

**Best Management Practices  
Water Quality Evaluation Program  
Monitoring Report  
2003**

*Evaluation of Forest Service administered projects, including timber sales, roads, prescribed fire, recreation sites, grazing and mining activities*

<http://www.fs.fed.us/r5/klamath/projects/forestmanagement/index.shtml>

Natural Resources Staff  
1312 Fairlane Road  
Yreka, CA 96097

# Klamath National Forest 2003 Best Management Practices (BMP)

## Summary

Calendar year 2003 was the twelfth year of the Best Management Practices Evaluation Program (BMPEP) on the Klamath National Forest and in the Forest Service Pacific Southwest Region. This program is designed to evaluate how well the Forest and the Region implement BMPs and how effectively the BMPs control water pollution from National Forest lands. Onsite evaluations have been divided into 29 evaluation categories that reflect timber sale, engineering, recreation, grazing, prescribed fire, mining, and vegetation manipulation activities.

The Klamath Forest's BMPEP is composed of two sampling strategies. The first is the evaluation of randomly sampled sites, where data are collected and entered into a Regional database. Most randomly sampled site evaluations require that 1 to 2 winters have passed prior to completing the field assessment. The second strategy is concurrent monitoring, in which sites are selected based on management interest in specific ongoing projects. Concurrent evaluations are "real time" and can be qualitative. The results of these two program parts are summarized here separately.

**Randomly sampled sites:** In 2003, 51 sites on about 20 projects were randomly drawn from Forest activity pools (Table 3). Each project or site was reviewed for BMP implementation and effectiveness. The types of activities and sites evaluated this year include: timber sales (15 sites); road projects (20 sites); recreation (5 sites), grazing (2 sites), mining (3 sites); common variety minerals -- rock pits (3 sites); prescribed fire (2 sites); and vegetation manipulation (1 site).

BMP Implementation was evaluated to determine whether: (1) we did what we said we were going to do by design and not by accident to protect water quality; and (2) our documentation specifically identified resource protection measures and/or objectives to protect water quality. BMP effectiveness determined if water quality protection measures met objectives. Sediment deposition volume, if any and proximity to the nearest watercourse were used to indicate levels of water quality protection. The following table summarizes the results of the **BMP Random Site Evaluation Program for 1992 through 2003**. Sites that partially meet evaluation criteria are not tallied in the "fully successful" group.

**Table 1. Klamath Forest BMPEP Results, 1992-2003**

Monitoring Years	Total Number of Sites Monitored	Sites Meeting BMP Evaluation Criteria			
		Implementation		Effectiveness	
		Number of Sites	Percent Fully Successful	Number of Sites	Percent Fully Successful
<b>2003</b>	<b>51</b>	<b>51</b>	<b>80%</b>	<b>45</b>	<b>90%</b>
2002	53	49	92%	47	96%
2001	64	56	88%	61	95%
2000	45	40	89%	43	96%
1999	38	25	66%	34	89%
1998	61	38	62%	30/35	86%
1997	60	60	100%	59	98%
1996	57	48	84%	56	98%
1995	77	64	83%	74	96%
1994	52	39	75%	46	89%
1993	77	61	79%	72	95%
1992	53	29	55%	43	81%

BMP implementation and effectiveness declined as compared to 2002. BMPs were fully implemented at 80% of the sites evaluated and effective at 90% of the sites evaluated (water quality was protected at some sites even if BMPs were not fully implemented). Problems in implementation and effectiveness consisted of: not describing requirements or objectives for BMPs and water quality protection in the EA or road design package; erosion problems associated with a stream crossing repair and a water source; erosion of stockpiled road fill material into a live stream; erosion of a reclaimed mine area; improper refuse disposal and hazardous materials containment at mining operations; and problems at developed and dispersed recreation sites (Table 2). There was evidence of minor erosion impairing water quality from the noncompliant sites, except for one mining operations which noted significant erosion and hazmat spills near a stream. Of these problems, improvements need to be made in the following key areas:

- **Describing Best Management Practices and objectives in the environmental documents:** One way in which the Klamath Forest is improving environmental documentation of water quality objectives and BMPs during project planning is through the application of sufficiency standards for earth and aquatic resources. The sufficiency standards expect that site-specific BMPs are to be developed for all projects. Use of sufficiency standards began in 2003.
- **Proper site location and erosion control of stockpiled material:** Near stream or other sensitive locations should not be considered for stockpile sites. If these are the only possible locations, material at the toe of the slope should have erosion control and stabilization measures in place, for example boulders or logs with filter cloth placed behind them.

- **Water source development:** Design the access road and approaches to the water source so that erosion does not occur --- spot rock aggregate surfacing may be an option to reduce rilling and erosion.
- **Administration of active and intermittently operating mining sites:** Timely resolution of issues with on-site erosion, spill control/containment and hazardous material containment and storage.
- **Stream crossing repair and culvert installation:** Repairs need to address water diversion potential at the site. Erosion and piping of the fill can be reduced by proper compaction of the fill, use of riprap or designing the crossing as a rock fill.

**Concurrent monitoring** from September 2003 to February 2004 focused on compliance with wet weather operations standards (WWOS), stream dewatering, in-stream construction practices, and effectiveness. Wet weather protection measures were both fully implemented and effective or not applicable (operations were suspended prior to the onset of wet weather). Stream dewatering and in-stream construction practices complied with implementation criteria and will likely be effective. One project was evaluated for effectiveness of slope stabilization measures, and noted that gully erosion and shallow debris flows had occurred on the rehabilitated slopes. Further slope stabilization measures will be implemented on this site in the summer of 2004.

**Table 2. BMP Implementation and Effectiveness Problems, 2003**

<b>BMP</b>	<b>Site Name</b>	<b>District</b>	<b>Implementation Problems</b>	<b>Effectiveness Problems</b>	<b>Water Quality Impairment</b>
E08 Road Surface and Slope Protection	Blue Canyon Thin, Road 43N11	Goosenest	<ol style="list-style-type: none"> <li>The IDT or the EA did not develop design objectives that address water quality.</li> <li>The design criteria and objectives were unclear in the road design package.</li> </ol>		None
E09 Stream Crossings	Blue Canyon Thin, Road 43N11 culvert replacement	Goosenest		<ol style="list-style-type: none"> <li>Rilling in the upstream fill</li> <li>Piping under and along the side of the culvert</li> <li>Diversion potential at the crossing was not addressed.</li> </ol>	Minor erosion in stream
E11 Control of Sidecast Material	Blue Canyon Thin, Unit 27	Goosenest	<ol style="list-style-type: none"> <li>The EA did not contain specific BMP objectives for sidecast along roads.</li> <li>Berms were also created along the road.</li> </ol>		None
E13 In-channel Construction Practices	McNeal Creek Fish Passage, 10N04 Road	Salmon River	<ol style="list-style-type: none"> <li>Stockpiled material was placed too close to the stream and erosion occurred during construction.</li> <li>Stockpile locations and volumes not fully accounted for in the design.</li> </ol>		Minor erosion during construction which was remedied before construction ended—the stockpiled material was removed and the disturbed area was stabilized.
E14 Temporary Roads	Blue Canyon Tin, Unit 28	Goosenest	<ol style="list-style-type: none"> <li>Road did not meet closure provisions --- was left open for woodcutting.</li> <li>Road was not closed and obliterated and rilling of the road occurred.</li> </ol>		None
E16 Water Source Development	Shafter Thin Chip, 44N06X Blue Canyon Thin, 44N15Y	Goosenest	<ol style="list-style-type: none"> <li>Water quality protection measures and guidelines for water use and withdrawal were not described in the EAs.</li> <li>The water source for the Blue Canyon sale was not designed to minimize erosion.</li> </ol>	<ol style="list-style-type: none"> <li>Rill erosion occurred on the approach road to the Blue Canyon water source.</li> </ol>	Minor erosion during use.
M26 Mining Operations	Boulder Bar/Yellow Jacket Placer	Salmon River	<ol style="list-style-type: none"> <li>Refuse from occupancy left in burn pile.</li> <li>Fuel storage liner not secure, tear in liner, and berm breaking down.</li> <li>Erosion of reclaimed area</li> <li>Equipment leaking onto soil.</li> <li>Equipment wasn't repaired or removed from the site.</li> </ol>	<ol style="list-style-type: none"> <li>Reclaimed area eroded and deposited sediment in SMZ.</li> <li>Equipment leaking in high risk areas of SMZ.</li> </ol>	Significant erosion and hazmat spills near stream.
	DBA Pet Mine	Scott River	<ol style="list-style-type: none"> <li>Reclamation bond insufficient.</li> <li>Forest is completing reclamation on the long idle mine.</li> </ol>	<ol style="list-style-type: none"> <li>Raw and eroding excavated slopes.</li> <li>Outer bank edge of settling pond is eroding into channel.</li> </ol>	Minor erosion impacts that can be easily remedied by the Forest during reclamation.

**Table 2. BMP Implementation and Effectiveness Problems, 2003**

<b>BMP</b>	<b>Site Name</b>	<b>District</b>	<b>Implementation Problems</b>	<b>Effectiveness Problems</b>	<b>Water Quality Impairment</b>
R22 Developed Recreation Sites	Orr Lake	Gooseneck	<ol style="list-style-type: none"> <li>1. Refuse disposal</li> <li>2. Ground cover/sedimentation</li> <li>3. Streamside protection</li> </ol>	<ol style="list-style-type: none"> <li>1. Some contamination of site by refuse</li> <li>2. Runoff from roads, parking areas etc. reaching streamside area</li> <li>3. &gt; 20 % bare ground</li> </ol>	Minor erosion impacts that are being addressed by improvements at the site.
R30 Dispersed Recreation sites	Marble Valley	Scott River	<ol style="list-style-type: none"> <li>1. Groundcover/sedimentation</li> <li>2. Streamside protection</li> <li>3. Addressing problems at site through management actions</li> </ol>		Insignificant channel bank erosion that is being addressed through management.

# **BMP Monitoring Report, 2003**

## **INTRODUCTION**

On-site evaluations are the core of the BMP Evaluation Program. There are 30 different evaluation procedures designed to assess a specific practice or set of closely related practices. Though the evaluation criteria vary based on the management activity, the evaluation process is similar. The Regional Office annually assigns the type and number of management activities to be evaluated on each Forest. The specific sites for each evaluated management activity are randomly selected from Forest project pools. The criteria for sample pool development are Regionally standardized by activity type and described in the BMPEP User's Guide (June 2002 revision). Some minor changes in the forms for E10 (road decommissioning) and G24 (grazing) resulted from field protocol testing on the Forest in 2002.

Concurrent BMP monitoring is accomplished while the project is actively operating. Projects are selected that are of management interest with regard to timely water quality protection implementation. Feedback is immediate and remedial action can be taken. A comprehensive assessment of BMP effectiveness is not possible since there has not been a post-project winter to test the protection measures.

BMP monitoring strives for interdisciplinary evaluation of projects, including project proponents and watershed personnel. This interdisciplinary effort provides direct feedback to the project proponent on how well the BMP was implemented and allows for adaptive management on future project design. The 2003 field evaluation was used as an informal training opportunity on grazing, timber, engineering and recreation BMPs for employees in those staff areas, fisheries biologists, and earth scientists.

BMP evaluations were conducted by District and Forest personnel --- Tom Laurent, Sharon Koorda, Robbie Van de Water, Polly Haessig, Don Elder, Brian Thomas, Bill Snavely, Mark Reichert, and Juan de la Fuente. Concurrent Wet Weather Operations monitoring was conducted and reported on by Jon Bennett and Moki Holmes.

## **RANDOMLY SAMPLED SITE PROGRAM**

Data collection methods are specific for each BMP and are described in the June 2002 BMP User's Guide. BMP evaluations that require monitoring soil cover use the Forest's soil cover monitoring procedures developed in 1998. The data gathered are identified for each BMP and used to answer specific evaluation questions on each BMP evaluation form. Management activities (such as timber, roads, prescribed fire, tractor piling project etc. ) require: 1) a prepared Decision Memo, EA or EIS; 2) adherence to contract

requirements; and 3) the passing of at last one winter (but not more than 3 winters) since contract requirements were met. In-channel construction is an exception because the evaluation (E-13) is done during the activity.

The timber, silviculture and engineering project sample pool was developed from a list of closed timber sales. The prescribed fire sample pool was developed from a list of completed prescribed fire projects. The recreation sample pools included all known developed and dispersed recreation sites on the Forest. The grazing sample pool was a list of active grazing allotments on the Forest by district. The mining and rock pit pools consisted of lists of mines and rock sources where ground disturbing activity occurred the previous year.

## **CONCURRENT MONITORING PROGRAM**

Data collection was similar to that used for random sampled sites, however narrative reports may have been used in lieu of evaluation forms. The data may be more qualitative than that collected using the strict Regional protocol, although often the same forms are used. The primary difference from the randomly selected sites is that no significant runoff has occurred since project implementation, as this monitoring typically occurs before the rainy season.

## **SUMMARY BY BMP TYPE**

Unless otherwise stated, the following results are from random sampled sites. Table 2 at the end of this section shows what forest projects or facilities were monitored this year.

### **T01 Streamside Management Zones (SMZ)**

A total of five harvest units were evaluated. All SMZs were delineated either on the ground or on the sale area map. Three of the units had trees cut within the SMZ and one of the units had designated skid trails crossing the SMZ. Minimal ground disturbance within the SMZ was noted. All sites evaluated met BMP implementation and effectiveness evaluation requirements.

### **T02 Skid Trails**

Four units were evaluated from four different timber sales. The skid trails met all evaluation criteria for BMP implementation and effectiveness. One steep (25% slope) skid trail was noted that did not have waterbars, but no rill erosion occurred.

### **T03 Suspended Yarding**

Two units in Upper South Fork Timber Sale were evaluated. The yarding corridors met or exceeded all evaluation criteria for BMP implementation and effectiveness, and the reviewer noted that there was no sign of yarding corridors in one of the units.

## T04 Landings

Three log landings were evaluated from timber sales on the Gooseneck District. All landings met all evaluation criteria for BMP implementation and effectiveness.

## T06 Special Erosion Control and Revegetation

One timber sale unit had a skid trail that was designated for special erosion control through CT6.602, slash on skid trails. The skid trail met all evaluation criteria for BMP implementation and effectiveness. The skid trail met the cover objective of 70% and no post project erosion was evident.

## E08 Road Surface, Drainage and Slope Protection

Road stormproofing and maintenance for three timber sales was evaluated. Maintenance consisting of road blading and surfacing on the 43N11 road was evaluated on the Blue Canyon sale. Road design objectives to address water quality concerns were not identified by the IDT team or in the road design package. Though this did not fully meet the implementation criteria, no erosion problems were noted, and the site met effectiveness criteria. Stormproofing of the 38N16 road in the Upper South Fork Heli timber sale was evaluated. This site met all implementation and effectiveness criteria. Road stormproofing of the 45N22 road was evaluated in the Little Deer/Davis timber sale. This road had washed out at an ephemeral stream channel crossing prior to 2001. The site met all implementation and effectiveness criteria.

## E09 Stream Crossings

Road maintenance at stream crossings for three timber sales was evaluated. The sites were different than the ones evaluated for E08 above. Reconstruction and maintenance on the 43N11 road was evaluated at a crossing of Blue Canyon Creek, repaired in 1998. A new culvert was installed and the slope stabilized with riprap. The site met implementation criteria. Problems in effectiveness included rilling in the upstream fill, and piping under and along the side of the culvert. Additionally, the repair did not address the potential for diversion at the site. That is if the culvert failed, the flow would be diverted out of the channel and along the roadway causing erosion. These problems were noted as minor, but the duration could continue more than one season and would affect the stream reach if not remedied. Maintenance of a stream crossing on the 38N16 road was evaluated. The work was done in 1999. The site met all implementation effectiveness criteria, with no problems noted. A low water crossing on the 45N22 road was evaluated in the Little Deer/Davis timber sale. This site met all implementation effectiveness criteria, with no problems noted.

## E10 Road Decommissioning

No projects or roads were evaluated this year. Three projects were targeted for evaluation, but the field season ran out before they could be visited. These three projects will be visited in 2004.

## E11 Control of Sidecast Material

Three timber sales were evaluated. The 38N16 road in the Upper South Fork Heli timber sale met all implementation and effectiveness criteria. Roads in units of the Blue Canyon and Little Deer/Davis sales also met all effectiveness criteria, but the Blue Canyon EA did not contain any requirements or objectives for control of sidecast material. This was a minor deficiency as very little sidecasting was evident. However, the reviewer noted that some inappropriate berms were created along the side of the road.

## E12 Servicing and Refueling

A helicopter fuel storage area was visited that was used in the Upper South Fork Heli timber sale. The site met all implementation and effectiveness criteria.

## E13 In-Channel Construction Practices

Two in-channel construction sites were evaluated on the Salmon River and Scott River Ranger Districts. Open bottom arches<sup>1</sup> were constructed on the 10N04 road crossing of McNeal Creek and 40N17 crossing of South Fork Scott River to improve fish passage. Both sites were reviewed during the active phase of construction and post project, but not after one winter season. At the McNeal Creek site, a major deficiency was noted during construction. Stockpiled material was placed in a riparian area. The soil was saturated and the pile had oversteepened slopes that partially flowed into the stream. The site is very confined and the excavated volume may have exceeded design estimates. The stockpiled material was too close to the stream and was not stabilized to mitigate erosion from a high water or summer thunderstorm event during construction. The problem was remedied following an interdisciplinary field review. The site met all effectiveness criteria during the project (turbidity and sedimentation) above and below the site, and post project, all stockpiled material was removed from the channel and floodplain.

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<sup>1</sup> An open bottom arch is a road stream crossing structure with an open bottom. These arches are made of steel multi-plates. They function like a bridge spanning a stream without covering or altering the stream bottom as occurs with a culvert. Arches require similar excavation and footing structures as bridges.

The other open bottom arch construction project on the 40N17 road met all implementation criteria and partially met effectiveness criteria during the project and post project. The reviewer noted some channel disturbance near the project upstream of the inlet when debris was removed. The disturbed areas were seeded and mulched.

#### E14 Temporary Roads

Two temporary roads were evaluated. The site on the Upper South Fork Heli timber sale was an old temporary road that was to be reopened to haul timber on, but instead, logs were just skidded on the road. The road crossed a wet swale area; there was no fill or channel banks at the crossing. The temporary road was outsloped and water barred at the end of use. The site met all implementation and effectiveness criteria. A temporary road on the Blue Canyon timber sale was water-barred but there was a deviation from the road closure and obliteration provisions. The road was left open for a time for firewood cutting of the tops and limbs deck, and it was not obliterated (by ripping of the road bed) when it was finally closed. The road was later closed. Rilling was noted at the log deck but the rills did not extend beyond the road surface. The reviewer noted that first 500 feet of road beyond the takeoff delivers water and sediment to a channel crossing. The road either should be ripped or a dip should be constructed near the main road. Alternatively, the through-cut at the takeoff should be entirely filled in and obliterated in order to stop the collection of water and sediment from the main road.

#### E16 Water Source Development

A total of four sites were evaluated. A temporary water drafting site for road maintenance or fire use was evaluated on the 37N11 road on Blacks Gulch in the Upper South Fork Heli timber sale area. The site exceeded implementation requirements for minimizing erosion and streambank alteration. There were no problems noted with effectiveness. A water source on the 44N06X road within the Shafter Thin/Chip timber sale was evaluated. There was a minor departure from project requirements because the EA did not contain protection measures for the water source, and guidelines for water use and withdrawal were not specified in the EA. Effectiveness criteria were met. The reviewers noted erosion from the railroad road to the west. The ditch was armored to prevent further cutting but the road requires further improvement to minimize erosion. A water source on the 44N15Y road used in the Blue Canyon Timber sale also did not fully meet implementation criteria. The deficiencies were lack of water quality protection measures and guidelines specified in the EA, and the site was not designed to minimize erosion --- the site was used as convenient access to water. Rills were observed in the approach to the stream. These are considered chronic problems due to the lack of adequate design at the site. The fourth site was an off channel pond constructed for road use. This site has been there for a long time and was used in the Little Deer/Davis timber sale. The site is not near a stream. Though the site met all implementation and effectiveness criteria, the reviewers noted that since the pond is an existing development, it was not described in the EA. The reviewer also noted that the pond is used for livestock watering, but that it was not constructed (or designed?) as a stock pond.

## E17 Snow Removal

Two projects on the Oak Knoll District were evaluated. Snow removal was evaluated on the 47N63 road. This road was opened for Interdisciplinary Team access. The 40S09 road was also evaluated. This road was opened up for a planting contract. All requirements for implementation and effectiveness were met for both projects.

## G24 Range Management

The Back Meadows (Scott River District), and Haight Mountain (Gooseneck District) range allotments were evaluated. The 2002 version of the BMP user guide was used for this BMP. Both sites met implementation criteria for herbaceous plant utilization. Some needs identified for more complete and consistent implementation monitoring include developing stream bank disturbance and woody utilization objectives and measurement criteria either Forest-wide, or for specific individual Annual Operating Instructions. Effectiveness criteria were completely met at Back Meadows. Effectiveness criteria at Haight Mountain were all met except for bank stability, where there 25% of the channel banks were noted as vulnerable and unstable.

## F25 Prescribed Fire

Two prescribed burn units were monitored on the Adaptive Management Area Fire Surrogate project on Gooseneck District. Both units met all implementation criteria and exceeded project requirements of meeting the prescription. In the effectiveness evaluation, both units had 90% or greater cover, and there was no sediment transport to the streamside management area

## M26 Mining Operations

One completed and two active mining operations were reviewed. The Boulder Bar/Yellow Jacket placer mine (now the Dragon Tail Mine) on the Salmon River District was reviewed for reclamation activities completed in 2002, and for proposed mining by the new owner/operator. NEPA planning is in progress for future mining operations by the current operator, under a new Plan of Operations. Though water quality protective measures were included in the former operating plan, various problems with implementation and effectiveness were observed. Metal refuse and engine parts were left in a burn pile and not properly disposed of. The liner was torn and not secured in the fuel storage area, and the containment berm was breaking down. Leaking mining equipment was also left on site which was contrary to the operating plan which stated that all equipment, debris, and trash would be removed from National Forest land. The reviewer also noted that the settling pond was developed to its maximum depth, as water

was standing in the bottom. The site met effectiveness requirements in all areas except for the area reclaimed in the previous year, and for handling of hazardous materials. A small gully and depositional fan was noted in the streamside management area within the lands reclaimed. Oil, grease and other fluids were leaking onto the soil from various pieces of equipment on the claim. The leakage was not directly into the channel but was in high-risk areas within the 10-year floodplain of the streamside management area. Spill cleanup and pollution prevention specifications need to be clearly described in mining authorization instructions and routinely monitored as part of minerals administration. The other active mining operation evaluated was the Gilt Edge #1 mine on the Scott River District. Only implementation was evaluated as the mine and disturbed areas had not wintered over at least one year. The mine met all implementation criteria. The plan of operations stated that the mine dump and pad would be contoured, topsoiled and seeded. The reviewer was unable to determine whether the waste dump had been seeded at the time of the review in the fall of 2003. The third mine site reviewed was the DBA Pet mine on the Scott River District. The last operations at the mine were in the early 1990s, and since then the mine has been idle except for frequent use of the old cabin during the summer. The mining claims have been relinquished and the District is reclaiming the mine. Actions taken in 2003 consisted of tearing down the old cabin (District) and removal of equipment and personal items on site (by the claimant's agent). The site did not meet implementation criteria because the mine operator did not carry out full reclamation of the site; this is being undertaken by the Forest. The site did not meet effectiveness criteria because of erosion problems. The reviewer noted some raw eroded slopes near the settling pond and at the old workings. Rilling was noted on the outer bank of the settling pond. The District plans to restore the areas where erosion is occurring and perform maintenance on the settling pond in 2004. Much of the disturbed mine areas has revegetated naturally since the period of mining in 1990s so the outcome of the District's restoration and reclamation is anticipated to be very good. Effectiveness of further reclamation and restoration should be monitored in a few years.

## M27 Common Variety Minerals

Three rock pits were evaluated on the Happy Camp and Goosenest Districts. Two rock pits were used in the No Mans Daggett road stormproofing project in the Clear Creek watershed. Both rock pits are small ones used for primarily for riprap. They met all implementation and effectiveness requirements. The Dry Lake rock pit is a source in old lake bed and glacial outwash and alluvial fan deposits. This site did not fully meet implementation criteria as there was no current site development plan. The minerals materials permit with Siskiyou County expires in 2004. The District and Zone Engineering has plans to evaluate the material source and update the development plan this year. The rock source met all effectiveness criteria and no erosion problems were noted.

## R22 Developed Recreation Sites

Two developed recreation sites, Orr Lake (Goosenest District) and Grider Creek Campground and Trailhead (Oak Knoll District), were evaluated. Orr Lake did not meet implementation criteria for refuse disposal, ground cover, and protection of the streamside/lake area from erosion and sedimentation. Effectiveness criteria for refuse disposal, runoff control and ground cover were not met. More than 20% of bare ground was noted. The problems were confined to the site and refuse or sediment did not enter the lake. These problems are known and were in the process of being remedied. Improvements to the recreation site are being planned and designed at the present time. The recreation site at Grider Creek met all implementation requirements and exceeded requirements for refuse disposal. Effectiveness requirements for ground cover were not met as the area had between 10-20% bare ground at a randomly sampled campsite. However, most of the campground has ample ground cover. A potential problem unrelated to R22 was identified by the reviewers in one corner of the campground where the loop road comes close to Grider Creek. There is a risk of high water flowing down and eroding this main campground access.

## R23 Location of Stock Facilities in Wilderness

The Marble Mountain stock pasture was evaluated on Scott River District. The area met all implementation and effectiveness requirements. The reviewer noted that the stock is either free to congregate near streams or are hobbled, causing damage to trees within the streamside area. Corrective measures are being installed consisting of a hitching rail at the cabin. Since the rail is within 50 feet of a stream, the effectiveness should be monitored in a few years.

## R30 Dispersed Recreation Sites

Sky High Shelter and Marble Valley on Scott River District were evaluated. At Sky High, minor problems were noted in implementation. Ground cover objectives were not being met. The reviewer noted that horses have been tied to trees near the site which has decreased the soil cover. This problem, though noted, has not been addressed by management actions. The site met all effectiveness criteria, and no erosion or sedimentation was noted. At Marble Valley, implementation criteria were not fully met. There were problems noted in groundcover/sedimentation, and protection of the streamside areas. Erosion is occurring at some of the trail stream crossings. Some of these crossings have been improved, but not all. People camping next the stream channels were causing erosion on steep channel banks. These problems can be addressed through various management actions. In the effectiveness evaluation, camping activities were noted as causing sediment delivery to stream channels. The effects this erosion were rated as insignificant and occurring over less than one season. The reviewer also noted problems with stock similar what was described in R23.

## V28 Vegetation Manipulation

Three plantation treatments consisting of thinning and fuel mastication were evaluated. Fuel mastication refers to mechanically based methods of understory biomass reduction. Typically this is done using a machine, usually an excavator, equipped with a cutting head that cuts, shreds and chips brush and small trees. The projects were completed by contract. Two of the three sites met all implementation criteria. In one project, soil and water quality protection measures were not described in the Decision Memo. All three sites fully met effectiveness criteria for soil erosion, and sediment transport, and all three sites exceeded their respective groundcover objectives.

**Table 3. Projects Evaluated for BMPs, 2003**

<b>BMPs Evaluated on Timber Sale Projects</b>				
	Blue Canyon D57	Little Deer Davis D57	Shafter Thin/Chip D57	Upper South Fork Heli D54
T01 Streamside Management Zones	X	X		X
T02 Skid Trails	X	X	X	X
T03 Suspended Yarding				X
T04 Landings	X	X	X	
T06 Special Erosion Control and Revegetation				X
E08 Road Surface, Drainage and Slope Protection	X	X		X
E09 Stream Crossings	X	X		X
E11 Control of Sidecast Material	X	X		X
E12 Servicing and Refueling				X
E14 Temporary Roads	X			X
E16 Water Source Development	X	X	X	X
<b>BMPs Evaluated on Road Construction &amp; Maintenance, Range Management, Mining, Rock Source, and Recreation Projects/Facilities</b>				
E13 In-channel Construction Practices	McNeil Creek 10N04 Fish Passage Stream Crossing, D54 Upper South Fork Scott 40N17 Fish Passage Stream Crossing, D55			
E17 Snow Removal	47N63 Road, D51 40N09 Road, D51			
G24 Range Management	Back Meadows, D55 Haight Mountain, D57			
F25 Prescribed Fire	Adaptive Management Area Fire Surrogate Project, D57			
M26 Mining Operations	Boulder Bar/Yellow Jack Placer, D54 Gilt Edge #1, D55 DBA Pet Mine, D55			
M27 Common Variety Minerals	Road 15N27, M.P. 0.4, D52 Dry Lake Pit, D57 15N32 M.P. 3.5, D52			
R22 Developed Recreation sites	Orr Lake, D57 Grider Creek Campground and Trailhead, D51			
F23 Location of stock Facilities in Wilderness	Marble Mountains Wilderness, D55			
R30 Dispersed Recreation Sites	Sky High Shelter, D55 Marble Valley, D55			
V28 Vegetation Manipulation	Garden Gulch Plantation Treatment, D54 Salmon River Pre-commercial Thinning and Release, D54			

## **WET WEATHER OPERATIONS**

The following projects continued after the normal operating season of October 15, 2003.

### **Canyon Kelsey Fuels Reduction**

The project continued after the normal operating season of October 15, 2003. The first rains were encountered October 30. Log haul and skidding operations were suspended after the first snowstorm on November 3. The sale was shut down, and equipment was moved out, and all ground operations ceased three days later.

### **Glassups Heli Timber Sale**

There was no hauling after the snowstorm of November 3, 2003, except for yarding and decking two days after the storm. During the rest of the month, hauling was intermittent when the roads were dry. After November 19 there was no more hauling, and the sale shut down December 1.

### **Taylor Blowdown**

The conditions were much same as described above. The sale shut down and the purchaser pulled all equipment out on November 20.

## **OTHER CONCURRENT MONITORING**

### **McNeal Creek Fish Passage Dewatering**



Review of the McNeal Creek fish passage site (10N04 road) on September 19, 2003 found that the dewatering of the site met all implementation criteria. The minor amount of turbidity noted downstream was from the construction crew positioning the inlet pipe.

### **Upper South Fork Scott River Fish Passage Dewatering**



Review of the Upper South Fork Scott fish passage site (40N17 road) on September 19, 2003 found that the dewatering of the river was effective and the water was running clear downstream.

## King Solomon Mine Sediment Dam Restoration In-Stream Construction

In-stream construction was monitored on September 16, 2003. At this time, the remnant dam abutment across the Matthews Creek channel was being excavated and removed. A temporary stream crossing was constructed to access the area. The creek crossing was built with a culvert and rock fill, and about 25 feet of soil fill over the rock.



The creek water was running slightly turbid about 75 feet downstream of where the excavator was working to remove the dam. After the dam abutment was removed, the temporary crossing was also removed.



## Siskon Mine Rehabilitation Phase I, In-Stream Construction

In-stream construction was reviewed on October 3, 2003. A vented rock ford was constructed across Copper Creek to provide access to the mine area. The crossing was designed to maintain fish passage during low flows, and to allow high water to pass over the crossing without causing sedimentation during the winter storm flows. During construction, the project contract inspector noted that several large boulders had to be removed from the stream bottom to allow the twin 49" X 30" and 30 foot long corrugated metal pipes (CMPs) to fit one foot below the stream bottom.



After the pipes were placed, about 15 cubic yards of class V riprap was placed on top of the pipes. In addition, six inches of one inch minus washed gravel was placed over geotextile fabric as a travel surface. Stream



turbidity was noted during placement of the CMPs,

but it was of short duration and was not noticeable more than 300 feet downstream. This crossing will be in place for about 2 years and will be removed when clean up of the mine is completed.

### King Solomon Mine Sediment Dam Restoration Water Source Development



The water source along the 38N17 road at M.P. 1.75 was reviewed during the project on September 19, 2003 and after project completion on October 10, 2003. The water source met most of the implementation requirements. BMPs were described in the environmental document and guidelines were established for water withdrawal, and stream bank alteration was minimized to provide the water source. The area was an old water source that had not been used for a long time. Fish were observed in the

pool, and the intake was screened appropriately. The minor problems were that sediment and rock (less than a cubic yard) was placed in the channel to construct the water source pool, instead of just rock, there was some rill erosion leading to the stream from where the hose is connected to the water truck, and the road



access was rutted due to the absence of aggregate surfacing. At the end of the project, the all of the sediment and rocks were removed from the channel, the channel bank was armored with riprap, and the disturbed areas off of the road way were mulched and seeded.



### King Solomon Mine Sediment Dam Restoration, Winter-Spring Monitoring, 2004



Project monitoring of the King Solomon project over the winter and spring of 2004 documented several small shallow debris flows on the west slope where the upper dam remnant was removed. Removal of the dam material allowed an existing spring line to surface in the restored slope. The spring line formed a gully delivering about 8 cubic yards of sediment into the stream with several more cubic yards stored in the channel. The stream down cut a couple of feet to the original base level and the creek migrated about 8 feet into the restored slope. Mitigation measures are to hand place additional riprap along the

channel and at the mouth of the gully to retard stream bank erosion while vegetation is becoming established on the slope. The dewatering pipe will also be removed. Additional grass seed, mulch, or other vegetation may also be placed on the erosion site if needed during the summer. Additional riprap was hand placed along the stream bank on the other side of the channel before the rainy season of 2004, and there were no erosion problems noted. Over the next couple of years, both restored slopes will



revegetate and stabilize. The other problem noted was that road use during fall and winter by woodcutters has damaged the road, leaving large ruts. The road was outsloped using material from the dams. The road will be graded and surfaced with aggregate this summer. Additional effectiveness monitoring will occur over the whole project site in 2004.

## RESULTS SUMMARY

Overall, 80% of the evaluated sites met all BMP implementation requirements and 90% of the sites met all BMP effectiveness requirements (Table 3). This is a decrease in BMP implementation and effectiveness as compared to 2002. The few problem areas consisted of: not describing requirements or objectives for BMPs and water quality protection in the EA or road design package; erosion problems associated with a stream crossing repair and a water source; erosion of stockpiled road fill material into a live stream; erosion of a reclaimed mine area; improper refuse disposal and hazardous materials containment at mining operations; and problems at developed and dispersed recreation sites. These problems are described in Table 2 in the summary section of this report. There was evidence of minor erosion impairing water quality from the noncompliant sites, except for one mining operations which noted significant erosion and hazmat spills near a stream.

**Table 4. Summary of 2003 BMP Implementation and Effectiveness Success Rate by Individual BMPs for Randomly Sampled Sites**

BMP	Forest Target and Total Number of Sites Evaluated	IMPLEMENTATION		EFFECTIVENESS	
		# of sites Meeting BMP Criteria	% of Total	# of sites Meeting BMP Criteria	% of Total
T01	5	5	100%	5	100%
T02	4	4	100%	4	100%
T03	2	2	100%	2	100%
T04	3	3	100%	3	100%
T06	1	1	100%	1	100%
E08	3	2	66%	3	100%
E09	3	3	100%	2	66%
E10	0	0	0	0	0
E11	2	1	50%	2	100%
E12	1	1	100%	1	100%
E13	2	1	50%	2	100%
E14	2	1	50%	2	100%
E16	4	2	50%	3	75%
E17	2	2	100%	2	100%
F25	2	2	100%	2	100%
G24	2	2	100%	2	100%
M26*	3	1	33%	0	0%
M27	3	3	100%	3	100%
R22	2	1	50%	1	50%
R23	1	1	100%	1	100%
R30	2	1	50%	2	100%
V28	2	2	100%	2	100%
<b>TOTALS</b>	51	41	80%	45	90%**

\*One of the three M26 sites had not wintered over at least one season and so it was not rated for effectiveness.

\*\* 50 sites were evaluated for effectiveness.

## **ADAPTIVE MANAGEMENT DISCUSSION**

A large proportion of sites met all BMP criteria. Those sites which did not, typically had minor or partial insufficiencies. The implications of these results, further field observations for future activities, and the Forest's ability to meet water quality objectives are discussed by activity type. They are presented as practices that: 1) are working well; 2) can be improved; 3) warrant consideration for Forest refinements; and 4) are compared with last year's evaluation.

### **1. Practices that are working well**

The following practices exceeded basic BMP compliance on the projects where they were evaluated. Line and staff should encourage the observed applications on all applicable projects.

- Streamside management zones (T01), skid trails (T02), suspended yarding (T03), landings (T04) and special erosion control (T06) all met criteria. In many cases disturbances were minimal or unnoticeable.
- Servicing and refueling (E12), snow removal (E17), prescribed fire (F25), and grazing (G24), common variety minerals (M27), stock facilities in wilderness (R23), and vegetation manipulation (V28) appear to be achieving both implementation and effectiveness criteria

### **2. Practices that can be improved**

Site designation, objectives and project design standards could be better described in the environmental documentation, the road design package, or the timber sale contract for the following BMPs:

- E08, road surface, drainage and slope protection
- E11, control of sidecast material
- E16, water source development
- E13, adequate stockpile areas designated, especially if they are near streams

One way in which the Klamath Forest is improving environmental documentation of water quality objectives and BMPs during project planning is through the application of sufficiency standards for earth and aquatic resources. The sufficiency standards expect that site-specific BMPs be developed for all projects.

The following practices could be improved on future projects:

- E09, Stream Crossings, particularly culvert installation. Proper compaction of the fill together with riprap placement could reduce erosion and piping under the culvert. In addition, repair at stream crossing need to address the diversion potential at the site.

- E16 Water Source Development, particularly with the design of the access road and approaches to the water so that erosion does not occur. Aggregate surfacing or spot rocking may be necessary to reduce erosion.
- M26 Mining operations. Specifications<sup>2</sup> for control of erosion, sedimentation and pollution needs to be emphasized in project planning, approval of operating plans, and during administration of active mine operations. Containment for settling ponds, fuel and other hazardous materials storage has been an ongoing problem at mining sites. Particularly at placer mine sites, equipment and materials is often left at the site over the winter. Leaks and spills from old equipment that is in poor operating condition commonly are discharged on to the ground and can easily pollute surface and groundwater in the highly permeable alluvium, or during larger than normal high water events.
- E13, In-Channel Construction Practices, particularly the location and erosion control of temporary stockpile sites during construction. Near stream or other sensitive locations should not be considered for stockpile sites. If these are the only possible locations, material at the toe of the slope have erosion control and stabilization measures in place, for example boulders or logs with filter cloth placed behind them.
- Minor compliance problems were noted at developed and dispersed recreation sites. The problems at Orr Lake are in the process of being remedied with facility improvements that are in the planning stage for the recreation site.

### **3. Practices to consider for possible modification by the Forest.**

There were no BMP practices considered for modification in 2003.

### **4. Progress since the 2002 BMPEP report.**

The following problems were identified in last year's report.

- Log landings (T04) at switchbacks. The log landings evaluated this year were from the Goosenest District, which has gentle slopes, and landings on switchbacks are rare.
- Temporary Roads (E14). Reopening of temporary or decommissioned roads for post sale activities was a problem seen last year. This year, a temporary road was left

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## **2 CONTROL OF EROSION, SEDIMENTATION, AND POLLUTION**

(a) Operations shall be scheduled and conducted to minimize erosion of soils and to prevent silting and muddying of streams, rivers, irrigation systems, and impoundments (lakes, reservoirs, etc.).

(b) Pollutants such as fuels, lubricants, bitumens, raw sewage, and other harmful materials shall not be discharged on the ground; into or nearby rivers, streams, or impoundments; or into natural or man-made channels. Wash water or waste from concrete or aggregate operations shall not be allowed to enter live streams prior to treatment by filtration, settling, or other means sufficient to reduce the sediment content to not more than that of the stream into which it is discharged.

From: Agriculture Acquisition Regulations (AGAR) : 452.236-74 Control of Erosion, Sedimentation, and Pollution. (NOV 1996)

open for wood cutting into the rainy season and erosion occurred at the landing. The erosion that occurred was minor in scope.

- Sidecast was noted as a problem last year. The only problem noted this year, was in implementation, where this BMP was not mentioned in the environmental documentation.
- Minor compliance problems were observed last year at in-channel construction sites (E13); one of these also had construction-related material left on the floodplain, a minor effectiveness problem. The problem occurred again this year when stockpiled material was placed in the riparian area adjacent to the stream and erosion occurred. In-channel construction requires vigilance, preventative deployment of erosion control measures and anticipation of potential problems throughout project planning and implementation.
- Developed and some dispersed recreation sites (R22 and R30) close to watercourses had similar problems this year as last year with refuse disposal, ground cover and sedimentation near the stream or lake, as the year before. The impact to streams was negligible.
- One common variety mineral extraction (M27) site was located adjacent to a sensitive area and erosion occurred. This problem was not seen in 2003.

## **CONCLUSIONS AND RECOMMENDATIONS**

Implementation standards for BMPs were fully compliant on 80% of the sites evaluated. BMP effectiveness requirements were met on 90% of the sites evaluated. This represents a decline in BMP implementation and effectiveness from 2002. Further improvement in BMP implementation is needed in designating sites where BMPs are required, describing objectives, and project design standards for BMPs in environmental documents and ensuring they make it into contract packages. Implementation and effectiveness at water sources could also be improved to reduce erosion. During the active construction phase, there was a problem with stockpiled material eroding into the creek at an in-channel construction site. The problem occurred because of the location of the stockpile site in close proximity to the stream. Significant problems in implementation and effectiveness were seen at mining operations. These problems can be remedied by vigilant administration standards, more frequent inspection, and enforcement of pollution prevention clauses. BMP effectiveness was compromised at only one of these mining sites. Recommendations are made in the Adaptive Management discussion to correct insufficiencies reflected by the numerical results, and to refine practices where deemed possible by evaluation teams.

Commendations are deserved on various practices that were seen as fully meeting criteria, including streamside management zones, skid trails, suspended yarding, landings, special erosion control measures, servicing and refueling, snow removal, prescribed fire, grazing, common variety minerals, stock facilities in wilderness, and vegetation manipulation. Wet weather operations in the fall of 2003 also deserves special recognition for compliance.