The Interactive Effect of Substrate Sand Content and Hydraulic Gradient on the Depth of Infiltration of Fines

Leonora King

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Department of Geography, McGill University

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ABSTRACT

Infiltration of fine sediment (<2mm) into river substrate has been documented to have deleterious effects on the survival and emergence of salmonid embryos. This research was designed to provide insight into two factors that control infiltration of fines in the very fine sand to silt size range into substrate – hydraulic gradient of water across the substrate and substrate composition, in particular the sand filter or clogging layer. The research was conducted in three parts. The first two parts were designed to assess the impact of hydraulic gradient and sand content on the infiltration of fine sediment. The experiments showed that infiltration amounts were inversely related to both. The third and final experiment was to use the relationships demonstrated in the first two experiments to explain the natural patterns of substrate found in a trout stream, by analyzing the vertical composition of freeze cores taken from that stream. The effect of hydraulic gradient was not obvious in the natural substrate, and clogging layers were only present in one of the cores. The composition of the gravel framework was the most important factor determining the infiltration of fines.

Leonora King: leonora.king@mail.mcgill.ca

Supervisor: Michel Lapointe, michel.lapointe@mcgill.ca