

Memorandum

To: Dean Lucke
Assistant Deputy Director, Forest Practice
California Department of Forestry
and Fire Protection
135 Ridgway Avenue
Santa Rosa, CA 95401

Date: January 14, 2001

Telephone: (916)653-5843

From: Department of Forestry and Fire Protection

Subject: Elk River Peak Flow Analysis

The effects of past harvesting and an annual harvest of 600 clearcut equivalent acres on peak flows in the Elk River watershed are summarized in attached Tables 1, 2, and 3. These peak flow changes were determined using Equation 1 in Lisle et al. (2000). Factors considered in this approach are limited to canopy removal, watershed wetness, flow return periods, and number of years since harvest. Attached Table 4 provides an example of the spreadsheets that were used to calculate changes in flow.

Canopy removal values were based on harvesting levels included in past, recently approved, and currently proposed Elk River watershed THPs, as summarized in Table 5, with adjustments for different silvicultural treatments based on coefficients given in Lisle et al (2000).

Overall, these results support the general conclusion that canopy removal rates of up to 600 acres per year do not result in an increase in peak flow over current conditions.

References

Lisle, T., L. Reid, and R. Ziemer. 2000. Addendum: Review of Freshwater Flooding Analysis Summary. Report prepared by the USDA, Forest Service, Pacific Southwest Research Station in Arcata for the California Department of Forestry and Fire Protection, Sacramento, CA. 16 p.

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Lewis, Jack, S. R. Mori, E. T. Keppeler, and R.R. Ziemer. 2001. Impacts of logging on storm peak flows, flow volumes and suspended sediment loads in Caspar Creek, California. *In*: Mark S. Wigmosta and Steven J. Burges (eds.) Land Use and Watersheds: Human Influence on Hydrology and Geomorphology in Urban and Forested Areas. Water Science and Application Volume 2, American Geophysical Union, Washington, D.C., p. 85-125.

John R. Munn
Soil Erosion Studies
Project Manager

cc: Jerry Ahlstrom
Pete Cafferata
Clay Brandow
Bill Snyder
Ron Pape

ELK RIVER PEAK FLOW SUMMARY
January 14, 2002

Table 1: PRIOR YEARS PEAK FLOW INCREASE

Harvest Year	Return Period (yrs)	Wetness		Peak Flow Increase (%)
		Rating	Value	
1999	2	Average	304	4.66
2000	2	Average	304	4.02
2001	2	Average	304	3.67

Table 2: FUTURE YEARS PEAK FLOW ALTERNATIVES

Harvest Year	Return Period (yrs)	Wetness		Harvest Area (CCE ac.)	Peak Flow Increase (%)
		Rating	Value		
2002	2	Average	304	600	3.54
2003	2	Average	304	600	3.45
2004	2	Average	304	600	3.39

Table 3: RETURN PERIOD AND WETNESS EFFECTS ON PEAK FLOWS

Return Period (yrs)	Wetness Rating	Wetness Value	Peak Flow Increase (%)	
			2001 w/ no harvest	2002 w/ 600 ac CCE
2	Dry	50	10.25	9.88
2	Average	304	3.67	3.56
2	Wet	400	2.67	2.58
15	Dry	50	9.24	8.91
15	Average	304	2.67	2.57
15	Wet	400	1.67	1.61

Table 5: Elk River Combined Canopy Equivalent Acres
January 14, 2002

Treatments within Watersheds	Acres Harvested																	Pending	
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002		
North Fork Elk River																			
Clearcut Equiv.	0.0	0.0	2.4	133.0	24.2	83.3	63.1	261.3	406.3	294.4	75.5	89.9	0.0	0.0	6.2	6.2	6.2	757.7	
ST/SW Equiv.	0.0	0.0	1288.4	116.6	793.6	0.0	93.5	355.4	221.6	988.4	216.2	138.6	0.0	0.0	0.0	0.0	0.0	158.7	
Selection Equiv.	0.0	0.0	0.0	476.1	55.4	775.6	10.5	356.3	311.0	1042.6	503.8	30.9	159.3	41.5	0.0	0.0	0.0	648.4	
South Fork Elk River																			
Clearcut Equiv.	3.5	0.0	0.0	4.0	8.8	0.6	274.7	97.3	0.0	0.0	233.3	0.0	0.0	0.0	0.0	0.0	0.0	63.4	
ST/SW Equiv.	0.0	0.0	508.1	93.6	810.0	0.0	131.7	197.2	678.2	0.0	0.0	0.0	0.0	0.0	0.0	84.0	84.0	0.0	
Selection Equiv.	0.0	0.0	56.1	79.6	0.3	0.1	18.7	0.0	100.3	0.0	324.5	0.0	0.0	0.0	0.0	522.8	522.8	672.6	
Lower Elk River																			
Clearcut Equiv.	0.0	0.0	0.0	0.0	0.0	48.8	237.5	0.0	19.6	8.4	0.0	0.0	11.7	0.0	0.0	0.0	0.0	0.0	
ST/SW Equiv.	0.0	0.0	0.0	434.0	13.7	0.0	0.0	0.0	11.0	0.0	125.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Selection Equiv.	0.0	0.0	1.6	0.0	0.0	53.8	39.7	40.2	23.2	22.3	15.5	255.5	34.1	0.0	0.0	0.0	0.0	0.0	
Elk River Sum																			
Clearcut Equiv.	3.5	0.0	2.4	137.0	33.0	132.7	575.3	358.5	425.8	302.8	308.8	89.9	11.7	0.0	6.2	6.2	6.2	821.0	
ST/SW Equiv.	0.0	0.0	1796.5	644.1	1617.3	0.0	225.1	552.6	910.9	988.4	341.7	222.6	0.0	0.0	0.0	84.0	84.0	158.7	
Selection Equiv.	0.0	0.0	57.7	555.7	55.7	829.4	68.9	396.5	434.6	1064.9	843.7	809.1	193.4	41.5	0.0	522.8	522.8	1321.0	

