Abstracts

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LONG-TERM DYNAMICS OF LARGE WOOD IN A THIRD-ORDER CASCADE MOUNTAIN STREAM. S. V. Gregory[1], L. R. Ashkenas[1], R. C. Wildman[1], M. A. Meleason[1], G. A. Lienkaemper[2]. [1]Department of Fisheries & Wildlife, Oregon State University, & [2]United States Geological Survey, Biological Resources Division, Corvallis, OR 98771, USA.

Since 1985, we have been studying input, storage, decomposition and redistribution of large wood in 750 m of old-growth forest and 300 m of 30 year-old clearcut in Mack Creek, Oregon. Within this 1.1 km section of stream, all pieces of large wood (> 1 m long, > 10 cm diameter) are tagged and inventoried annually. Data collected include dimension, location, geomorphic position, and decay. Densities of large wood in the old-growth reach are 0.24 pieces/m^2, with volumes of 0.08 m^3/m^2. Densities and volumes in the clear -cut were significantly lower. Most of the wood was found in accumulations of three or more pieces; in the old-growth 29% were in full-channel-spanning jams. The long-term nature of the study has allowed us to measure rates of input, fragmentation and movement. Recruitment of wood to both channel and floodplain was highly variable, and more closely related to climatic events (windstorms, snowfall) than to discharge events. Rates of in-channel movement were generally low (<1%) in any given year, but during a 35-year flood (1996) 11% of the logs in the old-growth and 25% of those in the clearcut moved >10m. All pieces of wood that moved during the period of record were less than the width of the active channel, and most pieces that moved more than 300 m were less than 2 m in length. The interaction between channel geomorphology, hydrology and wood dimension determines overall dynamics of large wood in riverine ecosystems.

POSSIBILITIES TO RECONSTRUCT LONG-TERM CHANGES IN FLOOD DISTURBANCES IN THE BOREAL RIPARIAN ZONE. K. Jonsson. Mid-Sweden University, Sweden.

Introduction

The loading of large woody debris (LWD) is shown to be highly correlated with riparian forest composition (Hedman et al 1996) and disturbance frequencies (Fetherston et al 1995, Morgan and Smith 1997). The spatial and temporal environmental mosaic characterizing the riparian zone is obtained by such disturbances (Naiman and Décamps 1997, Ward 1997). The most important disturbance is considered to be flooding. Among other things flooding renews nutrients and creates new patches and substrates for colonization (Ward 1998). The magnitude of flood events has been shown to have significant effects on the input and structural durability of LWD (Naiman and Décamps 1997, Roper et al 1998, Bragg 2000). The balance that exists within riparian ecosystems as an interface between aquatic and upland ecosystems is easily disrupted when flooding and water level conditions are changed (Stockton and Fritts 1973).

In the northern part of Sweden enormous and rapid changes have taken place during the last 150 years (Nilsson 1997). The majority of riparian habitats have been affected by regulation of water-flow, usually in connection with hydroelectric power development (Nilsson 1984) or stream-cleaning. The changes in land-use have affected the run-off (Bren 1993, Lundin 1994) and probably also the frequency and the size of the floods (Morgan and Smith 1997), which in turn will affect the regeneration and turnover time of floodplain vegetation (Hughes 1997). Linder and Östlund (1998) shows that the number of dead standing trees in the boreal forest has decreased markedly since the late 1800s. Together this will have a great influence on the input of large woody debris and alter the natural dynamics as well in the streams (Morgan & Smith 1997) as in the riparian zone. During the last 10-20 years there has been an ongoing debate about decreased fishing, increased number of floods and changes in water chemistry. There are a number of possible explanations for these changes, and to be able to take the correct measures to improve the situation it is important to have knowledge of the situation both before and after the these changes (Harding et al 1998). Since flooding has such a great impact on both the riparian zone and the stream morphology it is interesting to study the long-term changes in size and frequency. This on-going study is concentrating on the possibilities to use tree-rings to calculate long-term changes in river flow and flood-frequencies in the Swedish boreal zone.