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**Effects of 1997 Debris Floods in two  
Klamath Mountain Streams: A Large  
Woody Debris Mass-Balance Approach**

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Large landslides and debris flows in January 1997 produced contrasting downstream debris flood effects in two adjacent Northern California Klamath Mountain streams. Valley morphology and riparian forests were examined on post-flood 1:3000 air photos along two approximately 8 km survey reaches. Survey reaches began near headwater landslides and continued downstream into third-order (5-10% gradient) valleys. Volumes of mature conifer large woody debris (LWD) and riparian LWD input to and stored in the flood channels were measured on air photos and in the field. Debris flows evolved into debris floods along these reaches and transported large volumes of LWD. Valley width and width of inundation by debris floods in Walker Creek and Tompkins Creek alluvial sections were comparable. However, debris floods removed considerably more of the riparian forest (mostly young *Alnus rhombifolia*) from the inundated zone of Walker (90%) than in Tompkins (61%). Similarly, more valley-stored sediment was mobilized in Walker, apparently causing more streamside landsliding. In contrast, 1997 deposits up to 2 m thick around intact riparian trees were observed along Tompkins. As such, inundated areas in Tompkins were often flood sediment-sinks, not sources.

We conclude that a greater volume of mature conifer LWD delivered to Walker Creek during debris floods removed more of the riparian forest and mobilized more valley-stored sediment than in Tompkins Creek. Sharp valley bends in upper Tompkins caused deposition of many large logs preventing them from being incorporated in downstream debris floods. Streamside landsliding and high terrace erosion along Walker provided additional large logs to debris floods. High terraces were mostly absent from Tompkins in 1997 due to 1964 flooding.