BEST MANAGEMENT PRACTICES EVALUATION PROGRAM

ANNUAL REPORT
DECEMBER, 2010

USDA FOREST SERVICE
LAKE TAHOE BASIN MANAGEMENT UNIT
ECOSYSTEM CONSERVATION DEPARTMENT

Jim Harris, Hydrologist
Sue Norman, Supervisory Hydrologist
Joey Keely, PhD, Supervisory Hydrologist (editor)

TABLE OF CONTENTS

	PAGE
Executive Summary	**3**
1. Introduction	**4**
2. Objectives and Methods	**4**
3. Results	**5**
4. Summary/Recommendations	**18**
Appendix A: BMPEP Training	**21**

EXECUTIVE SUMMARY

In 2010, the Lake Tahoe Basin Management Unit (LTBMU) completed 39 Best Management Practices Evaluation Program (BMPEP) evaluations as part of the Pacific Southwest Region's effort to evaluate the implementation and effectiveness of BMPs designed to protect soil and water resources associated with Timber, Engineering, Recreation, Revegetation and Prescribed Fire activities. All 39 Regional target evaluations were conducted in 2010; of these, 37 (95%) of the evaluations rated the BMPs effective and two (5%) evaluations rated the BMPs not effective.

The two not effective ratings were for BMPs at:

- Streamside Management Zone Evaluation (T01) - Angora Roads & Trails Hazard Tree Project, Unit 4 (deficiency corrected in 2010)
- Streamside Management Zone Evaluation (T01) – Quail Project, McKinney/Chukar Units 3C and 3B (deficiency to be re-evaluated in 2011)

Monitoring in 2010 also included two follow-up evaluations at sites which had reported BMP deficiencies in 2009; Regency Road 16N93 and Bliss Creek Road. The Regency Road deficiency of road use during wet periods was corrected by installation of a gate in 2010, and the fence repair needed to prevent unauthorized use of the Bliss Creek Road is planned for 2011.

Improvements have been made to the BMPEP evaluation and reporting process, as a result of an interagency training exercise hosted by the LTBMU. These include:

- It had been found that inter-evaluator variability could produce different ratings among evaluators of the same BMP in the field. This variability among evaluator ratings was addressed by requiring evaluators to more thoroughly document the particulars of observed BMP deficiencies, followed by having the evaluations reviewed and vetted through interdisciplinary (and higher-level) staff, prior to reporting the results and any recommendations to correct deficiencies. The additional levels of documentation and technical reviews are intended to minimize the variability of the final ratings.
- Staff efforts to develop, obtain, organize and review the relevant implementation documents are being improved. In part, this is being accomplished by creating "Implementation Teams" from the NEPA InterDisciplinary (ID) Teams for projects, so that all project mitigations, design features, and BMPs are fully implemented and tracked. And, in part, it is being accomplished by additional higher-level review and tracking of BMPEP field preparations and recordkeeping.

1. INTRODUCTION

This report summarizes the results of the Best Management Practices Evaluation Program (BMPEP) at the Lake Tahoe Basin Management Unit (LTBMU) during 2010. The objectives of this program are (i) to fulfill USFS monitoring commitments to the State Water Resources Control Board (SWRCB), as described in the SWRCB/USFS Management Agency Agreement and *Water Quality Management for National Forest System Lands in California (USDA Forest Service, 2000)*, (ii) to assess and document the efficacy of the USFS water quality management program, specifically, by evaluation of the implementation and effectiveness of BMPs; and (iii) to facilitate adaptive management, by identifying opportunities to improve the program and recommending and tracking the improvements.

2. OBJECTIVES AND METHODS

Onsite evaluations are used to assess both implementation and effectiveness of BMPs. Implementation evaluations determine the extent to which planned, prescribed and/or required water quality protection measures are actually put in place on project sites. Effectiveness evaluations gauge the extent to which the practices meet the water quality protection objectives. Component ratings for project planning, implementation, and effectiveness are entered into the BMPEP database, along with the degree, duration, and extent of any problems that exist. Based on conditions observed during the evaluation, weight is applied to the component ratings to determine an overall rating for implementation and effectiveness.

Additional details regarding BMPs, protocols, and site selection can be found in *Investigating Water Quality in the Pacific Southwest Region, Best Management Practices Evaluation Program (BMPEP) User's Guide (USDA Forest Service, 2002)* and *Water Quality Management for National Forest System Lands in California (USDA Forest Service, 2000).*

BMP implementation evaluation forms are used to document answers to a variety of specific questions intended to determine whether the project was executed as specified in project planning documents. A range of possible ratings is assigned to each question depending on its relative importance and the degree to which a particular requirement is met (e.g., whether the project exceeds, meets, departs immaterially or substantially from requirements). Ratings for all implementation questions are then summed and compared to a pre-determined threshold to conclude whether BMPs were implemented completely. BMP effectiveness is determined through observations of qualitative water quality protection (e.g., visual evidence of sediment delivery to channels) and quantitative measurements (e.g. amount of ground cover, percent of stream shade).

This rating approach results in a 2 x 2 matrix, where a given suite of BMPs are placed into one of four categories: implemented and effective (I-E), not implemented but effective (NI-E), implemented but not effective (I-NE), and not implemented and not effective (NI-NE):

- "implemented and effective (I-E)" A rating of I-E results when the BMP was both implemented and effective (visually confirmed).

- "not implemented but effective (NI-E)" A rating of NI-E results when BMPs were not implemented, or were not installed according to specifications, yet there is no evidence of potential water quality impairment. The judgment that there is no evidence of potential water quality impairment is made when (i) BMPs are visually confirmed to be effective despite having been incorrectly installed, or (ii) no BMP was necessary for the specific situation, or (iii) no precipitation event occurred to provide evidence of impairment, or (iv) only project planning deficiencies were noted.
- "implemented but not effective (I-NE)" A rating of I-NE results when BMPs were implemented but were not effective (visually confirmed).
- "not implemented and not effective (NI-NE)" A rating of NI-NE results when BMPs were not implemented and not effective (visual confirmed).

For those locations where the BMPs receive poor ratings for implementation or effectiveness, observers are asked to identify the causes and to suggest corrective actions. The evaluators estimate the degree, duration, and magnitude of any existing or potential impacts to water quality, based on published Region 5 guidelines. This type of "hill-slope monitoring" uses indirect measures to evaluate BMP effectiveness. Poor ratings represent potential, as well as actual, impairment of water quality at a given location. All BMPs for which there exists visual evidence of impairment receive poor ratings; but so do some BMPs that have no actual impairment as yet, because the potential is significant for water quality impairments to occur in the future at those locations.

Best Management Practices Evaluation Program protocols are applied to both randomly and non-randomly selected project sites in the Basin. The number of random evaluations to be completed each year is assigned to the National Forests by the Regional Office based on (i) the relative importance of the BMP in protecting water quality in the Region and (ii) those management activities most common on the individual Forest. Forests can supplement these randomly selected sites with additional sites based on local monitoring needs, such as those prescribed in an environmental document. Only data from onsite evaluations made at randomly selected sites are used to assess BMP implementation and effectiveness at the Regional programmatic level.

3. RESULTS

The LTBMU completed all 39 of the Regional Office assigned BMPEP targets, which are summarized below in Table 1. In 2010, 95% of the evaluations rated the BMPs as effective. For comparison, 84% of the BMPs evaluated in 2007 were found to be effective, with 97% in 2008, and 97% in 2009. Of the 39 evaluations conducted in 2010, 34 (90%) rated BMPs both implemented and effective, whereas 2 evaluations (5%) rated BMPs as not implemented but effective, and another 2 evaluations (5%) rated BMPs implemented but not effective. The observed implementation deficiencies occurred in the Road Surface and Slope Protection (E8) and Prescribed Burn (F25) evaluations. The effectiveness deficiency occurred at the evaluations of (T01) Stream Side Management Zones and (E20) Management of Roads during Wet Periods. Results are summarized in Table 2.

Because of user variability observed during BMPEP training held this spring, the documented deficiencies on each evaluation form were reviewed by the BMPEP program manager. The review checked that the ratings reflected an appropriate interpretation of each evaluation, and that all deficiencies reported on the forms were brought forward in the annual report narrative, regardless of how these deficiencies were scored for the ultimate rating. Deficiency ratings were then "truthed" by the BMPEP program manager, based on communications with the evaluators and on follow-up field visits.

Additionally, follow-up BMP evaluations were conducted at two sites where BMP deficiencies were documented in previous years. Deficiencies were not resolved at these sites in 2010; however, corrective actions are scheduled for 2011.

Table 1: 2010 BMPEP Targets and Selections for the LTBMU.

Evaluation	*Form*	*Region 5 Target*	*Available Project Sites*	*Evaluations*	*Project Site*
Streamside Management Zones	T01	4	11	4	Angora Roads & Trails Hazard Tree Timber Sale portion of Unit 5___ 1. Xing at Seneca Pond___ 2. Culvert xing at culvert on road 14N23___ 3. Roundhill, Unit 21, timber sale at Burt Creek___ 4. Chucker / McKinney SEZ Xing between Units 3B & 3C)
Landings	T04	4	11	4	1. Angora Roads & Trails Hazard Tree Timber Sale portion of Unit 5, landing at Seneca Pond___ 2. Roundhill Unit 22, one landing at sharp bend on road 13N20___ 3. Chucker/McKinney Unit 2A____ 4. Unit 3C
Timber Sale Administration	T05	1	2	1	1. Angora Roads & Trails Hazard Tree Timber Sale
Special Erosion Control & Revegetation	T06	1	11	1	1. Angora Roads & Trails Hazard Tree Timber Sale, Unit 4
Road Surface & Slope Protection	E08	4	5	4	1. 16N86 (Beaver St) no stream xing___ 2. Saxon Creek xing (12N08)___ 3. Barker Pass Road Slide repair ___ 4. 16N57, water dip repair
Stream Crossings	E09	2	5	2	1. Fallen Leaf CG ___ 2. Saxon Creek Bridge (12N01A)
Control of Sidecast Material	E11	3	5	3	1. Fallen Leaf CG ___2. Slaughterhouse Xing ___ 3. Saxon Creek Bridge (12N08)
In-channel Construction Practices	E13	3	4	3	1. Fallen leaf CG ___ 2. Blackwood Ck Phase IIIa (2008, 2009) ___ 3. Tallac Creek Bridge
Temporary Roads	E14	2	2	2	1. Angora haz. Tree ___ 2. Blackwood boulder haul
Rip Rap Composition	E15	1	1	1	1. Angora Water Tank-located off of Aberdeen Cir. (2009)
Water Source Development	E16	2	2	2	1. Taylor Creek Visitor Center Aquarium ___ 2. Watson Lake Access Ramp, Fire Water
Snow Removal	E17	1	2	1	1. Forest Supervisors Office Parking
Management of Roads During Wet Periods	E20	5	43	5	1. 12N21 (High Meadow Rd) 2. 14N32A (Genoa Rd-near Spooner) 3. 1201A (Saxon Rd) 4. 14N32 (Genoa Rd-near Andria St) 5. 16N52 (off Hwy 267)
Developed Recreation Sites	R22	3	31	3	1. William Kent Visitor Center 2. Kaspain CG & picnic area 3. Eagle Falls Picnic area and Trailhead
Dispersed Recreation Sites	R30	1	6	1	1. Newhall (Skunk Harbor)
Prescribed Fire	F25	1	1	1	1. Dollar 5 (above Tahoe City on Fiberboard Freeway) (2008)
Revegetation of Surface Disturbed Areas	V29	1	1	1	1. Lower Truckee River streambank
TOTAL		**39**	**143**	**39**	

Table 2. Results of the BMPEP Evaluations by Program Area at LTBMU in 2010.

		EFFECTIVE		NOT EFFECTIVE	
Program Area & Form	**Number of Evaluations**	**Implemented & Effective**	**Not Implemented & Effective**	**Implemented & Not Effective**	**Not Implemented & Not Effective**
Timber					
T01	4	2	0	2	0
T04	4	4	0	0	0
T05	1	1	0	0	0
T06	1	1	0	0	0
Subtotal #	10	8	0	2	0
Engineering					
E08	4	3	1	0	0
E09	2	2	0	0	0
E10	0	0	0	0	0
E11	3	3	0	0	0
E13	3	3	0	0	0
E14	3	3	0	0	0
E15	1	1	0	0	0
E16	2	2	0	0	0
E17	1	1	0	0	0
E20	5	5	0	0	0
Subtotal #	23	25	1	0	0
Recreation					
R22	3	3	0	0	0
R30	1	1	0	0	0
Subtotal #	4	4	0	0	0
Other					
G24	0	0	0	0	0
F25	1	0	1	0	0
V29	1	1	0	0	0
Subtotal #	2	1	1	0	0
Total # BMPs	39	35	2	2	0
Percentage of Ratings		**90%**	**5%**	**5%**	**0%**
		95%		**5%**	

The following section outlines the completed evaluations. If the evaluation rated the BMPs not-implemented or not-effective or both, a brief description of the specific issues or conditions contributing to the rating is provided. All of the original hardcopy 2010 evaluations are maintained in files at the LTBMU Forest Supervisors Office and are available upon request.

Evaluations are outlined below in groupings relative to site location.

Timber (Vegetation and Fuels Management)

A total of ten timber evaluations were conducted at fuels reduction treatment projects:

- 4 - T01, Streamside Management Zones (SMZs/SEZs); three evaluations rated BMPs implemented and effective, whereas one evaluation rated the BMP implemented and not effective.
- 4 - T04, Landings. All BMPs were rated implemented and effective.
- 1 - T05, Timber Sale Administration. Rated BMPs implemented and effective.
- 1 - T06, Special Erosion Control and Vegetation. Rated BMPs implemented and effective.

T01: Streamside Management Zones

- Angora Roads & Trails Hazard Tree Project, Unit 5 (at Humboldt crossing on Angora Tributary on System Trail 17E49.4 *~Implemented and Not Effective*

  The evaluator rated the BMPs not effective due to evidence of disturbance within the SMZ, resulting in eroded sediment entering the channel. The prescribed SMZ buffer for this project was 150 feet from the stream. Where roads and trails cross SMZs, equipment was limited to use of the road or trail only. The erosion feature consisted of a 4'x 10' area of disturbed soil, with rilling. The total volume of eroded soil transported to the creek is estimated to be less than one cubic foot. The soil was apparently disturbed by project activities, either during road grading, hazard tree removal or construction of the Humboldt crossing. The erosion feature was repaired by the evaluator by raking in the rills with soil and placing slash in a manner such that erosion would no longer occur.

- Angora Roads and Trails Hazard Tree Project, Unit 5, (at culvert crossing on Trail 17E49,*~Implemented and Effective*

- Roundhill Fuels Reduction Project , Unit 21 *~Implemented and Effective*

- Quail Fuels Reduction Project –SMZ between Chucker/McKinney Units 3B and 3C ~ *Implemented and Not Effective*

  This evaluation was performed in an SMZ buffer that was delineated in an area that contains an intermittent stream channel, lying between Units 3C and 3B. A legacy forest road was utilized to provide access across this SMZ and intermittent channel, to Unit 3B for forwarder

/ harvester machinery. Before this forwarder/harvester trail was utilized, it was covered in slash and a Humboldt crossing was installed across the intermittent channel and natural swales around this channel. This is seen in Photos 1 and 2 below.

Photos 1 and 2: Humboldt crossing on intermittent channel between Units 3C and 3B.

The equipment exclusion buffer was implemented successfully, in that there was no evidence of equipment use within this SMZ. Once fuels treatments were complete, the slash mat and Humboldt crossing were removed, leaving enough residual slash to stabilize most of the access path. A log was also placed across the access path near the edge of the intermittent channel to discourage vehicular encroachment.

However, during the evaluation conducted on June 29th, 2010, there was evidence of bare exposed soils on the edges of the access path adjacent to the intermittent channel, as well as dispersion of flows from the intermittent channel over the bare soils on this access path. Flows from the channel had ponded on an approximately 75-foot length of the access path, seen in Photo 3 below.

Photo 3: Bare soils and diverted intermittent channel flows appeared on the closed forwarder/harvester trail between Units 3B and 3C, post-operation.

Because these diverted intermittent channel flows are likely transporting sediments from bare soil areas, the evaluator rated the BMPs not effective. However, because the gradient is very flat in this area and the total area of bare soil is limited to what can be seen in Photo 3, the potential for sediment loading is considered to be relatively minor. At this time, the LTBMU does not have specific plans to apply mitigation at this location. Rather, LTBMU hydrologists will revisit this site during spring runoff in 2011, and determine whether this site appears to be stabilizing on its own (i.e., there is an increase in natural duff or vegetation cover) or whether mitigation actions should be applied.

T04: Landings -

- Angora Roads & Trails Hazard Tree Timber Sale portion of Unit 5, (landing at Seneca Pond) ~*Implemented and Effective*
- Roundhill Unit 22, (landing on road 13N20) ~*Implemented and Effective*
- Quail Project, Chucker/McKinney Unit 2A ~*Implemented and Effective*
- Quail Project Chucker/McKinney Unit 3C ~*Implemented and Effective*

T05: Timber Sale Administration

- Angora Roads & Trails Hazard Tree Timber Sale ~*Implemented and Effective*

T06: Special Erosion Control and Revegetation

- Angora Roads & Trails Hazard Tree Timber Sale, Unit 4 ~*Implemented and Effective*

Engineering and Restoration

A total of 21evaluations of Roads and In-channel Construction Practices were conducted in 2010:

- 4 - E08, Road Surface, Drainage and Slope Protection; Three evaluations were rated implemented and effective and one evaluation was rated not implemented and effective.
- 2- E09, Stream Crossing; All were rated implemented and effective.
- 3- E11, Control of Sidecast Material; All were rated implemented and effective.
- 3- E13, In-Channel Construction Practice; All were rated implemented and effective.
- 2- E14: Temporary Roads; All were rated implemented and effective.
- 1 - E15: Rip Rap Composition; Rated implemented and effective.
- 2 - E16: Water Source Development; All were rated implemented and effective.
- 1 - E17: Snow Removal; Rated implemented and effective.
- 5 - E20: Management of Roads during Wet Periods; Four evaluations were rated implemented and effective and one evaluation was rated implemented and not effective.

16N86 (Beaver St)

- E08: Road Surface, Drainage and Slope Protection ~*Implemented and Effective*

12N01A Saxon Creek Stream Crossing

- E08: Road Surface, Drainage and Slope Protection ~*Implemented and Effective*
- E11: Control of Sidecast Material *xing~Implemented and Effective*

12N08 Saxon Creek Stream Crossing

- E09: Stream Crossing ~*Implemented and Effective*

Barker Pass Road, Slide Repair

- E08: Road Surface, Drainage and Slope Protection ~*Implemented and Effective*

Road 16N57, Routine Maintenance

- E08: Road Surface, Drainage and Slope Protection ~Not Implemented and Effective This evaluation was rated not implemented because road maintenance measures are not adequate at this location. Water from an adjacent spring (near to and likely associated with Brockway Spring) is ponding in the road surface forming a "mudhole" in an expanding depression caused by continued road use. The adjacent road surface contains >10% rills, 2" deep and 20' in length, which continue off the road surface. No evidence of sediment transport to waterbody or SEZ was observed. Improved measures to capture and convey spring flows across or away from this road were completed during the FY10 field season as a result of this evaluation.

Fallen Leaf Campground

- E09: Stream Crossing ~*Implemented and Effective*
- E11: Control of Sidecast Material ~*Implemented and Effective*
- E13: In-Channel Construction Practice ~*Implemented and Effective*

Slaughterhouse Stream crossing on Slaughterhouse Canyon Road

- E11: Control of Sidecast Material ~*Implemented and Effective*

Blackwood Creek Restoration Phase IIIA

- E13: In-Channel Construction Practice ~*Implemented and Effective (also re-evaluation from 2009 evaluation).*

  Cause of 2009 deficiency was failure of in- channel structures at the end of the reach constructed in 2008 during spring runoff of 2009, resulting in channel evulsion and bank erosion. Completion of the remaining 2/3 of the restored reach in 2009 corrected this failure, and channel function met restoration performance objectives during water year 2010.

- E14: Temporary Roads ~*Implemented and Effective*

Tallac Creek Bridge

- E13: In-Channel Construction Practice ~*Implemented and Effective*

Angora Hazard Tree

- 14: Temporary Roads ~*Implemented and Effective*

Angora Water Tank (located off of Aberdeen Cir.)

- E15: Rip Rap Composition ~*Implemented and Effective*

Taylor Creek Visitor Center-Stream Profile Chamber

- E16: Water Source Development ~*Implemented and Effective*

Watson Lake Access Ramp-Fire water

- E16: Water Source Development ~*Implemented and Effective*

Forest Supervisor's Office Parking lot

- E17: Snow Removal ~*Implemented and Effective*

12N21 High Meadow Rd

- E20: Management of Roads during Wet Periods ~*Implemented and Effective*

14N32A Genoa Road-near Spooner Summit

- E20: Management of Roads during Wet Periods ~*Implemented and Effective*

1201A Saxon Rd

- E20: Management of Roads during Wet Periods ~*Implemented and Effective*

14N32 Genoa Rd near Andria St

- E20: Management of Roads during Wet Periods ~*Implemented and Effective*

16N52 off of Hwy 267-

- E20: Management of Roads during Wet Periods ~*Implemented and Effective*

  There was no evidence of road use during wet periods on this road when evaluation was conducted on June 24th. This road is blocked by a gate managed by the USFS, and the gate is closed between November 15th and June 1st each year. A total of 1.4 miles of this road is located on USFS managed lands. The road continues on for another 2.5 mile on lands managed by the California Tahoe Conservancy (CTC).

As part of this evaluation, the evaluators also documented observations related to erosion issues adjacent to an insufficiently decommissioned bridge crossing at Griff Creek, located on CTC land. The USFS engineering department is currently coordinating with CTC to utilize USFS resources to address this bridge as well as other maintenance needs for the 2.5 miles of road 16N52 that are located on CTC lands.

Recreation

A total of four Recreation Sites were evaluated in 2010:

- 3 – R22, Developed Recreation Sites
- 1 – R30, Dispersed Recreation Sites

All were rated implemented and effective.

William Kent Visitor Center

- R22, Developed Recreation Sites ~*Implemented and Effective*

Kaspian Campground and Picnic Area

- R22, Developed Recreation Sites ~*Implemented and Effective*

Eagle Falls Picnic Area

- R22, Developed Recreation Sites ~*Implemented and Effective*

Newhall (Skunk Harbor)

- R30, Dispersed Recreation Sites ~*Implemented and Effective*

Prescribed Fire

One Prescribed Fire evaluation was conducted in 2010.

Dollar Burn

- F25, Prescribed Fire ~ *Not Implemented but Effective*

Dollar Burn, Unit #5, is located near Tahoe City and was implemented in 2008. The not implemented rating is due to the lack of a defined ground cover objective in both the NEPA document and the Burn Plan for this project. Previous Burn Plans at the LTBMU have contained a ground cover standard, and recently developed Burn Plans are utilizing this standard which states: "Maintain 25% duff retention over 80% of the surface area. Tolerable deviations include 100% of the duff consumption on less than 25% of the surface area." This standard was not incorporated in the planning process for this project. Fire management staff will review and update each existing Burn Plan on the Unit to make sure this standard is contained in the Burn Plan document.

Although the above standard was not stated in Burn Plan, monitoring staff determined that the site contained close to 25% residual soil cover overall, and there was no evidence of erosion or sediment transport from the site. Therefore, the BMP was rated effective .

Monitoring staff also evaluated hydrophobicity at the underburned site. Measurements were taken every 5 meters along a 100 meter transect. Data from 4 data points could not be used, due to documentation errors, resulting in 17 total measurements. The table below summarizes and displays the results.

Sample Points	**Hydrophobic**	**Not Hydrophobic**
10 burned	**8** (80%)	**2** (20%)
7 unburned	**4** (57%)	**3** (42%)
17 Total	*12 (70%)*	*5 (30%)*

It may be premature to rely on tentative conclusions that can be drawn from these data. The small number of samples per category (e.g., 2, 3, 4, and 8) precludes employing statistics to test the strength of the associations; so, the following discussion is provided in that light. First, only 10 of the 17 sample points were burned (based on visual indicators), indicating that the intensity of burn was sufficiently low that ground vegetation and the duff layer were left intact over approximately 40% of the transect. Secondly, while there was a higher degree of hydrophobicity in the burned areas (8 of 10 locations), there were several hydrophobic locations in the unburned areas too (4 of 7). The latter result affirms previous findings that Tahoe Basin soils are often naturally hydrophobic due to waxy organic substances produced by local vegetation and microorganisms. By contrast, those forest stands burned by high intensity fire in the Angora Fire Burn Area that resulted in hydrophobic soils were mostly on hillslopes with southeast-facing aspects (USDA Forest Service, 2010) – directly in the line of fire advancement. Hydrophobicity, therefore, appears to be a difficult metric for establishing post-fire condition objectives, in contrast to the current suggestion on the BMP evaluation form. It is suggested here that ground cover should be the primary objective established and utilized for upslope underburn evaluations in the Lake Tahoe Basin. Current research conducted in the Tahoe Basin may provide additional insight into appropriate soil quality metrics (and standards) to be used for evaluating post-burn conditions.

Revegetation of Surface Disturbed Areas

One Revegetation of Surface Disturbed Areas (V29) evaluation was conducted in 2010.

Lower Truckee Riverbank Stabilization Project

- V29, Revegetation of Disturbed Surface ~*Implemented and Effective*

Follow-up Evaluations from 2009

The 2009 BMPEP Report recommended follow-up evaluations at two site locations to verify whether corrective measures were taken to address past issues of concern.

Bliss Creek Road, 15N61, was revisited in 2010 to determine if the fence was repaired as recommended in the 2008 BMPEP report. As of the June, 2010 site visit, the Bliss Creek Road fence has not been repaired, although it is currently scheduled for repair in 2011. This site is recommended for follow-up evaluation in 2011.

Regency Road 16N93 is a seasonal road which is administratively closed to public use from November 15 to June 1st. At the time of the 2009 evaluation, a Forest Service gate did not exist at the western terminus of road 16N93 (where it meets road 16N63), and ruts and fresh tire tracks indicated the road was used during the prescribed closure period. Road 16N63 is now gated, which effectively prevents unauthorized entry onto 16N93 during seasonal closure periods. No further evaluation is needed.

Post-Storm Event Monitoring

There were two large storm events that occurred between October 3-5th and October 23-24th. Rainfall totals for the first event were measured at the Fallen Leaf, Rubicon, and Ward Snowtel sites and averaged 2.5 inches of total rain. During the later October event, however, precipitation totals measured at these 3 sites ranged from 5.3 inches to 9 inches.

There were a number of active or recently completed projects that were inspected immediately prior to and after these events, in compliance with Lahontan Timber Waiver and NPDES construction permits. These were visual inspections [only] to ensure that required BMPs were in place, required BMPs were effective in controlling storm runoff, and mitigation actions were identified and implemented as appropriate to either repair or augment BMPs.

The hardcopy documentation of these inspections is maintained in USFS files. This documentation will be submitted to Lahontan under separate cover, as part of required Annual Implementation Reporting, as specified in each project permit. This discussion provides a summary of the results of the storm inspections, for the purposes of tracking, as part of the Forest's overall BMP monitoring program.

<u>Camp Richardson & Meeks Bay Restrooms (3) Project</u>
The Engineering Department had three restroom retrofit projects permitted by Lahontan in 2010. Based on the visual inspections before, during and after these rainfall events, BMPs were implemented as intended and performed satisfactorily.

<u>Cold Creek/High Meadows Stream Channel and Floodplain Restoration</u>
During the early October event, flows unexpectedly filled up one of the constructed channel reaches and overflowed into the existing channel. Turbidity levels in Cold Creek just below the project reached a measured peak of 12.3 NTUs during this event. There was also flow observed on one of the access roads within the project boundary, contributing stormwater to Cold Creek

above the sampling site. Additional BMPs were installed after this event, to improve road drainage and contain flows in the constructed channel. The site was fully winterized by October 22nd. There were no observations of runoff from the project site during the late October storm event, indicating winterization BMPs were working as designed. Turbidity levels in Cold Creek, measured downstream of the project, peaked at 5.3 NTUs during this event.

Sediment erosion and transport to Cold Creek was observed on the High Meadows road during both of these events. Water bars were maintained, but more intensive measures are needed to prevent further long term transport of sediment from this road to Cold Creek. This road has been a chronic sediment producer for decades, and is identified for upgrades and retrofits as part of the Cold Creek /High Meadows Restoration Project Decision Memo. Work is planned to address erosion and sedimentation issues on the High Meadows Road during the FY 11 field season. Anticipated work includes aggregate surfacing of road segments that exceed 15% road grade and re-contouring of drainage outlets. These treatments are expected to substantially reduced erosion and sedimentation and reduce overall road maintenance needs.

Blackwood Phase IIIB Floodplain Restoration

During the early October event, all construction BMPs were installed and functioning. No flows were observed in the intermittent channel crossing, and no rilling or sediment transport were observed on project surfaces. There was some stormflow observed on the access road to stockpile area, so additional BMPs were recommended for this access road prior to winterization. The restoration site was winterized by October 22nd, and the stockpile area was winterized by October 27th. An NOV was issued by the Lahontan Regional Water Quality Control Board because the October 15th grading deadline was missed and BMP implementation deficiencies were found. There were no observations of discharges of sediment.

During the late October event, peak flow in the intermittent channel that runs through the completed project site occurred at an estimated 536 cfs. BMPs in the restored floodplain performed as designed, with the exception that sprayed hydromulch on the floodplain cutslope was largely displaced during this event. However, since the cutslope was also covered with slash, only minor rilling occurred on the cutslope. Sediment transported onto the site from ephemeral channels draining upslope sources (including Barker Pass road drainage) was effectively trapped in floodplain depressions. BMPs at the decommissioned channel crossing and temporary project access road also performed as designed, with no evidence of channel erosion, or sediment transport.

Some sediment was transported off spoil piles in the stockpile area; however, this sediment was deposited in adjacent forest swales and depressions. Additional straw wattles were placed in these flow paths to provide additional protection against erosion.

Angora Hazard Tree Project, Mule Deer Road

BMP implementation checklist monitoring was conducted during both of the October events. There were no observations of BMP effectiveness problems during the earlier storm event. Discussion with Lahontan staff on site between the October events, however, raised concerns regarding the adequacy of existing BMPs for winterization. In a subsequent meeting, mutual

agreement was reached on the winterization BMPs and these were in place prior to the later October event. During the later event some rilling and sediment transport were observed, however sediment was deposited in well vegetated areas, where there is little potential for sediment to be delivered to a waterbody.

2010 BMPEP Training Results

In the spring of 2010, the LTBMU hosted a more intensive BMPEP training on the Forest than has been conducted in previous years. Regional USFS staff and local regulatory staff participated. The purpose of this training was both to re-familiarize Forest staff that would be conducting the 2010 evaluations and to also introduce the protocol to regulatory staff (Lahontan and TRPA), who have accepted the use of BMPEP protocols for the USFS to meet timber waiver monitoring requirements associated with fuels reduction projects. Another desired outcome was to identify difficulties with effective utilization of the protocols, and identify solutions to those difficulties. The details of this effort are presented in Appendix A.

Difficulties in utilizing the protocols were identified, as well as recommendations for improvement. The reader is requested to read this Appendix directly, to see the full discussion regarding these recommendations. Improvements have been made to the BMPEP evaluation and reporting process, as a result of the results presented in Appendix A, and are summarized below:

- It had been found that inter-evaluator variability could produce different ratings among evaluators of the same BMP in the field. This variability among evaluator ratings was addressed by requiring evaluators to more thoroughly document the particulars of observed BMP deficiencies, followed by having the evaluations reviewed and vetted through interdisciplinary (and higher-level) staff, prior to reporting the results and any recommendations to correct deficiencies. The additional levels of documentation and technical reviews are intended to minimize the variability of the final ratings.
- Staff efforts to develop, obtain, organize and review the relevant implementation documents are being improved. In part, this is being accomplished by creating "Implementation Teams" from the NEPA InterDisciplinary (ID) Teams for projects, so that all project mitigations, design features, and BMPs are fully implemented and tracked. And, in part, it is being accomplished by additional higher-level review and tracking of BMPEP field preparations and recordkeeping.

4. SUMMARY / RECOMMENDATIONS

Forest-wide, 95% of BMPs monitored in 2010 were implemented as planned; 92% were rated effective. Two BMPs were deficient regarding implementation; two others were deficient regarding effectiveness:

E08-Road Surface, Drainage and Slope Protection, Road 16N57, Routine Maintenance: Road maintenance had not resulted in adequate BMPs to control intercepted flows from adjacent spring. Corrective measures were applied in 2010 field season, as a result of monitoring.

F25-Prescribed Fire, Dollar Burn: No ground cover objective was specified in either the NEPA document or the Burn Plan. LTBMU will ensure that future Burn Plans will identify appropriate ground cover objectives.

T01-Streamside Management Zone, Quail Fuels Reduction Project, Chucker/McKinney Units 3B & 3C: Observations of bare soils and diverted flows from intermittent channel at SMZ access road stream crossing. No restoration is recommended at this time; the area will continue to be monitored.

T01-Streamside Management Zone, Angora Roads & Trails Hazard Tree Unit 5: Evidence of disturbed soils in SMZ due to project activity and evidence of sediment delivery to a channel from this disturbed area. Restoration was implemented in 2010.

Despite the magnitude of the October storm events, the only location in which stormwater flows were observed was within the Cold/Creek High Meadows Restoration project (including access roads). During the early October event, stormwater flows were observed on access roads within the project boundary, as well as at the downstream end of a reconstructed channel. No flows of stormwater were observed from the project site during the later October storm event, even though the magnitude of this event was twice as great.

The most significant discharge of stormwater flows [related to project activities] was associated with the High Meadows Road, which accesses the Cold Creek High Meadows restoration site. In the short term, work is planned to address erosion and sedimentation issues on the High Meadows Road during the FY 11 field season. Anticipated work includes aggregate surfacing of road segments that exceed 15% road grade and re-contouring of drainage outlets. Long term remediation of this road is currently still in the planning phase, including negotiations with a private land owner who owns much of this road.

Recommendations

In 2011, LTBMU will implement on-site restoration at the one implementation deficiency and two effectiveness deficiencies that have not already been addressed in 2011. Follow-up evaluations will be conducted at these three locations, to evaluate installation of BMPs currently planned for 2011.

It is also recommended that fire management staff review all existing Burn Plans to ensure that a ground cover objective is specified. Hydrology and fire management staff should continue to use data from ongoing research and monitoring efforts to determine whether the current ground cover objective for prescribed underburns should be modified for future projects.

The results from the Forest BMPEP training identified several significant challenges in applying the BMPEP protocol, as well as recommendations for addressing those challenges. The LTBMU will continue to hold annual BMPEP trainings, including partner agency staff, to implement continuous improvement in the application of the BMPEP protocol.

References

USDA Forest Service. 2000. Water Quality Management for National Forest System Lands in California: Best Management Practices. Pacific Southwest Region; Vallejo, CA.

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

USDA Forest Service. 2010. *2010 Addendum to* 2007 Angora Wildfire Hydrophobicity Field Monitoring Report, Lake Tahoe Basin Management Unit.

Appendix A: Results of the 2010 LTBMU BMPEP Training

Introduction

On May 27, 2010 the LTBMU Ecosystem Department Physical Sciences Group hosted its annual training on the Regions Best Management Practices Evaluation Program (BMPEP). The training was conducted by the Physical Sciences Group Leader (Susan Norman) and BMPEP Program Manager (Jim Harris). A total of 12 attendees participated in the whole training exercise, an additional 3 other attendees attended only part of the session. Of the 12 full attending participants, 6 were USFS staff from the Ecosystem Department that have responsibility for implementing the Regional BMPEP program on the Forest, 2 were USFS Regional Office staff connected to the BMPEP program, one representative from the LTBMU Engineering Department, one representative from the Lahontan Regional Water Quality Control Board, one representative from the Tahoe Regional Planning Agency, and one representative from a private consulting firm that applies a modified BMPEP protocol at the Heavenly Ski Resort.

The primary purpose of this training was to train and refresh USFS staff on how to apply the Regional BMPEP protocol, and increase awareness and understanding with Basin regulatory staff on the application of the BMPEP protocol. A secondary purpose to this training was to informally evaluate the variability of results received when the protocol is applied by a diverse group of resource specialists all evaluating the same site, and to receive input from this diverse group on difficulties they encountered when attempting to apply the protocol. USFS participating staff ranged from GS5 through GS12 grade levels, with most classified as hydrologists or hydrologic technicians. One USFS participant from the Regional office is classified as a wildlife biologist, and the other USFS staff person is classified as an Engineer.

The project selected for this training was the Angora Hazard Tree project. This project was implemented in 2009, and the purpose of the project was to remove dead trees deemed to be a potential safety hazard adjacent to USFS trails and roads within the 2007Angora Wildfire. This resulted in the clearing and removal of almost all residual trees within an approximate width of 150 feet on both sides of trails and roads within the Burn area. The project included construction of a temporary road that contained numerous stream crossings and several landings. The method of vegetation removal was tractor/skidding.

This project was also a site where a Notice of Violation (NOV) was issued by the Lahontan Regional Water Quality Control Board in response to BMP deficiencies and permit violations that occurred following an extreme storm event in October of 2009. Documentation of the BMP deficiencies that resulted in this violation are presented in the 2009 BMPEP monitoring report, located under the publications tab on the external LTBMU website. BMPs were later implemented at this project prior to the end of the field season, therefore the evaluations conducted as part of this exercise reflect the efficacy of those BMPS during spring runoff in 2010.

The BMPEP evaluation protocols selected for the training were limited to Temporary Roads (E14), Stream Crossings (E09), Landings (T04), and Skid Trails (T02). The participants were separated into two groups. Group 1 consisted of 5 individuals, and performed the E14 and E09

evaluation on the temporary road at stream crossing A (TSA contract crossing no. 11), and the landing evaluation as shown on Figure 1. The second group consisted of 7 individuals, and performed the E14 and E09 evaluation on the temporary road at stream crossing B, as well as the skid trail evaluation also shown on Figure 1. Each individual conducted their evaluations independently. Once this was completed, both groups then visited the sites evaluated by the other group, and the whole group discussed the results of all the individual evaluations.

Results

Table 1 below displays the results of all the evaluations conducted as part of this training. The BMP implementation evaluation forms are used to document answers to a variety of specific questions intended to determine whether the project was executed as specified in project planning documents. A range of possible scores are assigned to each question depending on its relative importance and the degree to which a particular requirement is met (e.g., whether the project exceeds, meets, departs immaterially or substantially from requirements). Scores for all implementation questions are then summed and compared to a pre-determined threshold to conclude whether BMPs were implemented completely. BMP effectiveness is determined through observations of qualitative water quality protection (e.g., evidence of sediment delivery to channels) and quantitative measurements (e.g. amount of ground cover, percent of stream shade).

This scoring approach results in a 2 x 2 matrix, where a given suite of BMPs are placed into one of four categories: implemented and effective (I-E); implemented, but not effective (I-NE); not implemented, but effective (NI-E) and not implemented and not effective (NI-NE). A score of NI-E results when BMPs were not implemented, or were not installed according to specifications, and there is no evidence of potential water quality impairment. No evidence of impairment can result when (i) incorrectly installed BMPs were still effective, (ii) no BMP was necessary for the specific situation, (iii) no precipitation event occurred to provide evidence of impairment, or (iv) only project planning deficiencies were noted.

Table 1. Results from 2010 BMPEP Training at LTBMU

Form	Name	IE	NIE	INE	NINE	Evaluations
T04	Landing	5	0	0	0	5
T02	Skid trail	5	2	0	0	7
E14	Temp Rd @A	3	1	1	0	5
E14	Temp Rd @B*	0	4	0	3	7
Total		13	7	1	3	24
		Effective=20		**Not Effective=4**		

*implementation ratings adjusted (see discussion below)

Difficulties with Implementation Evaluations

One of the key results from this exercise was gaining awareness of the difficulty presented to evaluators in obtaining and digesting the relevant information contained in project planning and implementation documents, in order to conduct the BMPEP implementation ratings, particularly for vegetation management projects. This exercise may not be as difficult for construction type projects which typically produce detailed site plans and details on BMP specifications. However the nature of fuels reduction projects allows for much of the final decisions regarding the specifics of BMP implementation to be determined in the field during the project. Documentation of these specific details and decisions turned out to be difficult to obtain for this exercise.

The BMPEP protocol directs the evaluator to review the environmental assessment, timber sale contract, contract daily diary (FS 6300-20), Timber Sale Administrators Handbook (FSH 2409.15), and the Timber Sale Administration Reports (R5-2400-181). In preparation for this training, the LTBMU BMPEP Program manager met with relevant vegetation management staff and obtained copies of all of the above mentioned documents. The Program manager and Physical Sciences Group Leader went through all these documents and attempted to highlight all the relevant sections of these documents that pertained to the BMPs to be evaluated as part of the BMPEP protocols. Copies of these documents were provided to the training attendees in their training folder.

It was apparent from trying to obtain and present these documents for this training that very little project specific detail can be found for the purpose of BMP evaluations in the NEPA or contract documents. This was particularly true for the temporary road stream crossings. NEPA design features and standard contract clauses often provide general guidance related to BMP implementation. This is appropriate and understandable given the nature of the BMPs to be applied, and the desire to make site specific decisions as part of project implementation. However these site specific field decisions were poorly documented in the forms that could be utilized for that purpose (R5-2400-181, or FS 6300-20).

Uniformly the participants in the training found the implementation documentation provided to be confusing and impossible to absorb in the time frame they were given during this one day training. Therefore for the purposes of the training participants relied also on information given to them verbally by USFS staff who had first hand knowledge on the site specific decisions regarding BMP design and implementation.

For the evaluations conducted for the FY10 Regional BMPEP program, particular attention will be paid to difficulties encountered in obtaining relevant implementation documents for each project, and suggestions for how to improve documentation will be recommended as appropriate.

Evaluation Results Discussion

T04 – Landing (Group 1)
All five reviewers of the landing found the landing BMPs both implemented correctly and effective. Only one reviewer rated one of the implementation criteria a "3" (minor departure). This was for landing stabilization and it was noted that the thickness of chips may have been greater than the specifications. It was also noted that an inordinate number of large stumps were left on sight, creating an unsightly visual impact.

T02 - Skid Trails (Group 2)
Five reviewer ratings were scored as implemented, but two reviewer ratings scored as not implemented correctly. When looking at the individual evaluations a "3" (minor departure from contract specifications) was noted on 5 out of the 7 evaluations. Specific causes of minor departure ratings noted on the evaluations forms are summarized below:

standards/conditions compliance	# of evaluations noting minor departures	Description of deficiencies
width	3	Greater than 15 feet wide
Drainage/erosion control	2	Less than 50% cover on steep areas
Ground disturbance	1	Skid trail went beyond harvest areas to connect with another historic skid trail

Because of the different weighting given to the compliance standards/conditions, three of the evaluations that rated one criteria a "3" were still given an overall score of "successfully implemented".

All of the seven evaluations rated the BMPs effective. Only one of the evaluations noted any effectiveness problems through their ratings. On this evaluation, the observer checked boxes describing minor (<20% of skid trail) rilling and diversion of runoff. In the group discussion, overall consensus was that there were some minor deficiencies in meeting implementation standards/conditions, but treatments were effective overall in protecting water quality.

E14- Temporary Road @ Stream Crossing A- Group 1
The temporary road constructed over the trail alignment of system trail 17E49.4 was evaluated at crossing # 11, as identified in Timber Sale documents. Four out of five evaluations on the temporary road at crossing 11 were scored successfully implemented.

One of the evaluations noted minor departures from contract/project requirements related to drainage, and channel crossing removal. On this evaluation it was described that the minor departure ratings were given because the stream crossing was not removed by the October 15th grading deadline, and that the diversion structures are inadequate where the temporary road connects to a user created trail just before the stream crossing. It was also noted on this evaluation however, that contract specifications were met when the crossing was eventually removed. On another evaluation, minor departures ratings were given on several criteria, and it

was noted that the rating was given because clear closure direction was not provided. Only one of these two evaluations actually scored as not implemented (based on database rule set). Three out of the five evaluations scored BMPs effective. The same evaluator that scored minor departures under implementation, also scored BMPs ineffective. This evaluator checked the box for "Sediment from fill slope enters channel", and noted that this occurred because of the implementation failure related to a user created trail connected to the road, which provides direct hydrologic connectivity to the stream channel. This evaluator did not fill out the degree, duration, and extent of effects boxes.

Another evaluator checked the box for ">10% of surface has rills 2" deep and 20' in length which continue off road surface and extend below fill slope", also because of the presence of this user created trail. This evaluator documented effects criteria as; degree: minor, duration: >1 season, and extent: near stream.

During discussion it was clear that group felt it was difficult to capture the nature of the problem related to the user created trail on the BMP evaluation form. There was consensus that hydrologically connected user created (and system) trails should be addressed during identification of BMPs when planning for future projects. This particular issue should be addressed during the Angora Long Term Restoration Project.

E14- Temporary Road @ Stream Crossing B – Group 2

The temporary road was evaluated at what was initially identified by the trainers to be crossing # 8, as identified in Timber Sale documents. While out in the field the project implementation hydrologist joined the group, and clarified that the crossing selected for evaluation was never identified during project planning. The ephemeral/intermittent channel that emerged on the temporary road at this location was subsequently discovered during project implementation during the October storm event of 2009 and during 2010 spring runoff. Therefore this obviously affects all the implementation ratings at this site, since no BMPs were ever prescribed or identified for this site during project planning or contract preparation. BMPs were implemented on the temporary road at this location during project "winterization", to button up the site before operations ceased for the field season. This consisted of placement of waterbars on either side of the channel crossing.

Because there was no documentation in the project file regarding prescribed BMPs at this location, the group agreed that the evaluation at this site should be scored not implemented, and all the individual evaluations have been adjusted accordingly.

Three out of seven reviewers found the BMPs installed on the temporary road at this location to be ineffective. These three checked different boxes that resulted in the failed rating , including "sediment from fill slope enters channel" or " >10% of surface has rills, …. , or "scour evident > 20' below outlet" , or "Banks unstable… ".

This evaluation caused the most confusion for training participants regarding how to use the evaluation form to document and evaluate what they were seeing on the ground. Most of the forms contained numerous written comments by the evaluators in their attempt to clarify and describe their ratings. The road is severely incised at this location, and the water flowing in the

channel continues to flow across the road without any mitigation or stabilization measures, besides the existing waterbars. There is some evidence of erosion of the road surface where flows cross the road, and deposition in the channel below. There was no consensus in the group regarding the degree of impact or whether current BMPs are adequate or not. All agreed that the situation looked "ugly".

E09- Stream Crossings

The course trainers made another mistake during the preparation for this training, relating to the stream crossing evaluation. All the participants were given the E09 evaluation form and told to utilize both forms in conjunction with there E14 temporary road evaluations. The trainers failed to catch that the E09 evaluation is only supposed to be done with the E14 evaluations IF the channel crossing (structure) is still in place, and then they are only to fill out the effectiveness portion of the evaluation not implementation. Since a channel crossing was not left in place at either of these locations, it was not appropriate to have the participants complete the E09 evaluation. So even though the participants did complete these evaluations, they were discarded for the purposes of reporting this exercise. However, it was noted that some of the criteria used to evaluate effectiveness on the stream crossing evaluation form would be useful to have on the temporary road crossing form, even when crossing structures are removed, to assess whether BMPs are adequate for controlling non-point source pollution.

Conclusions

It is apparent from the results presented in Table 1, that there is a fairly high degree of variability is evaluator scoring, even when each evaluator is evaluating the same site, at the same time, with an equal level of information. Interpretation of the how to score the qualitative criteria presented on the BMPEP evaluation forms is still a relatively subjective exercise, and therefore will be influenced by the different experience levels and perspectives of the individuals performing the evaluations. This is most likely to occur in situations where deficiencies are relatively minor in scope and scale, or the nature of the problem is outside what the evaluation form was designed to evaluate (ex.. the problem presented by a user created trail that was hydrologically connected to a temporary road).

Nonetheless, the BMPEP does direct the evaluator through a robust process to examine the information describing how water quality risk was supposed to be addressed, and assess whether or not that risk was adequately addressed. It is worth noting the observations of the private consultant who participated in the training, that despite the inherent subjectivity and resulting variability in overall scoring, it is still the best qualitative process for BMP effectiveness evaluation that they are aware of.

There are several ways to mitigate the impacts of evaluator variability. At the regional scale this can be addressed by:

1) Continue to have large sample sizes collected throughout the region, so that scoring trends will emerge despite user variability.
2) Continue to have annual regional trainings and workshops. Discuss difficulties encountered in using the protocol(s), and incorporate suggestions for revising the

protocols that can reduce some of the ambiguity or subjectivity in performing the evaluation.

3) In additional to the results from BMPEP database scoring, regional reporting should synthesize and summarize narratives provided by the Forest regarding the nature of BMP deficiencies, and management responses to those deficiencies.

At the Forest scale evaluator variability can be addressed by:

1) Require evaluators to thoroughly document in the comments section the particulars of any deficiencies observed and noted, including photographs.
2) The BMPEP program manager for that Forest/District should thoroughly review and "truth" each evaluation. After discussions with the evaluator, as well as any follow up field visits required, the BMPEP program manager may amend the evaluation based on their professional judgment.
3) Recommendations for management actions related to any documented deficiencies will be vetted and developed through interdisciplinary consultation with staff from appropriate disciplines to identify appropriate management recommendation to correct deficiencies. These recommendations will be included in the Annual Forest BMPEP Monitoring report for consideration by the Forest Leadership Team, and integration into Regional reporting.

The bottom line is that the ratings and scoring is only one part of the evaluation. The description of the nature of observed deficiencies, and management recommendations to address those deficiencies is also an integral part of a complete evaluation, and should be thoroughly documented in annual reporting.

The discussion below provides further recommendations for improving the BMPEP evaluation process, as well as to address BMP deficiencies noted during this training exercise.

<u>Implementation Rating Recommendations</u>

There are several recommendations for improving the efficiency and efficacy of future BMPEP program implementation ratings.

1) As soon as regional targets are assigned, and the Forest has identified the randomly selected projects to be evaluated, the BMPEP program manager for the Forest/District should work with project implementation staff to track down all relevant implementation documents. Only the ***relevant portions*** of these documents are then to be filed together in one folder for each evaluation, to be used by the evaluator who will be conducting the field evaluation. The BMPEP program manager should use highlighter, page tabs, and other methods to quickly identify the sections of these documents that contain information specific to the specific evaluation, and make sure that identification of the source document is clearly identified on the portion of the document copied and filed in the evaluation folder.

2) Project implementation staff should be made aware of the type and content of planning and implementation documents that will be needed to perform the BMPEP evaluations, so they can proactively assist with the assembling of this information.
3) Project implementation staff, including the sale administrator and support hydrologist/watershed specialists, should fully utilize the contracting forms available to clearly document the site specific decision made during project implementation (FS-6300-20, and R5 2400-181). These should be legible and complete, identify specific locations and BMP requirements, and relevant contract provisions to which they apply. ***For vegetation management projects these may be the single most relevant source of documentation needed by the BMPEP evaluator***.

Effectiveness Rating Recommendations

The following are recommendations for improving the efficacy of future BMPEP program effectiveness ratings.

1) When ever any deficiencies are observed on the ground related to erosion and sediment transport, the evaluator should thoroughly describe what they see on the ground even if they judge impacts to be minor. It will be the responsibility of higher level staff (s) (ie. Forest Hydrologist, Forest Engineer, etc) to review the evaluations, and then determine what the current potential for impacts are, and whether mitigations should be prescribed to address problems noted. This should be documented in the Forests annual BMPEP monitoring report.
2) Some of the criteria used to evaluate effectiveness on the stream crossing evaluation form would be useful to have on the temporary road crossing form, even when crossing structures are removed, to assess whether BMPs are adequate for controlling non-point source pollution. Some of the effectiveness criteria on the stream crossing evaluation form (E09) not currently on the temporary road evaluation form (E14) that seems to be relevant would be 2.b and c, and 3.b and d. In addition there should be additional criteria for evaluating the overall stability of the channel morphology (not just channel banks) where streams cross temporary roads. For instance on the temporary road at crossing #2 of this training exercise, the flow channel is incising through the road surface and has the potential to continue to enlarge and migrate. There was no way to capture this condition in the criteria on the BMPEP form, it could only be described in the comments section.

Recommended Mitigations for BMP effectiveness deficiencies

Although these evaluations were a training exercise, and not part of the Forest planned Regional or Project Specific BMPEP evaluation program, the group did come up with recommendations for mitigating observed BMP deficiencies. These recommendations are presented so Forest staff can consider these recommendations during implementation of ongoing management activities within the Angora Burn Area.

1) Flows from the ephemeral/intermittent channel located where the temporary road evaluation was evaluated at crossing # 2 should be conveyed in a stable morphology across the road. If the road is to be used for future work during active flow, a culvert pipe should be installed at this location. When/if this section of road is not being used, a channel should be constructed across the road, with some strategic placement of cobble

and erosion control fabric. Also flow feeding into this channel currently gets diverted onto an old skid trail further upslope. Consider actions to eliminate this diversion.

2) When use of the temporary road is completed (for both the Angora Hazard Tree and Angora Long Term Restoration), the road prism should be fully restored in this location to include sub-soiling compacted surfaces, reshaping prism to match adjacent topography, and woody material mulch, and constructing stable channels where needed to convey intermittent flow from springs/seeps. It may be desirable to consider relocating the system trail that used to be on this alignment, further up slope. The LTBMU Engineering Staff Officer and Physical Sciences Group Leader have both agreed that current impacts are minor, but that some additional mitigations are desirable at this location, and should be addressed as part of the Angora Long Term Restoration project.
3) Not part of the BMPEP evaluation per se, but the large number and size of root balls left on landings are visually unsightly. Consider actions to remove these from area.

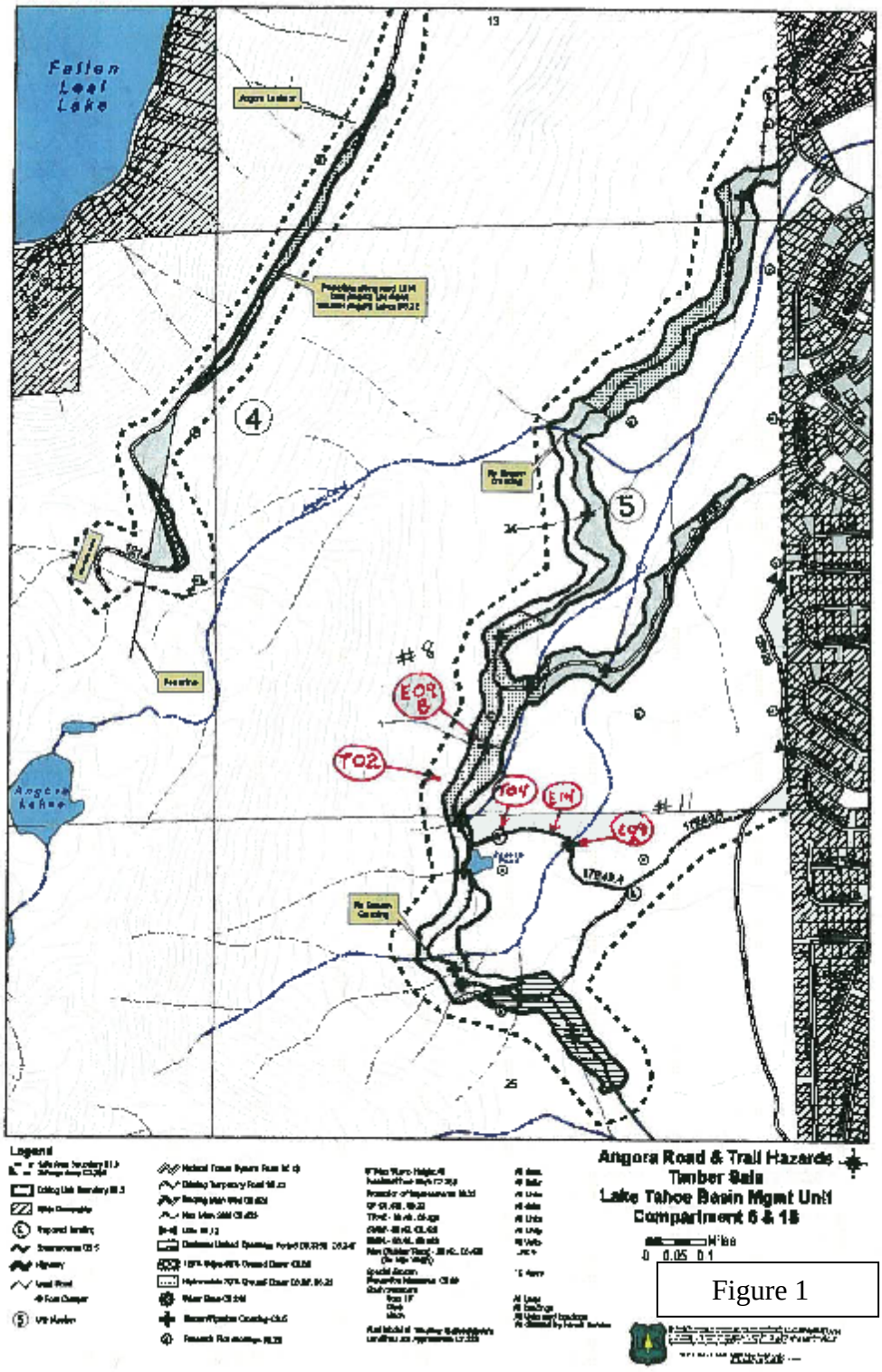
Fallen Leaf Lake
Angora Lake
4
5
#8
#11
E09 B
T02
T04
E14
E09
Legend
Angora Road & Trail Hazards
Timber Sale
Lake Tahoe Basin Mgmt Unit
Compartment 6 & 15
Miles
0 0.05 0.1

Figure 1