

Klamath National Forest Best Management Practices

REGION 5 EVALUATION PROGRAM WATER QUALITY MONITORING REPORT 2008 Fiscal Year

Evaluation of Forest Service administered projects including timber sales, roads, grazing, recreation sites, and mining operations, mining restoration, in channel construction and road obliteration.

www.fs.fed.us/r5/klamath/projects/forestmanagement/forestplan/reports/resourceplanreports/final-08bmp-report.pdf

December 14, 2008

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**KLAMATH NATIONAL FOREST
2008
BEST MANAGEMENT PRACTICES (BMP)**

SUMMARY

Fiscal year 2008 was the seventeenth year of the Best Management Practices Evaluation Program (BMPEP) on the Klamath National Forest (Forest) and the Forest Service Pacific Southwest Region (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 possible “activity groups” (categories) that look at related management practices. In 2008 fiscal year, Klamath National Forest staff evaluated timber, engineering, range, recreation, minerals, and restoration projects to determine whether BMPs were implemented and effective. Nineteen different protocols were used to evaluate a total of evaluations. Each protocol is designed to measure implementation and effectiveness of an activity category that includes from one to six related BMPs. Appendix A is a table that cross-walks each protocol/activity category alpha-numeric code with its name and the BMPs it is designed to monitor.

The 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. The second strategy is non-random monitoring, in which sites are selected based on management interest in specific ongoing projects. These sites are often evaluated concurrently (“real time”) and can be qualitative as well as quantitative. Most randomly sampled site evaluations require that 1 to 2 winters have passed prior to completing the field assessment; however, the in-channel construction protocol requires at least one sample per site to be done during the active project phase. The site evaluations followed protocols described in *Investigating Water Quality in the Pacific Southwest Region: the Best Management Practice Evaluation Program (BMPEP) User’s Guide* (USDA, Forest Service, 2002). The random samples were selected from a pool of eligible sites. In cases where the sample pool is very small, either all eligible sites are evaluated, or selection is done in a way that does not bias which sites are selected. The results of the random and non-random evaluations are summarized here.

Randomly sampled sites: In 2008, 50 sites were randomly drawn and evaluated from Forest activity pools and each was reviewed for BMP implementation and effectiveness. Timber (13 sites), road and engineering (25 sites), recreation (4 sites), grazing (4 sites), and mining operations (1 site), in channel construction (3 sites) activities were evaluated. Sites were located on all Ranger Districts (Oak Knoll, Happy Camp, Salmon River, Scott River, and Goosenest). One of the recreation sites from 2007 that was evaluated is also discussed in the 2008 report. The evaluation was not reported in 2007 because of evaluation scoring issues.

BMP Implementation was evaluated to determine whether: (1) we did what we said we were going to do to protect water quality; and (2) project environmental documentation and/or contract/permit language was sufficient to ensure water quality protection. BMP effectiveness was evaluated to determine if water quality protection measures met objectives. The objective for meeting most evaluation criteria is keeping all sediment out of channels and near-channel areas. Sediment deposition presence, volume and proximity to the nearest watercourse were used to indicate level of effectiveness.

Table 1 summarizes the results of the BMP Random Site Evaluation Program for 1992 through 2008. Sites that partially meet evaluation criteria are not tallied in the “fully successful” group.

Table 1. BMP Random Site Evaluation Program from 1992 through 2008.

Monitoring Years	Total # of Sites Monitored	Sites Meeting BMP Evaluation Criteria			
		Implementation		Effectiveness	
		# of Sites	% of Total Fully Successful	# of Sites	% of Total Fully Successful
1992	53	29	55%	43	81%
1993	77	61	79%	72	94%
1994	52	39	75%	46	89%
1995	77	64	83%	74	96%
1996	57	48	84%	56	98%
1997	60	60	100%	59	98%
1998	61	38	62%	30/35	86%
1999	38	25	66%	34	89%
2000	45	40	89%	43	96%
2001	64	56	88%	61	95%
2002	53	49	92%	47	96%
2003	51	51	80%	45	90%
2004	53	50	94%	53	100%
2005	48	46	96%	47	98%
2006	45	42	93%	45	100%
2007	56	56	100%	55	98%
2007*	57	56	98%	55	96%
2008	50	39	78%	46	92%

*One 2007 recreation evaluation (R22) was not reported in 2007. The second row of 2007 numbers reflects the revised 2007 data.

In 2008 BMPs were fully implemented at 78% of the sites evaluated and effective at 92% of the sites evaluated. Water quality was not measurably impacted at four sites where BMPs were not fully implemented. . This represents a notable change in BMP implementation (20% decrease) and a 4% decrease in effectiveness compared to 2007. Dividing the years 1992-2007 into three 5 to 6-year groupings makes the evaluation trends more apparent. Table 2 shows the improvements made in BMP Implementation and Effectiveness through time.

In 2007, BMPs were originally reported as fully implemented at 100% of the sites evaluated and effective at 98% of the sites evaluated (water quality was not protected at one site where BMPs were fully implemented), however, one recreation evaluation was not included in the analysis. Inclusion of all 2007 evaluations shows 98% of the sites as fully implemented and 96% effective at protecting water quality

Table 2. Implementation and Effectiveness success rate through time.

5-6 Year Increment	Average Implementation Success Rate	Average Effectiveness Success Rate
1992-1996	75%	92%
1997-2002	83%	93%
2003-2008	90%	96%

Actions taken in 2007 led to improvements in in-channel construction to solve problems identified in the 2006 annual report. Difficulty with BMP Implementation and/or Effectiveness had plagued “In-Channel Construction” (Activity Group E13; Table 3) over the previous 5 years; however, in 2007-2008 all seven E13 sites met both implementation and effectiveness criteria. BMP evaluations indicate R30 (Dispersed Recreation Sites) and M26 (Mining Operations) both have had implementation problems 3 out of the last 7 years. Both of the sampled sites in these two categories had problems in 2008.

BMP evaluation G24 Grazing has had effectiveness problems in 3 of the last 7 years, including 2008. Errors with automatic scoring by the Oracle software were fixed by the Region in 2007. Results for 2005 and 2006 were recalculated after the fix was applied, and it was determined that sites that been previously scored as a “failed” outcome actually passed. There was one sample in each year.

Table 3. BMPs with Implementation and Effectiveness problems over the last 7 years.

BMP	No. of years with Implementation Problems	No. of years with Effectiveness Problems
E08	1	0
E09	1	1
E10	1	1
E11	1	0
E13	4	1
E14	3	1
E16	4	3
E17	2	1
R22	2	2
R30	3	0
G24	1	2
M26	3	1
M27	0	1

Non-Randomly sampled sites: Several sites were selected for concurrent monitoring because the activities and their proximity to watercourses pose a potentially high risk for sediment discharge. These sites are not included in the numeric summaries in Tables 1, 2 and 3. They are discussed in the Non-Random Site Results summary section.

The 2008 BMP monitoring report suggests how to continue the trend of improved success by ensuring proper implementation and further refining BMP effectiveness.

2008 BMP MONITORING REPORT

INTRODUCTION

On-site evaluations are the core of the BMP Evaluation Program. Such evaluations are necessary to meet the requirements of a Management Agency Agreement between the Region and the State of California. There are 29 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. Statistical analyses are periodically performed from the collective Regional data, and annual reports of Region wide BMP implementation and effectiveness are presented to the State and Regional water boards.

The criteria for sample pool development are Regionally standardized by activity type and described in the BMPEP User's Guide (2002). Some minor changes in the forms for E10 (road decommissioning) and G24 (grazing) forms resulted from field protocol testing on the Forest in 2005.

In addition to the random sample sites, projects are selected that are of management interest with regard to timely water quality protection implementation. Evaluation of these non-randomly selected sites is often called "concurrent" BMP monitoring because it is accomplished while the project is actively operating. Feedback is immediate and remedial action can be taken. However, comprehensive assessment of BMP effectiveness is not possible since there has not been a post-project winter season to test the protection measures. Besides the BMPEP, contract compliance monitoring is done concurrently, and assesses BMP implementation along with other project resource protection measures.

BMP monitoring strives for an interdisciplinary evaluation of projects and actively involves 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 designs.

Earth scientists Juan de la Fuente, Gregg Boosfield, Jules Riley and William Snively, along with District project leaders conducted the 2008 BMP evaluations.

2008 PROGRAM OVERVIEW AND METHODS

Randomly Sampled Site Monitoring

The following is a breakdown of the type of activities sampled on timber, engineering, range, recreation, minerals, and restoration projects:

Timber

Timber Activities that were sampled that fell into the following activity groups: Streamside Management Zones (T01), Skid Trails (T02), Suspended Yarding (T03), and Landings (T04). Five sites were sampled on three Districts. Timber monitoring results showed 100% implementation and effectiveness.

Engineering

The following activity groups were sampled: Road surfacing, drainage and protection (E08), Stream Crossings (E09), Road Decommissioning (E10), Control of Sidecast Materials (E11), Servicing and Refueling (12), In-channel Construction Practices (E13), Temporary Roads (E14), Water Source Development (E16), Snow Plowing (E17), and Restoration of Borrow Pits and Quarries (E19). A total of 25 sites distributed across 5 Districts were sampled.

Range

One Activity Group, Range Management (G24) was evaluated at four separate range allotments on four Districts.

Recreation

These two activity groups were evaluated: Developed Recreation (R22) and Dispersed Recreation (R30). A total of 4 sites were sampled on two Districts.

Minerals

Two activity groups, Mining Operations (M26) and Common Variety Minerals (M27), were evaluated at two sample sites.

Data collection methods are specific for each BMP activity group and are described in the BMPEP User's Guide (USDA, Forest Service, 2002). One Forest modification is that BMP evaluations which require soil cover monitoring use the Forest's soil cover monitoring procedures developed in 1998.

Data gathered for each BMP are used to answer specific questions on BMP evaluation forms. Management activities (e.g. timber projects, roads, prescribed fire, tractor piling) to be evaluated must: 1) be implemented under a NEPA decision; 2) adhere to contract requirements; and 3) have been completed at least one but not more than 3 winters prior to evaluation. In-channel construction BMP evaluations (E-13) are conducted during the activity and immediately after completion.

The timber, silvicultural and engineering project sample pools were developed from a list of closed timber sales. Decommissioned road samples were taken from the Forest-wide Decommissioned Roads Database. The prescribed fire sample pool was developed from a list of completed prescribed fire projects. The recreation sample pool 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.

Non-Randomly Sampled Site (“Concurrent”) Monitoring

Data collection was similar to that used for randomly sampled sites; however, some data may be more qualitative than those collected using the strict Regional protocol. Often the same forms are used, but data are not entered into the database or numerically scored. Narrative reports often present or supplement the evaluation. The primary difference between concurrent and randomly selected sites is that typically no significant runoff has occurred since project implementation. Non-random site evaluations in 2008 were completed because the reviewer was on-site to evaluate other random BMP.

SUMMARY OF RANDOM SAMPLING RESULTS BY ACTIVITY GROUP

Timber Activities

T01 Streamside Management Zones (4 sites)

Two harvest units, three sites (#16 and 13) were reviewed from the Goosenest LSR Sale and one unit (#5) on Colestine Timber Sale, all on the Goosenest and Oak Knoll Ranger Districts. All streams monitored for protection zones were well-buffered by layout of the units. **All four of the sampled SMZs met BMP implementation and effectiveness evaluation requirements.**

T02 Skid Trails (2 sites)

Skid trails were evaluated for the Adams Project, Scott River Ranger District and the Robinson Flat Project (Unit 1), Salmon river Ranger District. Skids trails were strategically placed, well drained, and appropriately sloped. The water bar failure rate was 0%. **The skid trails met all evaluation criteria for BMP implementation and effectiveness.**

T03 Suspended Yarding (3 sites)

Three units were reviewed in the Jack Conventional Timber Sale (Units 30, 39, 100) on Scott River Ranger District. **Each unit met project BMP and contract requirements and BMP effectiveness criteria.** None of the corridors had rills present and “very little ground disturbance from logs” was noted. In every unit, measured ground cover ranged from 85-94%, which exceeded objectives that ranged from 60-80%, depending on the site.

T04 Landings (3 sites)

Log landings were reviewed in the Indian Scotty and Adams Projects on Scott River District and the Robinson Flat Project on Salmon River District. **All evaluations met project BMP and contract requirements.** The landing for the Robinson Flat unit was large in size and in close proximity to the stream. Although near the stream, the landing is located in the most practical location for the unit. A portion of the landing nearest the stream could be restored improving water quality protection and while not impacting current logging activities.

T06 Special Erosion Control

Special erosion control measures implemented at Indian Scotty Campground, Scott River Ranger District were evaluated. All objectives were met or exceeded.

Road Engineering Activities

E08 Road Surface, Drainage and Slope Protection (3 sites)

Road reconstruction and/or maintenance were randomly selected and evaluated on three system roads (46N92, 46N92.2 and 41S03) on two different projects. **All sites fully met BMP implementation and effectiveness requirements.** Project-specific details follow.

A fourth, non-system road was evaluated as a requirement for a randomly selected Mining Operations (M26) evaluation performed on Salmon River Ranger District. The access road was constructed at least partially on an existing skid trail. **The road is steep for much of the grade, and at the time of evaluation, erosion control measures had not been implemented, and removed vegetation had not been properly treated. Effectiveness could not be adequately evaluated because no precipitation events had occurred since the road construction.** Requirements for erosion control measures were clearly identified during the permit process for the mine. Responsibility for implemented of these erosion controls measures was delegated to the mine operators as part of the permit approval.

Road 41S03 underwent maintenance in 2007 as part of a timber sale contract. This road is well designed with extensive outsloping. No drainage concerns observed. This road is located on the Oak Knoll ranger District. **All implementation and effectiveness criteria were met.**

Road 46N92 on Goosenest District underwent maintenance for the Goosenest LSR Timber Sale. **Very little erosion is evident and all implementation and effectiveness criteria were met.**

Road 46N92.2 on Goosenest District underwent maintenance for the Goosenest LSR Timber Sale. **Very little erosion is evident and all implementation and effectiveness criteria were met.**

E09 Stream Crossing (4 sites)

All of the road-stream crossing sites were on same projects as for E08. The crossings occur on roads 46N92, 46N92.2 and 41S03 on Goosenest and Oak Knoll Ranger Districts, respectively. **All three sites passed the evaluation criteria for Stream Crossing Protocol implementation and effectiveness.** No evidence of erosion or sedimentation due to construction or maintenance was observed.

E10 Road Decommissioning (4 sites)

All four sites passed evaluation criteria for implementation and effectiveness. For each case, project-specific notes follow.

Road 10N045 – Decommissioning completed in 2005. Road was taken out by landslide. Decommissioning occurred at both ends of road to avoid crossing the slide. Some sediment movement observed, but it is deposited on site and not reaching the channel. Good reshaping of road noted in the evaluation. Tracks of one vehicle observed beyond road closure at one end. Project is located on Salmon River Ranger District.

Road 1C06.26 – Decommissioning completed in 2006. Road is effectively outsloped with no slope failure or evident erosion. Vegetation is becoming established on site and vehicle access is effectively blocked. Project is located on the Salmon River Ranger District.

Road 15N06 – This road was decommissioned in 2001. Road was closed by a landslide in 1997. Road has been successfully reshaped and stream crossings armoured. Some erosion observed. Project is located in Elk Creek watershed, Happy Camp Ranger District.

Road 40S07C – This road was decommissioned in 1998. Small amount of fill left in one ephemeral draw. At time of project, the design practice was to leave some residual fill in stream crossings. The design practice has evolved toward minimization of fill volume left on site. Channel has cut through the sediment and no further erosion is anticipated. The road was decommissioned after a landslide. Good 15% outslope on road bed. No rills visible on road surface. Moderate vegetation cover on road, local thick conifer saplings, some small ephemeral channels fill removed. Channel on one side left is too steep (30% for 5 vertical feet). No rills on these slopes - gravely soil pavement. Small gully in one ephemeral crossing but no sediment delivered to stream system.

E11 Control of Sidecast Material (2 sites)

Three of the roads evaluated for E08 and E09 were also evaluated for E11 (46N92, 46N92.2 and 41S03). All maintenance projects fully met BMP Implementation and Effectiveness requirements to control sidecast.

E12 Servicing and Refueling (1 site)

One evaluation for servicing and refueling (E12) was performed for the Goosenest LSR Timber Sale, Goosenest Ranger District. All criteria for implementation and effectiveness were achieved.

E13 In-Channel Construction Practices (3 sites)

Individual sites, rather than entire road segments, comprise the sample pool. In 2008 three sites were sampled. The protocol requires pre-, active-, and post-project observations. For the 2008 sites, two sites were sampled post-project, and one site was sampled during the active project stage. The four sites fully met all BMP Effectiveness and Implementation requirements. Two of sites were in the same project.

Know Nothing Creek Two road crossings of two forks of Know Nothing Creek were evaluated. The crossings had blown out and were later reconstructed. BMPEP evaluation was completed for post-project only. Both crossings are located on road 10N04. No alterations were channel substrate were detectable. Crossings are well armoured and appear stable. Filter fabric used at one evaluation site is visible on roadside and is deteriorating.

Bridge Construction – West Branch – In this project, a culvert was removed and replaced with a bridge. The site was evaluated during active construction. Practices to protect water quality including stockpiling of materials and minimizing disturbance to channel were implemented. No turbidity or changes to substrate were observed downstream. The design was developed considering future water quality protection needs. Construction was carefully executed to minimize disturbance, thus meeting E13 evaluation criteria.

E14 Temporary Road Construction (2 sites)

Two units on the Goosenest LSR were evaluation for temporary road access. Both units had very little slope, and no off site erosion or drainage concerns were evident. Roads were not affectively closed.

E16 Water Source Development (3 sites)

Three water sites were monitored. None of the water sources evaluated met BMP implementation criteria. Two sites were evaluated as not effective. The sites were located on Goosenest and Salmon

River Districts. Improvements to the water sources could be implemented to meet BMPs with minimal resource investments.

46N92 – This site is located on the Gooseneck Ranger District within the Gooseneck LSR. The water source is located on a small stream adjacent to and above the road. The source was excavated with vertical, native surface banks susceptible to erosion. The impounded hole is catching sediment, although there is no discernable difference in channel substrate or morphology above and below development.

10N04 – This site is located in the McNeal Creek watershed on Salmon River District. The water source is located on a very small stream with low recharge potential in dry months. Concern exists that minimum flows may not be adequately maintained. Water source is located in the stream with a native surface pad adjacent to the stream. Runoff from the pad drains directly into the water source. The embankment on the pad is not armoured and is eroding from drafting and runoff.

39N20 – This water source is located on Shadow Creek on the Salmon River Ranger District. The water source is located within the stream course. Vehicle access to the water source drains directly into the stream with no protection zone. Erosion occurs on steep, native surfaced embankment from both drafting and runoff.

E17 Snow Removal (3 sites)

Three sites were monitored for snow removal, all on Happy Camp Ranger District. Two of the sites were located on 15N16, and a third on 15N10. Two of the three sites were evaluated as not implemented, and one site was evaluated as not protecting water quality. The evaluations showed minor departure from meeting standards for snow removal. All evaluations reported >10% surface length with > 2 inch ruts by vehicles. The site where effectiveness was not achieved also had rills on extending off the road surface and onto the fill slope. Berms on the sides of the road did not allow the road surface to drain effectively. The site reviewer note that traffic on the native surface roads occurred before the roads were adequately drained thereby causing impacts to water quality.

E19 Restoration of Borrow Pits and Quarries (1 site)

The site is West and Grider Quarry on Happy Camp Ranger District, restored in 2007 but currently open. **All requirements for BMP Implementation and Effectiveness were fully met for this quarry.**

Recreation Activities

R22 Developed Recreation Sites (2 sites)

Two sites were randomly selected for evaluation, and two additional sites were selected for evaluation (See non-random sites). Lover's Camp Trailhead, Scott River Ranger District and Fort Goff, Happy Camp Ranger District both fully met BMP implementation and effectiveness criteria.

R30 Dispersed Recreation Sites (2 sites)

Two dispersed recreation sites were visited, Hoteling campground/Henry Bell River Access on Salmon River District and Happy Camp River Access on Happy Camp Ranger District. The Hoteling site met

all BMPEP evaluation criteria. The Happy Camp River Access did not meet all evaluation criteria. The site is native surface, and all drainage flows directly into the stream course. The site was free from litter and sanitation facilities were in good condition.

Range Management Activities

G24 Range Management (4 sites)

Allotments on Goosenest, Oak Knoll, Salmon River, and Happy Camp Ranger Districts were sampled. Samples were taken at long term condition and trend reference sites. Range conditions indicated drought effects and therefore vulnerability to grazing damage. Herbaceous and woody utilization standards were met at three of the four sites. The G24 streambank alteration measurement protocol was followed for each effectiveness evaluation; however, the Forest Plan contains no streambank alteration standard and guideline against which to accurately gauge implementation. Table 1 gives the effectiveness rating for each sample site for this criterion, according to the BMPEP form. Recommendations were made for the two allotments where samples indicated less than 80% stable streambank observed. (See Table 4 and adaptive management discussion.)

Middle Tompkins Allotment, Tyler Meadow – Stream channel was stable and vegetation diverse and well established. Minor damage had occurred from a singular OHV. If no additional OHV access occurs, long term impacts are not a concern.

Carter Meadow Allotment, Lower Long Gulch – Herbaceous and woody utilization standards were met. Streambank stabilization was less measured at 69%. Although streambank stability was less than the desired objective, several unstable areas indicate a trend toward recovery. The source of streambank instability is attributed to past grazing activity. One wet area within the unit experienced localized heavy browse and trampling. Potential for this wet area to become eroded exists if grazing and trampling is not actively managed.

Beaver Allotment, West Long John – Herbaceous and woody utilization and streambank alteration guidelines were met. Several active headcuts exist in this unit. Cause of headcuts was not identified. The heavy willow component is critical to keeping this unit stable.

Bogus Allotment, Snackenburg – Herbaceous utilization and streambank alteration standards and guidelines were not met. Streambank stability was measured at 66%, and most of the stability component came from rubble. Groundcover was measured at less than 50% on transect perpendicular to stream. Several trampled areas devoid of any vegetation were observed. Cattle trailing within the unit was prevalent. The low water crossing with the road was also trampled further eroding the crossing. Area appears to have been impacted by long term over use.

Table 1 – Summary of Bank Stability ratings for range management samples

Allotment and District	Pasture Unit	Bank stability rating per G24 form		
		>80% stable	70-80% stable	<=70% stable
Carter Meadow, Salmon	Lower Long Gulch			x

River				
Middle Tompkins, Happy Camp	Tyler Meadow	x		
Beaver, Oak Knoll	West Long John	x		
Bogus, Gooseneast	Snackenburg Unit			x

Minerals Management Activities

M26 Mining Operations (1 site)

The High Bar Mine #1 & 2 on the Salmon River drainage was evaluated. At the time of evaluation, the mine was in exploratory status and the operators were to apply for permit to begin mining operations. Most Implementation criteria were adequately addressed, however, at the time of evaluation erosion control measures were not implemented. The access road was constructed at least partially on an existing skid trail. **The road is steep for much of the grade, and at the time of evaluation, erosion control measures had not been implemented, and removed vegetation had not been properly treated. Effectiveness could not be adequately evaluated because no precipitation events had occurred since the road construction.** Requirements for erosion control measures were clearly identified during the permit process for the mine.

M27 Common Variety Minerals (1 site)

The sample site was a pit used to generate aggregate for two road projects (Bowerman and Gronchi Stormproofing). The pit is not near a stream, so many of the criteria are not applicable. The site was benched as per OSHA requirements, and access roads were waterbarred. Currently, the site is in “restored” status. The evaluation indicated that the operation had fully met all BMP Implementation and Effectiveness requirements.

Table 4. Summary of 2008 BMP Implementation and Effectiveness Success Rate by Individual BMPs. (Randomly sampled sites only)

BMP	Total # of Sites	IMPLEMENTATION		EFFECTIVENESS	
		# of Sites Meeting BMP Criteria	% of Total	# of Sites Meeting BMP Criteria	% of Total
T01	4	4	100	4	100
T02	2	2	100	2	100
T03	3	3	100	3	100
T04	3	3	100	3	100
E06	1	1	100	1	100
E08	4	3	100	4	100
E09	4	4	100	4	100
E10	4	4	100	4	100
E11	3	3	100	3	100

E12	1	1	100	1	100
E13	3	3	100	3	100
E14	2	0	0	2	100
E16	3	0	0	1	33
E17	3	1	33	2	67
E19	1	1	100	1	100
R22	2	2	100	2	100
R30	2	1	100	2	100
G24	4	3	75	3	75
M26	1	0	0	1	100
Totals	47	39	78%	43	92%

SUMMARY OF NON-RANDOM SITE EVALUATIONS

1. Evaluation of Lover's Camp Stock Trailhead.

Lover's Camp Trailhead was part of the random pool for BMPEP R22. When more than one section exists at the site, protocol directs one section to be randomly selected and evaluated. The pedestrian trailhead was randomly selected. However, because the stock trailhead experiences different use, the site was evaluated as a non-random site. The site is located near streamcourse and riparian vegetation. Runoff in the stock enclosures has potential to impact water quality. During the site evaluation, very little excrement was present on site and was not considered a threat to water quality. However, during peak season use, periodic impacts to water quality may be a concern. Several social trails from stock accessing the streams have developed within the wet riparian areas. In especially wet areas, the trampling of livestock has widened and has potential to become degraded. The lush riparian vegetation serves to protect water quality from both erosion and biologic contaminants. Routine monitoring of this area is recommended to protect water quality.

2. Indian Scotty Campground.

Indian Scotty Campground was evaluated for special erosion control measures. While on-site, the campground was also evaluated for developed recreation BMP. All implementation and effectiveness criteria were met for the site. The campground is located near the Scott River. Social trails from campground visitors are prevalent between the campground and stream. Frequent use by recreationists along the banks does have a minor localized impact to water quality.

ADAPTIVE MANAGEMENT DISCUSSION AND CONSIDERATIONS

The following discussion is divided into 1) practices that are working well, 2) practice applications that can be improved, 3) practices to consider for possible modification at the Forest level, and 4) Oracle database problems that need fixing at the Region.

1. Practices that are working well

Most of the 22 activities evaluated in 2008 met BMP compliance and were effective at controlling nonpoint pollution. These included all timber sale activities; minerals management activities, and recreation sites; and most road engineering activities. Management should continue to use these practices on all future projects.

2. Practice applications that can be improved

The 2008 project BMPs were largely implemented as planned and effective. For a few practices, effectiveness could be improved even further.

E16 Water Sources

Three of three water sources evaluated showed implementation and/or effectiveness issues. Maintenance and management practices could be implemented at each of these sites to meet guidelines for water sources. Capital and labor investments to implement improvements would be minor.

E17 Snow Removal

Concerns were noted on all of the snow removal evaluations. The primary issues noted were water pooling on road because of berms, and damage to the road surface due inadequate drainage and traffic on roads while the road surfaces were saturated. Change in plowing and or timing of use would likely alleviate the concerns noted in 2008.

G24 Grazing

Although three of the four grazing allotments evaluated were found to protect water quality, three of the four sites visited demonstrated bank instability. The streambank instability at two sites is likely due to past and or present grazing activity. One sites with poor streambank stability appears to be healing (Long Gulch), however the instability is persistent and the system remains at greater risk than a site meeting forest standards and guidelines. Problems have been documented in past year on the Bogus allotment, and an effort to revise management to improve conditions was made in the last decade. Further evaluation of this allotment is recommended to determine if recommended practices have been implemented or if they need to be revised. Because the streambank stability at Long Gulch appears to be in an upward trend corrective action is not deemed necessary, but the site will continue to be monitored.

3. Practices to consider for possible modification at the Forest level

E 10 Road Decommissioning

Limiting rock armoring to only culvert outlets may be less effective than armoring all channels on a road restoration project. An interdisciplinary team of an earth scientist, fish biologist and engineer should develop Forest wide criteria for use of riprap which would lead to better project consistency. A review of the “design test” by the 2006 flood flows is recommended on decommissioned crossings may provide a learning opportunity that can result in better decommissioning designs. Similar evaluations of stormproofing projects post 1997 was done by Elder in 2003. This opportunity should be considered for the 2008 season.

G24 Grazing

Grazing over-utilization of riparian areas is a concern for water quality and beneficial uses. Even though sites passed implementation and effectiveness criteria overall, range management situations reported in 2006 included localized trampling of meadows and streambank areas. This was seen on some of the 2007 and 2008 samples as well. On one of these sites, a draft management decision was released to the public in 2007 that would reduce the number of cattle to half. In this same decision, for another allotment (not BMPEP monitored in 2007) it was proposed to not renew the grazing permit in order to allow restoration of the meadow ecosystem. On other allotments that were sampled in 2007, recommendations made include moving salt blocks to reduce trailing in riparian areas. These are all examples of adaptive management that is working.

The 2006 report mentioned that the Forest lacks site specific water quality and riparian standard and guidelines. The G24 evaluation protocol is structured as if such a standard is already in place on each Forest. This makes the implementation rating “not applicable” by default. In 2002, Forest range staff began formulating objectives for streambank disturbance and woody plant utilization on allotments that have vulnerable stream channels. This has been gradually occurring as permits come due for renewal. It is unknown whether these objectives are consistent with what is being formulated on other forests, or even from permit to permit on this forest. In September 2005, a proposal was made by Forest fisheries, soils, and hydrology staff to revise the Forest Plan to include a grazing standard and guideline for streambank disturbance that is a consistent and effective practice. The proposal is being reviewed by range management and Forest planning staff and could be incorporated in the upcoming Forest Plan Revision. As a next step, in August 2007 the Forest Hydrologist, Fisheries and Endangered Species Program Manager, Goosenest Range Conservationist, Region 5 Hydrologist and R5 Acting Range Program Manager conducted a field trip to a Goosenest range allotment to look at various options for measuring streambank alteration using more meaningful metrics than the current BMPEP criterion. Use of stubble height and rooting depth of herbaceous riparian vegetation were two options they discussed. At the present time, the G24 protocol is being redesigned at the Regional and National level by interdisciplinary teams grappling with the same issues. It is recommended that these broader monitoring design processes be tracked by Forest planning, range, fisheries and watershed staff with the goal of coming up with a standard and guideline for the Forest Plan revision. The standard and guide should be meaningful for assessing water quality protection in KNF rangeland settings, and measurable in a way that is simple and repeatable.

CONCLUSIONS AND CONSIDERATIONS

In 2008, implementation standards for BMPs were 78% compliant on all evaluated sites. BMP effectiveness requirements were met on 92% of the sites evaluated. This represents a decline in comparison to 2006 and 2007, however the trend since monitoring began in 1992 is favorable. Further improvement in BMP implementation is needed for water sources (E16), snow removal (E17), grazing practices (G24) and mining operations (M26). Activities that occur in proximity to streams and those which create relatively large amounts of disturbance have the greatest potential to impact water quality.

The majority of practices evaluated in 2008 were highly successful, owing to management’s commitment and the training and experience of project planners and implementers. This needs to be

encouraged in order to continue the Forest's BMP successes. Suggestions made in the Adaptive Management discussion can improve BMP performance even further.

REFERENCES

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

Appendix A. BMP Evaluation Procedure Names and Descriptions.

<i>Procedure #</i>	<i>Procedure Name (BMPs Monitored)</i>
T01	Streamside Management Zones* (BMP 1.8, 1.19, 1.22)
T02	Skid trails (BMP 1.10, 1.17)
T03	Suspended yarding (BMP 1.11)
T04	Landings (BMP 1.12, 1.16)
T05	Timber sale administration (BMP 1.13, 1.20, 1.25)
T06	Special erosion control and revegetation (BMP 1.14, 1.15)
T07	Meadow protection (BMP 1.18, 1.22, 5.3)
E08	Road surface, drainage and slope protection (BMP 2.2, 4, 5, 10, 23)
E09	Stream crossings (BMP 2.1)
E10	Road Decommissioning (BMP 2.26)
E11	Control of side cast material (BMP 2.11)
E12	Servicing and refueling (BMP 2.12)
E13	In-channel construction practices (BMP 2.14, 2.15, 2.17)
E14	Temporary roads (BMP 2.16, 2.26)
E15	Rip rap composition (BMP 2.20)
E16	Water source development (BMP 2.21)
E17	Snow removal (BMP 2.25)
E18	Pioneer road construction (BMP 2.3, 2.8, 2.9, 2.19)
E19	Restoration of borrow pits and quarries (BMP 2.27, 2.18)
E20	Management of roads during wet periods (BMP 2.24, 7.7)
R22	Developed recreation sites (BMP 4.3, 4, 5, 6, 9, 10)
R23	Location of stock facilities in wilderness (BMP 4.11)
G24	Range management (BMP 8.1, 8.2, 8.3)
F25	Prescribed fire (BMP 6.3)
M26	Mining operations (Locatable minerals) (BMP 3.1, 3.2)
M27	Common variety minerals (BMP 3.3)
V28	Vegetation manipulation (BMP 5.1, 5.2, 5.5, 5.7)
V29	Revegetation of surface disturbed areas (BMP 5.4)
R30	Dispersed Recreation Sites (BMP 4.5, 4.6, 4.10)

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Appendix B Non-Random BMP Monitoring

FY 08 Season Notes

Wet Weather Operations BMP Monitoring

T05 Timber Operations and E20 Management of Roads during Wet Periods

Documentation of monitoring is found in timber sale contract folders in *BMP – WWO Seasonal Report Tables* and *SF 181 (Contract Daily Diary)* referenced by its file number in the table.

Monitoring of wet weather operations was favorable. Two instances of concern were documented (Renter and Occupant). These were attributed to public use and not timber activities. Monitoring also demonstrated that when timber activities would result in potential impacts to water quality, corrective actions were taken before resource damage could occur.

Table summarizing Wet Weather Operations and related BMP monitoring

Project	BMPEP Status	WWO standards/BMPs and/or monitoring done	Reference source (year and number-for-year of SF 181)*
Colestine	Meets	10/01: Rained night before	BMP-WWO Seasonal Report
	Meets	10/04: Purchaser shutdown operations	BMP-WWO Seasonal Report
	Meets	10/09: Hauling halted due to moisture/rain	BMP-WWO Seasonal Report
	Meets	10/15: Aggregate on wet area to drain	BMP-WWO Seasonal Report
	Meets	10/16: Operations terminated due to rain	BMP-WWO Seasonal Report
	Meets	10/25: Recommence haul – no skidding	BMP-WWO Seasonal Report
	Meets	11/09: Terminate haul – Shut down for winter. Roads blocked and water berms installed	BMP-WWO Seasonal Report
Erickson	Meets	12/03: No action needed	BMP-WWO Seasonal Report
	Meets	12/03: No action needed	BMP-WWO Seasonal Report
	Meets	12/05: No action needed	BMP-WWO Seasonal Report
	Meets	12/06: Moist soil, no rutting	BMP-WWO Seasonal Report
Lockout	Meets	02/19: Road frozen – haul until 10 am.	BMP-WWO Seasonal Report
	Meets	02/19: Skidding over snow –	BMP-WWO Seasonal

		no exposed soil	Report
	Meets	02/26: Road thaws at ~11am – no haul	BMP-WWO Seasonal Report
	Meets	03/03: Skidding over snow	BMP-WWO Seasonal Report
	Meets	03/03: Soil exposed and frozen	BMP-WWO Seasonal Report
	Meets	03/13: No haul/Snow melt with rain am	BMP-WWO Seasonal Report
Renter	Under	11/08: Ruts in recently groundup pavement. Made by hunting traffic in October before logging started.	BMP-WWO Seasonal Report
	Under	11/15: Forest Service put down lots of soil/p-rock on 77 road to firm up road surface. No rock present – mostly sand.	BMP-WWO Seasonal Report
Occupant	Meets	12/11: Ground is staying frozen. No rutting, Good logging.	BMP-WWO Seasonal Report
	Meets	01/25: Roads, skid trails and landings staying frozen and snow packed.	BMP-WWO Seasonal Report
	Under	11/08: Ruts present	BMP-WWO Seasonal Report
	Meets	11/20: Only one soft spot. Jim Davis aware of location. Ground freezing and road staying in good shape even soft spot not a problem after 1.5 weeks of hauling.	BMP-WWO Seasonal Report
Larch	Meets	12/03: Melting snow runoff	BMP-WWO Seasonal Report
	Meets	12/03: New road base is stable	BMP-WWO Seasonal Report
	Meets	12/06: Ground frozen and stable	BMP-WWO Seasonal Report
	Meets	12/13: Roads solid – no damage	BMP-WWO Seasonal Report
	Meets	12/13: Roads solid – no damage	BMP-WWO Seasonal Report
	Meets	01/23: All roads frozen solid	BMP-WWO Seasonal Report
	Meets	03/31: Dry or frozen/ Haul done	BMP-WWO Seasonal Report
	Meets	04/07: Too wet to haul.	BMP-WWO Seasonal Report

		Continue monitor	Report
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*** Except where other source is given**

Appendix C – Comparison of Evaluation Accomplishment with Target for KNF

Evaluations were accomplished for a total of 47 sites, using 19 protocols to assess timber, engineering, recreation, grazing, and minerals management. The Klamath had a target of 58 sites using 26 protocols.

Shortfalls occurred in these protocols:

T01 – 4 of 4 were done.

T02 - 2 of 3 were done

T03 – 3 of 2 were done

T04 - 3 of 3 were done

T05 – 0 were done

T06 -1 of 1 were done.

T07 – 0 of 1 were done.

E08 – 3 of 3 were done.

E09 - 4 of 4 were done.

E10 – 4 of 4 were done.

E11 – 3 of the 3 were done.

E12 – 1 of 1 were done.

E13 – 3 of 2 were done.

E14 – 2 of 1 were done.

E16 – 2 of 2 were done.

E17 – 3 of 3 were done.

E19 – 1 of 1 were done.

E20 - a non-random, concurrent sample of wet weather ops was done beyond the BMPEP program..

R22 – 2 of 1 were done.

R30 – 2 of 2 were done.

G24 – 4 of 4 were done.

F25 – 0 of 5 were done.

M26 – 1 of 1 were done.

M27 – 1 of 1 were done.

V28 – 0 of 1 were done.

V29 – 0 of 1 were done.

The KNF exceeded the target in these protocols:

T03 – 3 sites instead of the assigned 2

E08 – 4 sites instead of the assigned 3

E13 - 3 sites instead of the assigned 2

E16 - 3 sites instead of the assigned 2

R22 - 2 sites instead of the assigned 1.