Abstracts

International Conference on Wood in World Rivers

October 23 - 27, 2000
Oregon State University
Corvallis, Oregon

http://riverwood.orst.edu

RECRUITMENT OF LARGE WOODY DEBRIS IN INCISING RIVERS: QUANTIFICATION AND APPLICATION. P. Downs and A. Simon. University of Nottingham, School of Geography, University of Nottingham, Nottingham, NG7 2RD, UK.

Recruitment of large woody debris in rivers may be controlled predominantly by episodic 'terrestrial' factors or by in-channel geomorphic controls related to the rate of bank erosion. Quantifying in-channel controls is rare because of the uncertainty in predicting lateral migration rates in actively meandering rivers. However, in incising rivers, a conceptual model relating the density of riparian trees to the knickpoint migration rate and bank stability analyses provides the basis for quantification. Through the Yalobusha River network, eleven sites just upstream of the major knickpoints have been analyzed. Knickpoint migration rates vary from 0 - 15.6 myr-1 based on approximately 30 months of monitoring. Geotechnical bank stability analyses predict from 1.8 - 31.5 m of channel widening as the knickpoints move upstream. Riparian conditions in 500 m2 plots on each bank upstream of the knickpoints range from 0 to 98 trees in each plot, averaging 0.18m diameter and 15m in maximum height. Annually, almost 100 trees are estimated to be recruited from the 11 sites, adding ~20 m3 wood yr-1. These results are used to rank contemporary and medium-to-long term potential for in situ channel blockages and the delivery potential to downstream constrictions, as an aid to prioritizing river channel management works.

INFLUENCE OF LARGE WOOD ON THE MORPHOLOGY AND DYNAMICS OF A 3RD ORDER MOUNTAIN STREAM, WESTERN CASCADES, OREGON. J. M. Faustini and J. A. Jones. Oregon State University, Geosciences Department, Corvallis, OR 97331, USA.

This study combined repeated cross section surveys over a 20-year period, streamflow data, and detailed mapping and wood inventories in two adjacent, contrasting stream reaches to examine the influence of large wood on channel morphology and channel response to peak flows in a 3rd order stream in the Western Cascades of Oregon. The upper reach flows through old-growth forest and contains abundant wood, while the lower reach was clearcut in 1964-65 and contains little wood. Large logs create distinctive, 1.5 to 3 m high steps in the longitudinal profile of the old-growth reach, which strongly affect local bed texture and slope-and, hence, habitat characteristics. In response to a 25-year flood in February 1996, the clearcut reach exhibited significant net scour and a marked coarsening of the channel bed, while the old-growth reach exhibited more modest scour interspersed with substantial deposition accompanied by fining of the bed upstream of wood structures, and no net change in bed elevation or particle size at the reach scale. Smaller peak flows (recurrence interval of 1 to 12 years) also produced greater response in the clearcut reach than the old-growth reach. The influence of wood on channel structure and response at the reach scale depends largely on the quantity and size of wood in the channel, but at finer scales it depends critically on the details of the location and arrangement of wood within the channel.

LONG-TERM CHANGES IN WOODY DEBRIS AND POOL HABITAT OCCURRENCE IN A CASCADIAN RIVER. R. Wissmar. School of Fisheries, 355020 University of Washington, Seattle, WA 98195, USA

This landscape analysis evaluates long-term changes in large woody debris (LWD) and pool habitat frequencies in a Cascadian river of Washington. Objectives include determining effects of LWD on pools in the main channel of the Beckler River basin (260 km2) and assessing opportunities for restoration of fish habitats. Data from the US Forest Service were used to evaluate LWD (31 cm diameter, >8 m in length) abundance and large pool habitat occurrence during 1980, 1989 and 1991. LWD and pools habitats were examined in seven contiguous reaches (2 to 4 km in length) along 20.1 km (96%) of the main river channel. After LWD removal from the channel for flood control purposes during the 1970s and in 1980, averages for all river reaches were 0.7 LWD pieces per 100 meters (100 m-1) and 1.3 pools 100 m-1. The LWD value is low in comparison to undisturbed regions of western Washington and southeast Alaska which can range from 7 to 41 LWD pieces 100 m-1. Average LWD increased to 3.3 pieces 100 m-1 and 6.2 pieces 100 m-1 in 1989 and 1991, respectively. However, pool numbers decreased to 0.24 and 0.02 pools 100 m-1 (1989 and 1991, respectively). Changes between 1980 and 1991 represent an 8-fold increase in LWD pieces in contrast to a 65-fold decrease in pools. This retrospective study indicates amounts of LWD are recovering to "natural" levels while pool conditions continue to degrade. Number of LWD and pools in the river channel can be attributed to the chronology of past management practices and natural disturbance events. This history includes timber harvest of old growth conifers on the valley floodplains (1930s-1950s), past forests fires, LWD removal from channels, and LWD and sediment transport and accumulation during six major floods between 1959 and 1990.