Longitudinal Distribution of Wood along Headwater Streams in the Colorado Front Range

Ellen Wohl and Kristin Jaeger
Department of Geosciences, Colorado State University

Abstract. Wood loading, channel parameters, and valley parameters were surveyed in 50 contiguous stream segments each 25 m in length along 12 streams in the Colorado Front Range. Length and diameter of each piece of wood were measured, and the orientation of each piece was tallied as a ramp, sunken, bridge, or floater. These data were then used to evaluate basin- and local-scale controls on wood loading, as well as longitudinal patterns of wood distribution in forested headwater streams of the Colorado Front Range. We hypothesized that wood would be non-uniformly distributed as a result of the presence of wood jams and greater numbers of individual pieces in some segments of the stream, and that the degree of non-uniformity would vary among channels in correlation with variations in channel width, gradient, and drainage area as these parameters reflect relative capacity of a stream to transport wood introduced from the adjacent riparian zone and valley bottom. Analyses of the longitudinal uniformity of wood distribution are ongoing. Multiple regression models to evaluate controls on wood loading used either a stream-wide average or data from all 50 segments on each stream. Models that used an average for each of the 12 streams indicated that wood loading correlates most strongly with drainage area, average slope, channel width, and elevation. When all 600 stream segments were included in the multiple regression, the presence of a jam, diameter at breast height (DBH) of trees in the riparian zone, channel width, and stream gradient correlate most strongly with wood loading. Trends in sets of analyses indicate that wood loading is higher for smaller drainage areas, steeper stream gradients, narrower channels, higher elevations, the presence of a jam, and greater DBH values. Each of these correlations is physically reasonable in that smaller drainage areas and narrow channels likely have lower transport capacity, steeper streams and those with jams are hydraulically rougher and have more obstacles to wood transport, and higher elevations in the study area correspond to greater forest density.