

# **The “Threshold” of Habitat: Spawning Salmon in a Restored Threshold Channel**

**Jeff Muirhead<sup>1</sup>,**

<sup>1</sup>*Stantec Consulting Ltd., Waterloo, Ontario, Canada*

Many stream restoration projects in North America are situated in urban or semi-urban environments. Urban development reduces the amount of coarse bedload supplied to receiving watercourses. Restoration designs for these receiving streams must account for the decreased bedload. However they must also minimize the risk to nearby infrastructure by maintaining channel planform and profile over a wide range of flood flows. Threshold channel design is a type of Natural Channel Design (NCD) which can be applied to maintain channel plan and profile under decreased bedload conditions. Threshold channels can achieve this stability through the installation of grade control riffles consisting of particles of sufficient size to withstand mobilization under flood conditions.

Restoration designs for these receiving streams are often also required to provide aquatic habitat to compensate for development activities. Whether or not the larger particles in a threshold channel can provide sufficient aquatic habitat has been a topic of debate between regulators and designers alike, resulting in difficulties meeting both biological and hydraulic/geomorphic objectives. Here, we present an instance of salmon migrating and spawning in a threshold channel. It is an excellent example of restoration design success from a biological perspective and as a starting point for discussion between biologists, geomorphologists, and river engineers.