

Erosion and Runoff Mitigation for Water Quality Enhancement for a Rural, Northern Ontario Community

Ed Gazendam¹, Ph.D., P.Eng.
John McDonald², M.Sc.

¹*Water's Edge Environmental Solutions Team Ltd. Cambridge, Canada*

²*Matrix Solutions Inc. Mississauga, Canada*

Callander Bay is a confined bay at the east end of Lake Nipissing, just south of North Bay, Ontario. It is the municipal drinking water supply for the Town of Callander and has elevated levels of phosphorus, increasing the risk of blue-green algae blooms, which have the potential to produce toxins, degrading water quality and safety. Although it has been found that current application of phosphorus to the surface (fertilizer/manure) is quite low, high levels of phosphorus coincide with turbidity following flood events. Phosphorus binds to soil particles which are supplied to the system by entrainment processes of surface runoff or channel erosion. It has a subwatershed area of approximately 285km², and includes portions of several communities.

The North Bay Mattawa Conservation Authority (NBMCA) initiated this study to understand local runoff and river process which provided the opportunity to identify potential mitigation strategies. These strategies require landowner engagement and participation through ongoing stewardship programs by the NBMCA, and the support of local municipalities in their construction and maintenance programs.

Given the large size of the contributing area, limited site access, and the necessity to develop strategies in a timely manner, the project approach relied on desktop analyses with rapid field investigations (windshield assessments), community and agency interaction, and select detailed surveys. Recommendations had to consider budgets, limited funding, and ease of application. Therefore only a few major rehabilitation projects were recommended, while other low-cost and low-maintenance, basin-wide strategies were proposed that landowners and municipalities could implement under the direction of the NBMCA including: buffer strips, floodplain creation and naturalization, bioengineering and planting plans, culvert sizing, and typical erosion and sediment control applications. Successful demonstrations and ongoing community outreach will be essential factors in achieving water quality objectives.

Biography

Ed Gazendam is the President of Water's Edge, a private consulting firm offering fluvial geomorphological and natural channel design expertise to public and private clients. He has over 20 years of experience in stream restoration and watershed projects in both the private and public sectors.

Ed holds Bachelor, Master and PhD degrees from the University of Guelph. Ed has had specialized training in applied fluvial geomorphology, open channel hydraulics and natural channel design and is registered with the Professional Engineers of Ontario and the Canadian Society of Civil Engineers (Hydraulics).

Ed is currently a Director with the Canadian Water Resources Association – Ontario Branch. He is also an active member of the provincial Natural Channels Initiative Committee and was a co-chair of the 2010 Natural Channel Conference.

John McDonald is an environmental consultant at Matrix Solutions Inc. specializing in fluvial geomorphology. In 2011, he completed his M.Sc. in Geography at the University of Western Ontario, focusing on the morphological response of Highland Creek in Scarborough, Ontario to urbanization. Over the past 6 years as a consultant, John has applied his knowledge of fluvial geomorphology in practice, and gained experience in natural channel design, hazard assessments, subwatershed studies, and public and agency consultation, primarily in Southern Ontario.