Large Woody Debris and Pool Dynamics in the Caspar Creek Experimental Watershed, Northern California[1]

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Although large woody debris (LWD) is now widely recognized as an important contributor to channel habitat, LWD dynamics are still poorly understood. This poster describes interim results of a study of inputs, breakage, transport, and decay of LWD in the mainstem channels in the two Caspar Creek Experimental Watersheds. LWD volumes and characteristics differ in the two reaches. Here we discuss possible causes for the differences, how the differences affect pools in the reaches, and what might happen to LWD in these reaches over time.

The two Caspar Creek experimental watersheds supported approximately 100-year-old second-growth redwood *(Sequioa sempervirens)* forest in 1968, when road building began for the first Caspar creek experiment. From 1971 to 1973, approximately 65 percent of the timber volume in the entire South Fork Watershed was removed in a series of selection cuts, with logs tractor-yarded to stream-adjacent roads. Twenty years later, 50 percent of the North Fork was harvested in a series of small clearcuts. Logs were cable yarded from ridgetop roads, and 100' selectively logged buffers were left along both sides of the mainstem.

LWD was inventoried in an 1800 m reach in the North Fork mainstem in 1986, 1994, and 1996, and in an equivalent reach in the South Fork in 1994 and 1996 (Keppeler 1996, O'Connor and Ziemer 1989, Surfleet 1996). In 1998, all recent LWD pieces >0.2 m diameter and 2 m long and all old LWD pieces >0.5 m^3 were tagged and measured in the two reaches. Those logs were resurveyed in 1999, and all pieces larger than the minimum new piece size were tagged at that time. Both reaches were remapped and remeasured in 2002 and 2004.

Since 1998, the volume of LWD in the North Fork study reach has remained more than twice that in the South Fork reach. We identified three potential causes for this difference. First, much of the existing wood in the South Fork channel was removed during the 1970s logging, and that LWD may not yet have been replenished. Second, there was significant blowdown along the North Fork in buffer strips left during the 1990s logging, and much of that wood entered the channel. Inputs into the South Fork channel during the same period were much lower. Third, since the 1970s logging, stands adjacent to the South Fork channel have not been capable of producing as much LWD as those along the North Fork. In 2004, trees within 100' of the South Fork channel were smaller and shorter than North Fork trees, and a higher proportion of the trees were species that are relatively resistant to blowdown

[1] This poster was presented at Redwood Science Symposium: What does the future hold? March 15-17, 2004, Rohnert Park, California
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(redwood) or fairly short-lived in the channel (alder).

We compared LWD volumes in the 800 m downstream subreach of each study reach to pool volumes in a 500 m section of that subreach (Lisle and Hilton 1999). Total pool volumes in the two reaches are similar, but pool LWD relationships differ. Most of the pool volume in the North Fork reach is in pools associated with second-growth LWD, and that proportion, as well as the total volume, increased from 1994 to 1996 in response to increased LWD from buffer strip blowdown *(fig. 1)*. In the South Fork, almost half of the pool volume is associated with residual old-growth pieces, and about 10 percent is in non-wood pools. Changes in second-growth associated pool volume appear to be related to changes in total LWD.

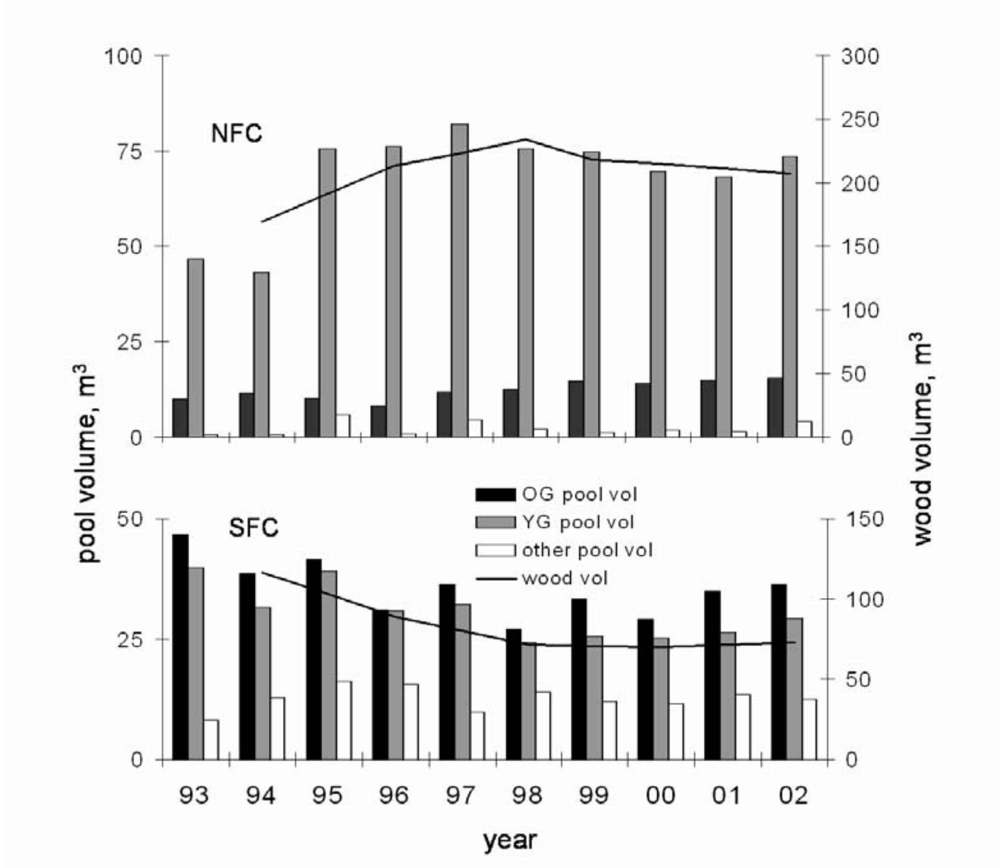

Figure 1—LWD Volume in the downstream 800 m of each study reach compared to pool volume in the downstream 500 m by type of pool each year, 1993 to 2002.

In the South Fork, 30 percent of all pieces and 16 percent of the volume was gone, moved, or broken from 1998 to 2004, although the total volume changed by less than five percent. In the North Fork, 24 percent of the pieces and 17 percent of the volume had changed, while the total volume increased, due primarily to input from snags. Monitoring continues at both tributaries. Data will be used to create a yearly wood budget for the channels, and will be used in combination with stand growth and wood input models to project the future of LWD in these reaches.

References

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