

TRADITIONAL POSTER ABSTRACT

Title: Relationships Between Watershed, Stream Characteristics and Channel Forming Discharge in Snowmelt Dominated Streams

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Topic: Channel Forming Flow in Snowmelt Domination Streams

Abstract: The selection of an appropriate design discharge that best approximates the channel forming discharge is critical to channel design and dictates the success of restoration projects in improving stability and water quality. Channel forming discharge is defined as the theoretical discharge that if constantly maintained in an alluvial stream over a period of time will produce the same channel geometry that is produced by the long-term hydrograph, and it is often estimated as the bankfull, effective, or recurrence interval discharge. The determination of the channel forming flow often focuses on the physical and erosional characteristics of the stream at a reach scale (analyzing sediment transport characteristics or identifying bankfull indicators). However, with wide variability in streamflow and flood timing across regions, it is critical to examine hydrologic and watershed characteristics (e.g., rainfall, snowfall, geology, soil type, land use, basin topography) and their relationship to channel forming flow. A past investigation was conducted by an MS graduate student at the University of Wyoming to determine relationships between channel forming discharge and hydrologic and watershed characteristics for snowmelt dominated streams in Wyoming and Colorado. Significant relationships between bankfull/effective discharge and watershed and hydrologic characteristics were determined and presented as descriptor equations. In particular, it was determined that certain characteristics directly related to snowmelt hydrology and runoff (e.g., drainage area above 9000 ft and snow water equivalent) are most significant in describing bankfull and effective discharge. The current study was conducted to provide a verification data set for testing the bankfull discharge equation produced in the previous study. Watershed and stream characteristics at snowmelt dominated stream sites in Washington and Idaho were collected and used to verify the previous descriptor equation for bankfull flow. The result is a predictor equation for bankfull discharge in snowmelt dominated streams that is based on drainage area above 5000 feet, snow-water equivalent, and the geometric mean diameter of the stream surface material. This equation is presented for use as an additional means for determining bankfull discharge for snowmelt dominated streams in the Rocky Mountain Region and the Pacific Northwest. Overall, the results of this study provide the key regional characteristics of snowmelt dominant systems that are important when determining the bankfull discharge for stream restoration projects.