

A detailed investigation of the morphological impact of in-stream remediation structures on Mill Brook, Kings County, Nova Scotia

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In the summer of 1995, a hydrogeological study was conducted on Mill Brook, a tributary of the Cornwallis River. Mill Brook is about 10 km long and draws from a watershed of 45 km². The brook has an average flow of 5 cm/s, cross channel width of 8.5 m and can be characterized as a free-stone creek with a traction load clast size-range of silt (<0.1 cm) to cobble (20 cm) size. The natural channel morphology of Mill Brook has been altered significantly resulting in loss of salmon and trout spawning habitat. In-stream structures (digger logs and deflectors) were installed in July and August 1995 in an effort to re-establish the original channel pattern of the river.

Research focused on a detailed examination of the impact on stream morphology of the in-stream structures. It was found that the ability of the in-stream structure to alter river bed morphology is dependent on the dimensions and

orientation of the structure itself, the bed composition of the river (bedrock, freestone or sand) and flow velocity and depth. Stream bed monitoring stations were installed at three of the modification structures. Within one month of installation the development of a subtle thalweg was observed and sand and silt-sized sediment was absent from the bed load. These observations were made while the stream was at low stage indicating that further re-organization of the stream bed can be expected. These changes occurred during low water conditions indicating that the structures have the potential to transport larger substrate at higher rates. The effectiveness of in-stream structures is dependent on a detailed understanding of the system in which they are to be employed. The information collected in this study will serve to guide further remediation efforts.