2006 TEMPORARY BEST MANAGEMENT PRACTICES EVALUATION PROGRAM REPORT

USDA FOREST SERVICE
LAKE TAHOE BASIN MANAGEMENT UNIT

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I. Introduction

Temporary Best Management Practices are required during all construction in the Tahoe Basin that involves soil disturbance. Temporary BMPs differ from permanent BMPs as they are designed to remain effective only until construction is complete and permanent BMPs can be applied. Depending on the nature of the activity and site characteristics, a variety of different BMPs may be employed to keep sediment from being mobilized.

The LTBMUs Temporary BMP Monitoring program is designed to monitor BMP's applied to forest construction and restoration projects which have the potential for short term adverse impact to soil and water quality. Patterned after the Region 5 BMPEP process (USFS, 2002), protocols were developed to systematically assess and document the following:

Implementation

- Whether temporary BMP's were incorporated in NEPA documents and contracts.
- Whether temporary BMP's in NEPA documents and contracts were implemented on the ground.
- Whether temporary BMP's in NEPA documents and contracts were constructed according to design specifications.

Effectiveness

- Whether temporary BMP's were effective at controlling erosion and sediment delivery to surface water bodies.
- Whether observed problems with temporary BMP's were addressed in a timely manner.
- Whether corrective actions remedied problems with temporary BMP's or problems persisted.

Protocols for this program are documented in the LTBMU Temporary BMP Monitoring Plan (USFS, 2006) and were incorporated into all Storm Water Pollution Prevention Plans (SWPP) for construction and restoration projects on the Lake Tahoe Basin Management Unit in 2006. The monitoring program fulfills the requirements within SWPP to inspect, report, maintain, repair, and monitor temporary BMP's.

This was the first year that temporary BMP monitoring was formally documented on the LTBMU. Six projects implemented by the engineering and restoration departments were monitored as displayed in Table 1.

Table 1. Projects selected for Temporary BMP monitoring in 2006.

Project Name	Project Type	Potential Threat	Years of Construction
Blackwood Canyon bridge replacement	Road bridge construction	Sedimentation into Blackwood Creek	2006
Cookhouse Meadow Channel Construction	New Channel Construction in a montane meadow	Sedimentation into Big Meadow Creek; soil compaction of meadow	2005-2006
Lam Watah Trail Construction	Trail Construction; Boardwalk in wetland	Sedimentation into Burke Creek	2006
Meeks Bay Resort Campground Rehab.	Campground Rehabilitation	Sedimentation into Meeks Creek	2006-2007
Pope Beach Parking Area Reconstruction Phase 2	Parking Lot Reconstruction for BMP upgrades	Sedimentation into Lake Tahoe and Truckee Marsh	2006
Ward Creek Trail Bridge Construction	Trail bridge construction and trail decommission	Sedimentation into Ward Creek	2006-2007

A brief description for each evaluated project listed is provided below:

Blackwood Canyon bridge replacement and channel construction: Replace the existing low water crossing with a bridge and construct a new stream channel and flood plain adjacent to the crossing.

Cookhouse Meadow Channel Construction: Constructed a new stream channel through Cookhouse meadow, and eliminated the old channel by filling and re-contouring that portion of the meadow occupied by the stream currently. The new channel was constructed in 2005. Water was diverted from the old channel to the new channel in 2006, and the old channel was obliterated.

Lam Watah Trail Construction: Graded and paved existing gravel parking area on Kahle Street and installed a catch basin to catch storm water runoff; constructed a new trail and decommissioned existing trail; and construct a boardwalk over Burke Creek and the associated wetland.

Meeks Bay Resort Campground Rehabilitation: Includes removing and disposing of asphalt within campground; scarifying and revegetating compacted areas; removing gravel drive; removing six 24" trees; removing and disposing of one building and its foundation (20'x35') and associated concrete walks; and capping and abandoning non-necessary electrical, sewer and water lines.

Pope Beach Parking Area Reconstruction Phase 2: Constructed approximately 1200' of paved road; installed drop inlets with filter baskets; remove and restore 240' of existing roadbed and fill down to pre-development Pope Marsh grade; and constructed concrete walkways to existing toilet buildings.

Ward Creek Trail Bridge Construction: Install a 51' trail bridge across Ward Creek with abutments outside of the 100 year floodplain; decommission and restore approximately 120 feet of the existing trail; construct approximately 60'of new trail; and stabilize both stream banks where existing trail crossed Ward Creek.

One other project should have been monitored, the Fallen Leaf Water System upgrade project, but due to monitoring staff error data collection was not conducted until the project temporary BMPs had been winterized. This project will need to be monitored in the spring of 2007.

II. Methodology

The complete description of protocols can be found in the Temporary BMP Monitoring Plan (USFS, 2006) and is available upon request. At the end of June 2006 the Restoration and Engineering Departments submitted a list of planned forest construction projects to the Monitoring Program. Once the project list had been finalized, monitoring staff contacted the project manager for each project to collect all relevant planning and design specifications pertaining to temporary BMP implementation. The plans and specifications were evaluated in the field to determine whether appropriate temporary BMPs were included and if BMP's were constructed according to design specifications.

Effectiveness monitoring was conducted periodically during construction; after precipitation events; after winterization (if applicable); and in spring (if applicable). Monitoring after storms was conducted based on professional judgment after determining amounts measured at the nearest precipitation gauging station. A template of the data form utilized is presented in Appendix A.

III. Results

A summary of the results of the 2006 temporary BMP monitoring is presented in Table 2. As can be seen there was mixed success relative to temporary BMP implementation and effectiveness. Although there is no current method for "scoring" these evaluations (such as has been developed for the BMPEP program), the results are presented in terms of minor departures and major departures in effectiveness. A rating of unsatisfactory is considered a minor departure, with no sediment reaching an SEZ. A rating of poor is considered a major departure, and sediment is believed to be, or have potential to be, reaching an SEZ as a result. There was one major implementation failure documented (for the Ward Trail Project), and one major effectiveness failures (in the Blackwood Canyon project).

In addition there were a number of minor departures documented. Of these there were two projects (Lam Watah and Ward Creek) where effectiveness failures were never remedied even after minor departures were documented in several evaluations. Fortunately no major departures in effectiveness resulted from not correcting these BMPs. Although there were several types of BMP failures observed, the most persistent BMP failure observed across almost all projects was proper management of stockpiles of fine-grained sediment. This failure is a concern because not only are these types of stockpiles a source of sediment to surface water bodies but they are also significant sources of $PM_{2.5}$ and PM_{10}, from emissions of blowing dust. Lake Tahoe is in attainment for $PM_{2.5}$ but not PM_{10} (CARB, 2006).

IV. Recommendations

BMP Implementation

The following are recommendations in regards to improving implementation and maintenance of temporary BMPs for forest construction projects.

- Ensure better management of stockpiles of fine-grained sediment through the following:
  - Locate piles away from surface water bodies.
  - Properly cover stockpiles when not in use.
  - Surround stockpiles with sediment control BMP's.
- Correct effectiveness failures within 48 hours after documentation, even if the failure is considered a minor departure.

BMP Monitoring

The following are recommendations related to the monitoring of temporary BMPs.

- There was no clear documentation of project start and end dates on the current forms. Revise the forms to document the start of project construction, which should be the date of installation of temporary BMPs, as well as the estimated project completion date. Make sure the actual end date of the project is clearly documented on the last evaluation performed in that year.

- Several of the 2006 data forms are missing information, including name of reviewer, and type of survey. Improve completeness of data documentation in future.

- The following projects were not completed this year and contain winterized BMPs (Meeks Campground, Ward Bridge, Law Watah Trail, and Fallen Leaf Water System). These projects will need to be monitored during spring runoff to assure that winterized BMPs are still intact, and monitoring is continued until construction is complete.

Table 2:Summary of Temporary BMP Failures

NAME OF PROJECT	Date Surveyed	IMPLEMENTATION		EFFECTIVENESS	
		BMPS Prescribed	Implemented according to design	Minor Departure	Major Departure
BLACKWOOD CANYON BRIDGE REPLACEMENT AND CHANNEL CONSTRUCTION	24-Aug	No failure	No failure	No failure	No failure
	7-Sep			No failure	No failure
	26-Sep			Management of Stockpiled materials	No failure
	10/6 (storm)			Management of Stockpiled materials, Sediment Control BMPs	Water Diversion Structures, Erosion Control BMPs
	30-Oct			No failure	No failure
	11/3 (storm)			No failure	No failure
	30-Nov			No failure	No failure
COOKHOUSE MEADOW RESTORATION	2-Aug	No failure	Minor departure from prescribed design	Management of Stockpiled materials, Egress/Ingress to site	No failure
	8/5 (storm)			Management of Stockpiled materials, Sediment Control BMPs Egress/Ingress to site	No failure
LAM WATAH TRAIL CONSTRUCTION	3-Aug	No failure	Minor departure from prescribed design	Management of Stockpiled materials, Sediment Control BMPs	No failure
	29-Aug			Management of Stockpiled materials, Sediment Control BMPs	No failure
	25-Sep			Management of Stockpiled materials, Sediment Control BMPs	No failure
	6-Oct			Management of Stockpiled materials, Sediment Control BMPs	No failure
MEEKS RESORT CAMPGROUND RECONSTRUCTION	6-Oct	minor modification required to achieve resource protection	No failure	No failure	No failure
POPE BEACH PARKING AREA RETROFIT	2-Aug	No failure	No failure	No failure	No failure
	8/5 (storm)			No failure	No failure
	25-Aug			Erosion Control BMPs, Sediment Control BMPs, Management of Stockpiles	No failure
	26-Sep			No failure	No failure
WARD CREEK TRAIL BRIDGE	8-Sep	minor modification required to achieve resource protection	Major departure from prescribed design	Sediment Control BMPs, Designation of construction/exclusion zones, Management of stockpiled materials	No failure
	25-Sep			Sediment Control BMPs, Designation of construction/exclusion zones	No failure
	6-Oct			Sediment Control BMPs, Designation of construction/exclusion zones	No failure

Note: 8/5 Storm- 0.5 in precip/4 hours, 10/6 storm- 0.2 in precip/24 hours, at nearest gauging station. Actual intensity on site may have been different.

References

California Area Resources Board (CARB). ATTACHMENT C MAPS AND TABLES OF AREA DESIGNATIONS FOR STATE AND NATIONAL AMBIENT AIR QUALITY STANDARDS. Retrieved from website: http://www.arb.ca.gov/regact/area06/appc.pdf on October 12, 2006.

USDA Forest Service. 2006. LTBMU Temporary BMP Monitoring Plan, LTBMU, South Lake Tahoe, CA.

USDA Forest Service. 2002. Investigating Water Quality in the Pacific Southwest Region: Best Management Practices Evaluation Program (BMPEP Users Guide); Pacific Southwest Region; Vallejo, CA.

APPENDIX A

Temporary BMPs Monitoring Form-Implementation

UTM Coordinates (NAD 27)
Zone _____
Easting_____
Northing _____
Construction Site Name
_____
Quadrangle_____ Township_____ Range_____ Section_____
SWPPP#_____
Date of Project Start _____
6th Field Watershed
Reviewer _____ Date of BMP Implementation_____
Survey Date/Time _____
Date_____

Last BMP Maintenance
Construction Type (Circle): Road/Trail Decommission Road/Trail Maintenance Road/Trail Stream Crossing

New Road/Trail Parking Lot Improvement Campground Improvement

Restoration/Enhancement
Other:_____

Implementation Evaluation:
1) Project design included Erosion and Sediment Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from construction activities (per FS and Lahontan Regional Water Quality Control Board (LRWQCB) standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZ's, and hazardous substance control. _____

1=Temp BMP measures n the contract and are prescribed adequately to achieve resource protection.

2=Temp BMP measures in the contract require minor modifications to achieve resource protection.
3=Temp BMPs in contract are inadequate to achieve resource protection
4=The contract does not address temporary BMP needs

2) Are BMP measures constructed according to contract design specifications?_____

1 = Constructed according to prescribed design
2 = Minor departure from prescribed design.
3 = Major departure from prescribed design.
4 = Not implemented.
5 = Repeat, not implemented.

Describe deficiencies and proposed corrective actions. Also describe corrective actions taken from previous evalutions if any deficiencies were noted:

Temporary BMP Monitoring Form- Effectiveness

Reviewer:_____ Date:_____ Construction Site Name: _____, SWPP ID:_____

Monitoring/Survey Timing (check one): Start/End of Construction _____, Storm Response_____ (intensity_____, station_____), Routine Time-interval_____

1)Water Control

a) Ponding of water and constructed detention systems.

	Satisfactory			Unsatisfactory/Minor Departure			Poor/Major Departure
	Not applicable.		No evidence of unexpected ponding on site. Constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion. Constructed detention ponds (applicable to stream crossings) are less than 25% full. Coffer dams are functioning properly and flow remains in pipes and ponds.		Some evidence of on site ponding, but does not appear to threaten integrity of hill slopes or foundations. Minor erosion may be occurring as a result, but no sediment has reached an SEZ. Constructed basins show minor signs of piping, 90% of water is retained. Less than 50% of capacity of constructed ponds has been lost. Coffer dams (applicable to stream crossings) show signs of piping, or are not capturing the full flow of water. Inlets and outlets are less than 25% plugged and less than 50% of capacity of coffer dams has been lost.		Onsite ponding threatens to erode slopes or the integrity of foundations. Outlets of constructed basins exhibit erosion and there is evidence of sediment transport to SEZ. If constructed basins have overtopped, note color of water below the outlet. More than 50% of capacity of constructed ponds has been lost. Coffer dams (applicable to stream crossings) show signs of piping, or inlets and outlets are plugged; or water is not being captured by the coffer dam system. Coffer dams have lost over 50% of capacity.

b) Water diversion structures

	Not applicable.		Protective measures were installed properly and are adequate to prevent concentrated runoff from entering or exiting the site.		Water diversion structures are not functioning properly and need maintenance. Water flows through the site and has caused erosion. However, no sediment has reached the SEZ.		Water diversion structures have failed and are no longer effective. Majority of flow has piped beneath structures, bypassed the structures, or over-topped structures. Rill or gully erosion has occurred. There may be sediment transport in the SEZ.

2) Dust Control

	Not applicable.		Protective measures are adequate to control dust.		Dust control measures are in place to prevent flying dust. There may be infrequent plumes of dust.		No control measures are being implemented. There are large plumes of dust or dust devils throughout the site. Dust control measures need to be

							implemented.

3) Erosion Control

	Not applicable.		Disturbed and bare areas are kept to a minimum. Temporary BMP measures (such as erosion control or Geotextiles blankets, mulch or pine straw application, or fabric rolls) applied for slope protection is adequate to prevent soil erosion. There is no soil movement; rilling is not observed.		BMP's are installed improperly. Minor erosion such as rilling (<20 feet in length) and deposition of eroded soils has occurred in fans. There may be small areas of exposed soil, but erosion has not resulted in rills or gully formation. Eroded sediments have not reached the SEZ."		BMP's are installed improperly. Large areas of bare ground are visible. Active erosion has occurred with rill and/or gully erosion. Off-site effects can be observed such as sediment delivery into the SEZ.

4) Sediment Control

	Not applicable.		Protective measures were installed properly and are effective at preventing sediment from leaving the construction site.		Protective measures may need minor maintenance to eliminate piping or to increase capacity. Structures have less than 50% of design capacity. Minor amounts of construction spoils or sediment has left the site, but not reached the SEZ.		Protective measures may need major maintenance. Over 50% of the capacity of structures has been lost. Construction spoils or sediment have reached the SEZ.

5) Designation of construction zone and any equipment exclusion zones.

	Not applicable.		Protective measures have been installed to protect sensitive areas and are adequate to prevent resource damage.		Protective measures have not been installed or were improperly installed. No resource damage has occurred yet.		Protective measures are inadequate to prevent resource damage, which has already occurred. Protective measures need major maintenance.

6)Storage and management of foreign and hazardous materials, stock pile (i.e. soil and rock), portable toilets, and refuse.

a) Evaluate the occurrence and mitigation of foreign and hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality. For example, oils and greases.

	Not applicable.		Protective measures are adequate.		Protective measures are inadequate. Area is properly signed for types of substances stored. I.E., cement mixing is outside of the SEZ, but cement may be present in small quantities on the ground. None has reached the SEZ. Evidence of improper storage of hazardous substances, such as chemical or mineral stains on the ground; however substances have not entered the SEZ. There is no evidence of runoff from or through the site.		There are indicators of runoff through the storage area. Mixing of cements occurs within the SEZ; or cement and/or water with cement has reached the SEZ. Storage of foreign material is located within SEZ or substances have entered the SEZ. Area is improperly signed.

b) Evaluate the management of stockpiled materials, such as soil, sod, mulch, and rock.

	Not applicable.		Protective measures are adequate.		Stockpiles are not properly covered; diversion structures are not in place; or there is minor evidence of runoff in the stockpiled area (for example minor rilling). Movement of materials by wind is likely. There is no evidence of stockpiled materials leaving the site or entering the SEZ.		Runoff either originates in the storage site or has entered the storage site. Diversion structures have failed. Stockpiles are actively eroding and materials may have been transported in to the SEZ.

c) Management of refuse and portable toilets.

	Not applicable.		Protective measures are adequate. Portable toilets and dumpsters are located outside of SEZ's and in an easily accessible site for routine maintenance. There are no signs of refuse or loose materials within the entire project area.		Portable toilets and dumpsters are located outside of SEZ's and in an easily accessible site for routine maintenance. There are signs of loose refuse and materials within the site. Liquids may be leaking from the dumpster or portable toilet (s), but none has reached the SEZ and amounts have not resulted in puddles. Batteries are disposed of in the dumpster.		Portable toilets and dumpsters are located within SEZ's. The dumpster is overflowing with garbage and portable toilet door(s) are not secured shut. Liquids from dumpsters or toilet(s) is puddling or has entered the SEZ. Hazardous materials have been deposited in the dumpster. Refuse is scattered throughout the project site.

7) Egress/Ingress to and from the site.

	Not applicable.		Area of egress/ingress is rocked and adequate to prevent soil from leaving the project site.		Minor departure from normal. Egress/ingress area meets project specifications. Rock or crush has been displaced and needs maintenance. There may be minor amounts of soil and sediment leaving the project area.		There is no egress/ingress area although contract specifies one should be in place; or area requires major maintenance. There is considerable soil and sediment leaving the project site.

Comments (Deficiencies and Corrective Measures) and label photos. Draw diagrams if necessary. There may be more than one area where inadequate BMP's were observed. Use the back of these forms if necessary.