A Software Platform for Integrated Monitoring and Modelling of Stream Restoration Projects

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Environmental data has been assembled and used for monitoring and modelling by researchers, consultants and government agencies and NGOs for many decades to explain, explore, and predict environmental-system response to natural and human-induced stressors. Unfortunately, the original data may be kept by the organization doing the monitoring and modelling, but is usually not made widely available, while the results are usually confined to paper reports and are not easily accessible. This issue is a particular problem for monitoring in-stream river restoration projects, where the system response may not be clear until many years later. The lack of monitoring standards and the lack of a central repository for cataloguing and accessing such data means that valuable historical and cumulative effects data is lost to the natural channels community. Without such data it is difficult to understand our successes and failures and predict future impacts. Can we do better?

This talk describes an open environmental data platform called iEnvironment that is operational and continuously being developed to store both historical monitoring and modelling data and the results of modelling. The existing platform consists of data, application and user interface layers connected by APIs and supported by tools for automated acquisition and maintenance of both archival and new environmental data. As of January 2017, the platform contains records about flowing water in Ontario spanning every year from 1971 to the present. As well the system supports 17 study types including: Benthics, Fish, Channel Morphology, Channel Stability, and Discharge. This platform is currently used by over 50 research groups, mostly in Ontario, but from as far away as British Columbia. Next stages of iEnvironment will support a decision support and reporting system for river networks, Ontario brook trout status and data from the Community Aquatic Monitoring Program (CAMP) supported by the Department of Fisheries and Oceans. In this talk we further propose that this system be adapted to collect and support the analysis of information from restoration and stream monitoring projects.

Biography

Doug Mulholland is the technical manager for the Computer Systems Group at the University of Waterloo and for the Centre for Community Mapping ("comap.ca"), a not-for-profit UW spin-off. He graduated from the University in 1982 (B. Math) and has been involved in many of these groups' projects over the years, ranging from mainframe enterprise systems in the 1980s to cloud-based mobile apps involving distributed databases, social networking and advanced mapping facilities more recently. Many of the systems were based around observed needs in the community, such as volunteerkw.ca - a system for helping agencies that require volunteers and potential volunteers in the community to connect. Since 2008 Doug has lead the environmental information systems projects at CSG, including the Flowing Waters Information System (FWIS) and the Stewardship Tracking System (STS) in partnership with the Ontario Government, several conservation authorities and numerous other stewardship organizations.