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Annual Monitoring Summary Report

2007

South Fork Elk River Cleanup and Abatement Order R1-2004-0028

October 1, 2007

Version 1.0



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**PROJECT TITLE: SOUTH FORK ELK RIVER CAO R1-2004-0028
MONITORING PROGRAM**

ORGANIZATION IMPLEMENTING THE PROJECT:

PALCO (The Pacific Lumber Company)
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“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those directly responsible for gathering the information, the information submitted, is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

**SCIENCE TEAM LEADER FOR THIS
PROJECT**

_____ Date _____
Kathleen Sullivan, Ph.D.

PALCO AUTHORIZED REPRESENTATIVE

_____ Date _____
Kathleen Sullivan

2006 Work Plan

A total of 18 sites were scheduled to be completed in 2006 (as per the South Fork Elk River Monitoring QAPP 1.2). Work was scheduled from May through October 15th. The work plan summary for 2006 documents all treatment work conducted under the order and summarizes variations that occurred during the conduct of operations throughout the operating season. The work plan summary is attached in Appendix 1.

These sites included a number of road projects, including but not limited to:

- Removal of Humboldt crossings
- Culvert replacement, removal of crossing fill
- Culvert installation
- Bridge installation
- Construction of water bars

Sites are located on Map 2. Each site number for South Fork Elk River corresponds to the distance in feet on a given road. It is consistent with the listing of sites in the ECP listing in each corresponding THP. Site numbers on this table are consistent with the sediment source inventory submitted on 11/15/2006.

Deviation from Plan

Eighteen sites were originally scheduled to be completed in 2006 with 6,196 cubic yards of sediment to be treated (as per the South Fork Elk River Monitoring QAPP 1.2). As of November 15, 2006, 23 sites in South Fork Elk River have been completed. These sites totaled 6,000 cubic yards of material saved. Six sites were added to the original Monitoring Plan. Table 2 identifies the sites completed and the monitoring studies selected for each site. One site was not completed as originally identified in the first work plan submittals. Table 1 lists the site that was not completed and explains the reasons that it was removed from the work plan.

Table 1. Sites not completed per original 2006 work plan and treatment schedule

South Fork Elk River Sites not Completed in 2006		
Road Number	Site Number	Reasons sites not completed
U06	4170	Time constraints due to operational restrictions

CAO Sites Monitoring Plan

The monitoring plan for the 23 sites completed in South Fork Elk River in 2006 is provided in Table 2. Work was scheduled from May through October 15th.

Table 2. Overview of North Fork Elk River CAO Monitoring Plan for CAO sites completed in 2006.

2006 South Fork Elk River CAO Sites Monitoring Plan						
Road #	Site ID #	Sub-basin	Site Completed	Wet Weather Inspection	Erosion Void	Photo Monitoring
N53.61	2010	South Fork Elk	9/26/2006	X	X	X
N53.61	2725	South Fork Elk	9/28/2006	X	X	X
N53.61	3925	South Fork Elk	9/23/2006			X
N53.61	4800	South Fork Elk	9/20/2006	X	X	X
U06	6810	Tom Gulch	7/19/2006	X		X
U06	7140	Tom Gulch	7/19/2006	X	X	X
U06	7200	Tom Gulch	7/10/2006	X	X	X
U06	7260	Tom Gulch	7/21/2006	X	X	X
U06	7400	Tom Gulch	7/21/2006			
U06	7790	Tom Gulch	7/27/2006			X
U06	8080	Tom Gulch	7/28/2006			
U06	8180	Tom Gulch	7/31/2006			
U06	8380	Tom Gulch	8/2/2006	X		X
U06	8600	Tom Gulch	8/6/2006	X	X	X
U06	8880	Tom Gulch	8/11/2006	X		X
U06	8985	Tom Gulch	8/15/2006	X	X	X
U06	9225	Tom Gulch	8/17/2006			X
U06	9525	Tom Gulch	8/21/2006			X
U06	10350	Tom Gulch	8/25/2006	X	X	X
U06	11470	Tom Gulch	9/6/2006			X
U06	12045	Tom Gulch	9/15/2006	X	X	X
U06	13155	Tom Gulch	9/13/2006	X	X	X
Skid Road 0	S1	South Fork Elk	11/3/2006			

Daily Rainfall

Daily rainfall for 2006 is as follows in Table 3. Rainfall is recorded in inches and is gathered from the National Weather Service Station in Eureka (www.whr.noaa.gov/eka).

Table 3. Daily rainfall recorded at NWS station in Eureka, California. Data is presented in inches.

NWS Station at Eureka Hydrologic Year 2006-2007												
Date	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	July	Aug.	Sep.
1	0.00	0.00	0.01	0.00	0.00	0.20	0.00	0.29	0.00	0.00	0.00	0.00
2	0.00	0.64	0.00	0.01	0.00	0.13	0.00	0.14	0.00	0.00	0.01	0.00
3	0.00	0.86	0.00	0.97	0.00	0.00	0.00	0.31	0.00	0.00	0.01	0.00
4	0.22	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.06
5	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
6	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
7	0.00	0.66	0.00	0.00	1.03	0.36	0.29	0.00	0.00	0.00	0.00	0.00
8	0.00	0.14	0.26	0.00	0.50	0.00	0.29	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.29	0.00	0.05	0.04	0.00	0.00	0.11	0.00	0.00	0.00
10	0.00	0.60	0.85	0.12	1.32	0.00	0.00	0.00	0.12	0.00	0.00	0.00
11	0.00	0.18	0.70	0.04	0.23	0.00	0.33	0.00	0.00	0.02	0.00	0.00
12	0.00	0.38	0.98	0.00	0.23	0.00	0.10	0.01	0.00	0.00	0.00	0.00
13	0.00	0.58	0.57	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
14	0.02	0.03	0.44	0.00	0.20	0.00	0.76	0.00	0.00	0.00	0.00	0.00
15	0.30	0.43	0.03	0.00	0.52	0.00	0.00	0.01	0.00	0.00	0.00	0.00
16	0.03	0.06	0.14	0.12	0.00	0.00	0.04	0.00	0.00	0.00	0.06	0.00
17	0.00	0.00	0.03	0.00	0.04	0.00	0.36	0.00	0.00	0.88	0.00	0.00
18	0.00	0.00	0.00	0.00	0.12	0.00	0.06	0.00	0.00	0.05	0.00	0.00
19	0.01	0.35	0.00	0.01	0.04	0.62	0.04	0.03	0.00	0.00	0.00	0.00
20	0.00	0.39	0.01	0.00	0.97	0.04	0.00	0.05	0.00	0.00	0.00	0.00
21	0.00	0.44	0.77	0.00	2.32	0.00	0.28	0.00	0.00	0.00	0.00	0.00
22	0.00	0.78	0.00	0.00	0.79	0.00	0.13	0.00	0.00	0.00	0.00	0.00
23	0.00	0.05	0.08	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.01	0.03	0.01	0.79	0.00	0.00	0.00	0.00	0.01	0.00	0.00
25	0.00	0.03	0.73	0.00	0.51	0.26	0.02	0.00	0.00	0.00	0.00	0.00
26	0.00	0.45	0.97	0.00	0.50	0.39	0.00	0.02	0.00	0.01	0.00	0.00
27	0.00	0.14	0.13	0.00	1.16	0.45	0.00	0.02	0.00	0.00	0.00	0.00
28	0.00	0.13	0.00	0.00	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.10
29	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.01		0.00	0.00	0.00	0.00	0.00	0.00	0.44
31	0.00		0.00	0.00		0.02		0.00		0.00	0.00	

Post Activity Audits

Audits were conducted on all 23 sites completed this year. All post activity audit field forms are attached in Appendix 2.

Table 4. 2006 South Fork Elk River CAO Sites Audit Results

2006 South Fork Elk River CAO Sites Audit Results					
Road #	Site ID #	Site Completed	Audit Date	Within Time Restrictions	Conforms to Permits
N53.61	2010	9/26/2006	11/6/2006	X	Yes
N53.61	2725	9/28/2006	11/6/2006	X	No
N53.61	3925	9/23/2006	11/6/2006	X	No
N53.61	4800	9/20/2006	11/3/2006	X	Yes
U06	6810	7/19/2006	8/28/2006	X	Yes
U06	7140	7/19/2006	8/28/2006	X	Yes
U06	7200	7/10/2006	8/23/2006	X	Yes
U06	7260	7/21/2006	8/28/2006	X	Yes
U06	7400	7/21/2006	8/28/2006	X	Yes
U06	7790	7/27/2006	8/28/2006	X	Yes
U06	8080	7/28/2006	8/28/2006	X	Yes
U06	8180	7/31/2006	8/28/2006	X	Yes
U06	8380	8/2/2006	8/28/2006	X	Yes
U06	8600	8/6/2006	8/28/2006	X	No
U06	8880	8/11/2006	8/28/2006	X	Yes
U06	8985	8/15/2006	8/28/2006	X	Yes
U06	9225	8/17/2006	9/18/2006	X	Yes
U06	9525	8/21/2006	9/18/2006	X	Yes
U06	10350	8/25/2006	9/18/2006	X	Yes
U06	11470	9/6/2006	10/12/2006	X	No
U06	12045	9/15/2006	10/12/2006	X	Yes
U06	13155	9/13/2006	10/12/2006	X	Yes
Skid Rd.	S1	11/3/2006	11/14/2006	X	Yes

Those sites that did not conform to the permit are listed in Table 5. These sites will have additional corrective actions taken in 2007 or will be monitored over the 2006-2007 winter period and re-evaluated for conformance.

Table 5. Non Conforming CAO Sites South Fork Elk River 2006

Non Conforming CAO Sites South Fork Elk River 2006				
Road Number	Site Number	Proposed Treatment	Variance from Specifications	Proposed Corrective Action
N53.61	2725	Sediment Savings Site: To the nearest extent feasible excavate natural channel from white "TOP" flag to white "BOTTOM" flag. Excavated side slopes will be 2:1, or natural hillslope. Use rock armoring as necessary for stabilization.	Channel should have a more even grade. Stream channel is too high in the middle of the crossing. This may be ok if the water remains on the surface. Channel is rip- rapped or armored.	Re-evaluated- None
N53.61	3925	Sediment Savings Site: To the nearest extent feasible excavate natural channel from white "TOP" flag to white "BOTTOM" flag. Excavated sideslopes will be 2:1, or natural hillslope, or stabilized by armoring. Pull existing CMP which was placed over old Humboldt crossing to natural stream gradient. 5' min. channel width would be appropriate.	Stream channel should have a more even grade. It is high in the middle, channel is rock armored and may be fine if the water remains on the surface.	Re-evaluated- None
U06	8600	Failed fill crossing. Excavate from top to bottom flag and install a 30' culvert. Armor the hinge line and spillway to bottom of excavation. TRM may be used on the outboard edge fill in place of rip-rap. If the outboard fill exceeds 50 feet in length, rock armor the base of the fillslope. Taper the top excavation and armor with rock or large woody debris. Rock armor the inlet.	Watercourse not armored to reduce headcutting	Maintenance site- 2007 work plan- pending
U06	11470	Failed undersized culvert. Excavate from top to bottom flag and replace with 30' culvert. Taper and armor top excavation. Armor hinge line and spillway for the entire distance of the excavation below the road. TRM may be used on the outboard edge fill in place of rip-rap. If the outboard fill exceeds 50 feet in length, rock armor the base of the fillslope. Rock armor inside ditch leading into the inlet.	Culvert was downspouted. The channel was not rock armored	N/A. Meets intent of mitigation

Photo Monitoring

Photo Monitoring was conducted for 19 of the 23 sites completed in 2006. The date when photo monitoring has occurred at each site is listed in Table 6. Photo monitoring field forms are attached in Appendix 3.

Due to the considerable number of photographs taken at each site, the photos have been submitted on CD's South Fork Elk River CAO R1-2004-0028_1. Photos are indexed on the CD's by road and site number. Photographs within each site file are in numeric order and correspond to the SCOPAC assigned file name on the corresponding field sheet for each particular site.

Table 6. Photo-monitoring activity log for 2006 South Fork Elk River CAO sites

Photo-monitoring 2006 South Fork Elk River CAO Sites							
Road #	Site ID #	Site Completed	Post Audit Photo Monitoring	Wet Weather Inspection 1 Photo Mon.	Wet Weather Inspection 2 Photo Mon.	Wet Weather Inspection 3 Photo Mon.	Erosion Void Photo Mon.
N53.61	2010	9/26/2006	11/29/2006	12/13/2006	4/19/2007		9/12/2007
N53.61	2725	9/28/2006	11/29/2006	12/13/2006	4/19/2007		9/12/2007
N53.61	3925	9/23/2006	11/6/2006	N/A	N/A		N/A
N53.61	4800	9/20/2006	11/29/2006	12/13/2006	4/19/2007		9/12/2007
U06	6810	7/19/2006	11/21/2006	12/13/2006	4/19/2007		N/A
U06	7140	7/19/2006	None	12/13/2006	4/19/2007		9/28/2007
U06	7200	7/10/2006	None	12/13/2006	4/19/2007		9/28/2007
U06	7260	7/21/2006	11/21/2006	12/13/2006	4/19/2007		9/11/2007
U06	7400	7/21/2006	N/A	N/A	N/A		N/A
U06	7790	7/27/2006	12/7/2006	N/A	N/A		N/A
U06	8080	7/28/2006	N/A	N/A	N/A		N/A
U06	8180	7/31/2006	N/A	N/A	N/A		N/A
U06	8380	8/2/2006	11/21/2006	12/13/2006	4/19/2007		N/A
U06	8600	8/6/2006	11/21/2006	12/13/2006	4/19/2007		9/7/2007
U06	8880	8/11/2006	None	12/13/2006	4/19/2007		N/A
U06	8985	8/15/2006	11/21/2006	12/13/2006	4/19/2007		9/11/2007
U06	9225	8/17/2006	12/7/2006	N/A	N/A		N/A
U06	9525	8/21/2006	12/7/2006	N/A	N/A		N/A
U06	10350	8/25/2006	11/21/2006	12/13/2006	4/19/2007		9/13/2007
U06	11470	9/6/2006	12/7/2006	N/A	N/A		N/A
U06	12045	9/15/2006	11/21/2006	12/13/2006	4/19/2007		9/13/2007
U06	13155	9/13/2006	11/21/2006	12/13/2006	4/19/2007		9/14/2007
Skid Road 0	S1	11/3/2006	N/A	N/A	N/A		N/A

Water Quality Inspections

Wet weather inspections were conducted on all sites that were selected to receive that specific monitoring treatment described in the 2006 workplan and treatment schedule.

The log of wet weather inspection activity including audits and wet weather inspections is provided in Table 7. This table will be updated in each quarterly report.

Wet Weather Inspection field forms are attached in Appendix 4.

Table 7. Monitoring activity log for audits and inspections of sites completed in 2006.

2006 South Fork Elk River CAO Site Inspection Log							
Road #	Site ID #	Site Completed	Post Activity Audit	Wet Weather Inspection 1	Wet Weather Inspection 2	Wet Weather Inspection 3	Erosion Void
N53.61	2010	9/26/2006	11/6/2006	12/13/2006	4/19/2007		9/12/2007
N53.61	2725	9/28/2006	11/6/2006	12/13/2006	4/19/2007		9/12/2007
N53.61	3925	9/23/2006	11/6/2006	N/A	N/A		N/A
N53.61	4800	9/20/2006	11/3/2006	12/13/2006	4/19/2007		9/12/2007
U06	6810	7/19/2006	8/28/2006	12/13/2006	4/19/2007		N/A
U06	7140	7/19/2006	8/28/2006	12/13/2006	4/19/2007		9/28/2007
U06	7200	7/10/2006	8/23/2006	12/13/2006	4/19/2007		9/28/2007
U06	7260	7/21/2006	8/28/2006	12/13/2006	4/19/2007		9/11/2007
U06	7400	7/21/2006	8/28/2006	N/A	N/A		N/A
U06	7790	7/27/2006	8/28/2006	N/A	N/A		N/A
U06	8080	7/28/2006	8/28/2006	N/A	N/A		N/A
U06	8180	7/31/2006	8/28/2006	N/A	N/A		N/A
U06	8380	8/2/2006	8/28/2006	12/13/2006	4/19/2007		N/A
U06	8600	8/6/2006	8/28/2006	12/13/2006	4/19/2007		9/7/2007
U06	8880	8/11/2006	8/28/2006	12/13/2006	4/19/2007		N/A
U06	8985	8/15/2006	8/28/2006	12/13/2006	4/19/2007		9/11/2007
U06	9225	8/17/2006	9/18/2006	N/A	N/A		N/A
U06	9525	8/21/2006	9/18/2006	N/A	N/A		N/A
U06	10350	8/25/2006	9/18/2006	12/13/2006	4/19/2007		9/13/2007
U06	11470	9/6/2006	10/12/2006	N/A	N/A		N/A
U06	12045	9/15/2006	10/12/2006	12/13/2006	4/19/2007		9/13/2007
U06	13155	9/13/2006	10/12/2006	12/13/2006	4/19/2007		9/14/2007
Skid Road 0	S1	11/3/2006	11/14/2006	N/A	N/A		N/A

Summary of wet weather inspections results for 2006 South Fork Elk River CAO sites

Table 9 provides the wet weather inspection findings. Erosion was observed at 14 sites during the wet weather inspections, and consisted primarily of sloughing and bank erosion. Turbidity increases greater than 20% were observed at 5 of the sites. At two sites, turbidity increases occurred but no erosion or discharge was visible

Water samples were taken at all feasible sites during the wet weather inspections using a grab sampling technique. Samples were taken upstream and downstream relative to the road or where appropriate on decommissioned sites. Surveyors took great effort to minimize disturbance to the site during sample collection. In some instances samples could not be taken. Table 8 lists the sites where samples were not taken.

Table 8. Summary of South Fork Elk River CAO sites with no water samples taken

2006 Wet Weather Inspection sites with no water samples taken			
Road Number	Site ID Number	Wet Weather Inspection	Reasons Samples Not Taken
U06	7140	12/13/2006	Not Enough Flow to Take Water Samples
U06	7200	12/13/2006	Not Enough Flow to Take Water Samples
U06	8380	12/13/2006	No Access to Stream Below Crossing- Underground
U06	8880	12/13/2006	Not Enough Flow to Take Water Samples
U06	8985	12/13/2006	No Access to Stream Below Crossing due to Class I
U06	10350	12/13/2006	Class I Contaminates lower sample area
U06	6810	4/19/2007	Not Enough Flow to Take Water Samples
U06	7140	4/19/2007	Not Enough Flow to Take Water Samples
U06	7200	4/19/2007	Not Enough Flow to Take Water Samples
U06	8380	4/19/2007	Unable to Sample Upstream Due to Insufficient Flow
U06	8880	4/19/2007	Not Enough Flow to Take Water Samples

Table 9. Summary of wet weather inspection results for 2006 South Fork Elk River CAO sites

Wet Weather Inspection Results-- 2006 South Fork Elk River CAO Sites										
Road Number	Site ID Number	Wet Weather Inspection	Daily Rainfall	Date Samples Collected	Upstream NTU	Downstream NTU	NTU Difference	Percent Difference	Type of Erosion Observed	Estimated Amount
N53.61	2010	12/13/2006	0.57	12/13/2006	28.2	56.3	28.1	99.6%	No Erosion Observed	None
N53.61	2725	12/13/2006	0.57	12/13/2006	316	516	200	63.3%	Sloughing Bank Erosion Channel Erosion	< 1 yard
N53.61	4800	12/13/2006	0.57	12/13/2006	136	152	16	11.8%	No Erosion Observed	None
U06	6810	12/13/2006	0.57	12/13/2006	1949	1096	-853	-43.8%	No Erosion Observed	None
U06	7140	12/13/2006	0.57	None	X	X	X	X	No Erosion Observed	None
U06	7200	12/13/2006	0.57	None	X	X	X	X	No Erosion Observed	None
U06	7260	12/13/2006	0.57	12/13/2006	538	658	120	22.3%	No Erosion Observed	None
U06	8380	12/13/2006	0.57	None	X	X	X	X	Sloughing Bank Erosion Channel Erosion Downcutting	1-5 yards
U06	8600	12/13/2006	0.57	12/13/2006	379	787	408	107.7%	Sloughing or Slope Failure	1-5 yards
U06	8880	12/13/2006	0.57	None	X	X	X	X	No Erosion Observed	None
U06	8985	12/13/2006	0.57	None	X	X	X	X	Sloughing or Slope Failure Gullying	1-5 yards
U06	10350	12/13/2006	0.57	None	X	X	X	X	Sloughing or Slope Failure	< 1 yard
U06	12045	12/13/2006	0.57	12/13/2006	701	731	30	4.3%	No Erosion Observed	None
U06	13155	12/13/2006	0.57	12/13/2006	136	242	106	77.9%	Sloughing or Slope Failure Nickpoint Migration	< 1 yard
N53.61	2010	4/19/2007	0.04	4/19/2007	7.9	8.6	0.7	8.9%	No Erosion Observed	None
N53.61	2725	4/19/2007	0.04	4/19/2007	8.0	8.7	0.7	8.7%	Bank Erosion, Channel Erosion	< 1 yard
N53.61	4800	4/19/2007	0.04	4/19/2007	4.9	4.8	-0.1	2.0%	No Erosion Observed	None
U06	6810	4/19/2007	0.04	N/A	X	X	X	X	Sloughing or Slope Failure, Bank Erosion	1-5 yards

Road Number	Site ID Number	Wet Weather Inspection	Daily Rainfall	Date Samples Collected	Upstream NTU	Downstream NTU	NTU Difference	Percent Difference	Type of Erosion Observed	Estimated Amount
U06	7140	4/19/2007	0.04	N/A	X	X	X	X	No Erosion Observed	None
U06	7200	4/19/2007	0.04	N/A	X	X	X	X	No Erosion Observed	None
U06	7260	4/19/2007	0.04	4/19/2007	30	32	2	6.7%	No Erosion Observed	None
U06	8380	4/19/2007	0.04	4/19/2007	X	41	X	X	Sloughing or Slope Failure Bank Erosion, Downcutting	1-5 yards
U06	8600	4/19/2007	0.04	4/19/2007	71.3	67.8	-3.5	4.9%	Sloughing or Slope Failure, Bank Erosion, Gullyng	1-5 yards
U06	8880	4/19/2007	0.04	N/A	X	X	X	X	No Erosion Observed	None
U06	8985	4/19/2007	0.04	4/19/2007	20.8	20.4	-0.4	1.9%	Sloughing or Slope Failure Gullyng, Bank, Surface, and Channel Erosion	> 5 yards
U06	10350	4/19/2007	0.04	4/19/2007	22.2	21	-1.2	5.4%	Sloughing, Bank, Surface and Channel Erosion	1-5 yards
U06	12045	4/19/2007	0.04	4/19/2007	123	122	-1.0	0.8%	Sloughing or Slope Failure, Bank Erosion	< 1 yard
U06	13155	4/19/2007	0.04	4/19/2007	26.6	26.2	-0.4	1.5%	Sloughing/ Slope Failure, Gullyng, Bank, Surface, and Channel Erosion	1-5 yards

Notifications

Observations of sediment discharges to streams during the wet weather inspections are reported to the NCRWQCB. There are several possible outcomes of the inspections that determine when and if notifications are provided.

When the field inspector observes erosion features, such as bank slumps, rilling, etc., they complete a sediment discharge form upon returning from the field. The determination that sediment has been discharged to the stream, or may in the future, is based on observation and inspector judgment. The NCRWQCB is notified in writing, by phone and/or email within 48 hours of the observation consistent with Erosion Control Plan (ECP) reporting protocol. In cases where turbidity samples show significant turbidity increases but no erosion was visible during the inspection, the NCRWQCB is notified of a turbidity discharge via this monitoring report (Table 11).

PALCO operations managers review all types of discharges in a timely manner to determine notification status and corrective action. Table 12 lists the erosion and discharge findings and the PALCO operations follow-up if any.

As per the draft memorandum dated December 5, 2006 by the NCRWQCB, the discharge notifications are summarized in tabular form in Table 10. A map with the locations of these discharges is attached in Appendix 5.

Table 10. Log of Discharge Notifications sent to NCRWQCB for South Fork Elk River

Water Quality Discharge Notifications - South Fork Elk River 2006 Sites							
Road Number	Site Number	Date Discharge Discovered	Amount of Sediment Discharged	Nature and Cause of Discharge	Corrective Action Taken	Date Corrective Action Taken	Corrective Action Applied to Site or Recommendation
N53.61	2725	12/13/2006	1 yard	Bank Sloughing	Completed	12/2006	Hayed, Seeded, Bioengineering
N53.61	3000	12/13/2006	1 yard	Bank Sloughing	Completed	12/2006	Hayed, Seeded, Bioengineering
U06	8380	12/13/2006	2 yards	Sink Holes	Pending 2007 plan	N/A	Remove downspout and fill with filter rock
U06	8600	12/13/2006	1 yard	Bank Sloughing	Pending 2007 plan	N/A	Bioengineering, may need to armour with rip rap
U06	8985	12/13/2006	1 yard	Bank Sloughing	Pending 2007 plan	N/A	Bioengineering, may need to armour with rip rap
U06	10350	12/13/2006	1 yard	Bank Sloughing	Pending	N/A	Hayed, Seeded, Bioengineering
U06	13155	12/13/2006	2 yards	Bank Sloughing	Pending	N/A	Hayed, Seeded, Bioengineering
U06	8380	2/22/07	< 1 yard	Fill Failure	Pending	N/A	Install woody debris at downspout outlet as dissipater
U06	8600	2/22/07	6 yards	Fill Failure	Pending	N/A	Excavate slide material at inlet
U06	8985	2/22/07	8 yards	Fill Failure	Pending	N/A	Remove stumps and trees- excavate slide material at inlet
U06	11470	2/22/07	3 yards	Fill Failure	Pending 2007 plan	N/A	Excavate slide material at inlet- rip-rap as needed
U06	10950	3/5/07	7 yards	Outboard Edge Erosion	Pending	N/A	Install rock apron- add rock to ford
U06	9775	3/5/07	N/A	Soil pipe Outboard Edge Failure	Pending	N/A	Install rock apron
U06	10475	3/5/07	N/A	Soil pipe Outboard Edge Failure	Pending	N/A	Install rock apron

Table 11. Log of PALCO Notification Activities for 2006 South Fork Elk River CAO sites

Notification Log- South fork Elk River 2006 CAO Sites							
Road Number	Site ID Number	Wet Weather Inspection	Percent Turbidity Difference	Estimated Erosion Amount	ECP Discharge Notification to NCRWQCB	Date NCRWQCB Notified of ECP Discharges	Date Turbidity Discharges Reported
N53.61	2010	12/13/2006	100%	None	No	N/A	1/15/2007
N53.61	2725	12/13/2006	63%	< 1 yard	Yes	12/15/2006	1/15/2007
N53.61	4800	12/13/2006	12%	None	No	N/A	No
U06	6810	12/13/2006	-44%	None	No	N/A	No
U06	7140	12/13/2006	X	None	No	N/A	N/A
U06	7200	12/13/2006	X	None	No	N/A	N/A
U06	7260	12/13/2006	22%	None	No	N/A	1/15/2007
U06	8380	12/13/2006	X	1-5 yards	Yes	12/15/2006	N/A
U06	8600	12/13/2006	108%	1-5 yards	Yes	12/15/2006	1/15/2007
U06	8880	12/13/2006	X	None	No	N/A	N/A
U06	8985	12/13/2006	X	1-5 yards	Yes	12/15/2006	N/A
U06	10350	12/13/2006	X	< 1 yard	Yes	12/15/2006	N/A
U06	12045	12/13/2006	4%	None	No	N/A	No
U06	13155	12/13/2006	78%	< 1 yard	Yes	12/15/2006	1/15/2007
N53.61	2010	4/19/2007	8.9%	None	No	N/A	N/A
N53.61	2725	4/19/2007	8.7%	< 1 yard	No	N/A	N/A
N53.61	4800	4/19/2007	2.0%	None	No	N/A	N/A
U06	6810	4/19/2007	X	1-5 yards	No	N/A	N/A
U06	7140	4/19/2007	X	None	No	N/A	N/A
U06	7200	4/19/2007	X	None	No	N/A	N/A
U06	7260	4/19/2007	6.7%	None	No	N/A	N/A
U06	8380	4/19/2007	X	1-5 yards	No	N/A	N/A
U06	8600	4/19/2007	4.9%	1-5 yards	No	N/A	N/A
U06	8880	4/19/2007	X	None	No	N/A	N/A
U06	8985	4/19/2007	1.9%	> 5 yards	No	N/A	N/A
U06	10350	4/19/2007	5.4%	1-5 yards	No	N/A	N/A
U06	12045	4/19/2007	0.8%	< 1 yard	No	N/A	N/A
U06	13155	4/19/2007	1.5%	1-5 yards	No	N/A	N/A

Corrective Actions

PALCO operations managers consider a number of factors when determining what corrective actions will be taken. Accessibility and knowledge of site conditions will determine whether foresters or road maintenance crews are dispatched immediately or whether improvements are postponed until dryer operating conditions occur to avoid causing additional erosion damage at the site (typically the next summer).

The corrective action activities are listed in Table 12. Sites where activities are delayed are listed as pending.

Table 12. Corrective Action Log for 2006 South Fork Elk River CAO Sites

Corrective Action Log- 2006 South Fork Elk River CAO Sites									
Road Number	Site ID Number	Turbidity Difference	Estimated Erosion Amount	Discharge Reported	Operations Notification Date	Operations Person Notified	PALCO Operations Follow-up	Date Completed	Corrective Action Taken or Recommended
N53.61	2010	99.6%	None	No	N/A	N/A	None	N/A	None
N53.61	2725	63.3%	< 1 yard	Yes	12/15/2006	Dave Carter	Completed	12/2006	Hayed, Seeded, Bioengineering
N53.61	4800	11.8%	None	No	N/A	N/A	None	N/A	None
U06	6810	-43.8%	None	No	N/A	N/A	None	N/A	None
U06	7140	X	None	No	N/A	N/A	None	N/A	None
U06	7200	X	None	No	N/A	N/A	None	N/A	None
U06	7260	22.3%	None	No	N/A	N/A	None	N/A	None
U06	8380	X	1-5 yards	Yes	12/15/2006	Dave Carter	Pending 2007	N/A	Remove downspout and fill with filter rock
U06	8600	107.7%	1-5 yards	Yes	12/15/2006	Dave Carter	Pending 2007	N/A	Bioengineering, may need to armour with rip rap
U06	8880	X	None	No	N/A	N/A	None	N/A	None
U06	8985	X	1-5 yards	Yes	12/15/2006	Dave Carter	Pending 2007	N/A	Bioengineering, may need to armour with rip rap
U06	10350	X	< 1 yard	Yes	12/15/2006	Dave Carter	Pending	N/A	Hayed, Seeded, Bioengineering
U06	12045	4.3%	None	No	N/A	N/A	None	N/A	None
U06	13155	77.9%	< 1 yard	Yes	12/15/2006	Dave Carter	Pending	N/A	Hayed, Seeded, Bioengineering
N53.61	2010	8.9%	None	No	N/A	N/A	None	N/A	None
N53.61	2725	8.7%	< 1 yard	No	4/20/2007	Dave Carter	None	N/A	None

Road Number	Site ID Number	Turbidity Difference	Estimated Erosion Amount	Discharge Reported	Operations Notification Date	Operations Person Notified	PALCO Operations Follow-up	Date Completed	Corrective Action Taken or Recommended
N53.61	4800	2.0%	None	No	N/A	N/A	None	N/A	None
U06	6810	X	1-5 yards	No	4/20/2007	Dave Carter	None	N/A	None
U06	7140	X	None	No	N/A	N/A	None	N/A	None
U06	7200	X	None	No	N/A	N/A	None	N/A	None
U06	7260	6.7%	None	No	N/A	N/A	None	N/A	None
U06	8380	X	1-5 yards	No	4/20/2007	Dave Carter	Yes	Pending 2007	Install woody debris at downspout outlet as dissipater
U06	8600	4.9%	1-5 yards	No	4/20/2007	Dave Carter	Yes	Pending 2007	Excavate slide material at inlet
U06	8880	X	None	No	N/A	N/A	None	N/A	None
U06	8985	1.9%	> 5 yards	No	4/20/2007	Dave Carter	Yes	Pending 2007	Remove stumps and trees. Excavate slide material at inlet
U06	10350	5.4%	1-5 yards	No	4/20/2007	Dave Carter	None	N/A	None
U06	12045	0.8%	< 1 yard	No	4/20/2007	Dave Carter	None	N/A	None
U06	13155	1.5%	1-5 yards	No	4/20/2007	Dave Carter	None	N/A	None

Erosion Void Assessment

Erosion void assessments were conducted on 11 of the 23 sites completed in 2006. Table 7 lists the dates the assessments were conducted. Results are listed in Table13. Erosion void field forms are attached in Appendix 6.

Table 13. Erosion Void results for 2006 South Fork Elk River CAO sites

Road #	U06			U06			U06			U06			U06			U06					
Site #	7140			7200			7260			12045			8985			13155			8600		
	No Erosion Features			No Erosion Features			ID #	Displaced Volume (yd ³)	Delivered Volume (yd ³)	ID #	Displaced Volume (yd ³)	Delivered Volume (yd ³)	ID #	Displaced Volume (yd ³)	Delivered Volume (yd ³)	ID #	Displaced Volume (yd ³)	Delivered Volume (yd ³)	ID #	Displaced Volume (yd ³)	Delivered Volume (yd ³)
							1	1.640	0.410	1	1.555	1.555	1	30.186	241149	1	0.349	0.314	1	2.137	0.033
							2	0.305	0.061	2	2.270	2.270	2	1.537	1.537	2	0.648	0.615	2	32.153	2.675
										3	0.688	0.688	3	2.675	2.675	3	0.004	0.002	3	1.850	1.110
										4	0.461	0.461	4	0.615	0.615	4	0.716	0.0	4	91.254	12.216
													5	73.348	29.339	5	0.267	0.013	5	2.234	2.234
Total Site Vol.								1.945	0.471		4.974	4.974	6	1.175	0.940	6	0.741	0.037	6	5.564	5.286
Road #	U06			N53.61			N53.61			N53.61											
Site #	10350			2010			2725			4800											
	ID #	Displaced Volume (yd ³)	Delivered Volume (yd ³)	ID #	Displaced Volume (yd ³)	Delivered Volume (yd ³)	ID #	Displaced Volume (yd ³)	Delivered Volume (yd ³)	ID #	Displaced Volume (yd ³)	Delivered Volume (yd ³)	ID #	Displaced Volume (yd ³)	Delivered Volume (yd ³)	ID #	Displaced Volume (yd ³)	Delivered Volume (yd ³)			
	1	3.949	3.949	1	0.148	0.148	1	0.156	0.156	1	0.024	0.024									
	2	0.606	0.606	2	0.079	0.079	2	1.069	1.069	2											
	3	0.233	0.0	3	0.098	0.098	3	6.807	6.807	3											
Total Site Vol.		4.789	4.556		0.325	0.325	4	0.085	0.085		0.024	0.024									
								8.116	8.116												

Project Problems Encountered and Resolution

There were several minor problems encountered with the implementation of this first set of wet weather inspections. The triggering event can be somewhat difficult to catch. It was found that the weather forecast for that particular day is not necessarily accurate. These decisions are always going to be judgment calls. We'll continue to strive to hit the storm triggers.

Most of the inspectors working on this project do not have an extensive background in road construction. In reviewing some of the erosion findings with the road manager, we decided that it would be beneficial to hold a more detailed training to discuss general road construction and provide a better baseline of knowledge for the inspectors.

There were several inspectors that observed bare mineral soil at the sites. We would ideally like to have inspectors take hay bales, seed, wattles, and a shovel to the wet weather inspection sites, if feasible. This would enable the inspectors to take corrective action when a problem is observed. This could help minimize additional trips to the site to implement the corrective action.

In the first large storm after construction, most of the water samples taken exhibited more than a 20% increase in value from the upstream to the downstream sample for a particular site. The significant turbidity increases may have been caused by these sites being recently constructed and flushing out sediment from operations during these first storms. We expect to see a decrease in the NTU's over time at these sites.

We were unable to compare the two wet weather inspections due to the difference in weather conditions. In the future, comparing the wet weather inspections should help us to find trends in the data that may enable us to evaluate the sites more clearly. We will continue to make improvements to streamline this process. We look forward to analyzing the trends that the sites exhibit over time, and use our knowledge to improve our practices.

Appendices

Appendix 1

2006 Work Plan Summary

Appendix 2

Copies of Post Activity Audit Field Sheets

Appendix 3

Copies of 2006 Photo Monitoring Field Sheets

Appendix 4

Copies of 2006 Wet Weather Inspection Field Sheets

Appendix 5

Copies of 2006 Water Quality Discharge Notifications Map

Appendix 6

Copies of 2007 Erosion Void Field Sheets

CD South Fork Elk River CAO R1-2004-0028_1

Copies of Electronic Files Containing Site Photos and Erosion Void Photos