local stream channels. With the goal of reducing the impacts of U.S. Highway 12 on sediment loading in the West Fork of Lolo Creek, MDT agrees to pursue the following BMPs, where consistent with the principles of traffic and employee safety:

1. When possible, slow down snow plow speeds to help decrease sand/snow mix from entering the stream;
2. When possible, use a snow blower to blow additional snow build-up away from the stream channel, when doing so does not endanger snow-slope stability or safe traffic flow;
3. Monitor, maintain and upgrade existing ditch blocks as necessary;
4. Monitor, maintain and upgrade existing sediment catch basins as necessary;
5. Increase the use of chemical deicers and decrease the use of road sand, as long as doing so does not create a safety hazard or cause undue degradation to plant and water quality;
6. Explore revegetating key cut and fill slopes, with a goal of 70% vegetation cover of these areas;
7. Provide post-winter sand removal from the roadway with mechanized pick-up brooms;
8. Improve maintenance records to more accurately estimate the use of road sand and chemicals and to estimate the amount of sand recovered; and
9. Continue to fund and manage the MDT research projects, which will identify the best designs and procedures for minimizing road sand impacts to adjacent bodies of water, and incorporate those findings into additional BMPs.

In addition to the sediment control measures identified above, MDT's Maintenance Division has researched and purchased state-of-the-art winter maintenance snowplow equipment that will soon be available for use on Lolo Pass. This equipment has computer controls to help ensure accuracy and proper distribution of sanding materials, and infrared thermometers to help operators determine the correct materials to use (sand versus liquid deicer). In addition, MDT continues to modify and experiment with aggregate gradations to find appropriate blends of aggregate to apply that will ensure traffic safety while limiting broken windshields and lessening negative impacts to air and water quality. Solid and liquid chemical specifications are strictly specified and controlled to minimize negative impacts to the environment and infrastructure. MDT has developed Best Management Practices (BMPs) for all maintenance activities, included these BMPs in maintenance manuals."