

Day Two - Track Two

Thursday, March 23rd, 2017

10:00 a.m. – 10:30 a.m.

The Riffle – An Allegory of the Practice of Natural Channel Design in Ontario

Presenter: Mark Hartley, MMM Group

Biography



Mark has been working in the fields of natural channel design and flood-erosion hazard assessments and mitigation for almost 30 years. He started working in rivers in 1987 as a stream rehabilitation technician and has developed a keen awareness of the form and function of watercourses and their interactions with municipal infrastructure as his career evolved from fisheries biologist to river engineer. He has considerable experience working in urban environments and creating watercourses with natural features that support thriving aquatic and riparian communities..

Abstract

It is well known that rivers are complex systems that are a product of the interaction between flowing water and the boundary sediment (Lane 1955). It is also known that natural channels form characteristic bedform sequences that are diagnostic of the balance of the dynamic river forces. One of the characteristic bedforms of the low-gradient, gravel bed river is the riffle. The evolution of the identification, design and construction of the riffle over time with emphasis on its recognition in various provincial guidance documents and its use in the practice of natural channel design will be presented. An evolutionary time line of the riffle will be illustrated and will include the “before-Rosgen” and “Boulder” Eras as well as the “Transition” and “Enlightenment” Ages. The roles that the availability and timing of design guidelines from three different provincial ministries, including the Ministry of Natural Resources (pre-MNRF), Ministry of Environment (pre-MOEC) and Ministry of Transportation, plays in this evolutionary time line will be discussed. Finally, it will be shown how the riffle is viewed from the three disciplines typically involved in natural channel namely the biologist (benthic and fish habitat), geomorphologist (bedform feature) and engineer (grade control structure).

Learning Objectives

1. Raise awareness of the significance of the riffle in the design of natural channels;
2. Summarize design parameters currently provided in local design guidelines; and
3. Demonstrate how the riffle can provide a strong link amongst disciplines involved in natural channel design.