

DEVELOPING A GIS-BASED INTEGRATED MODELLING INTERFACE FOR WATERSHED EVALUATION OF BMPs (WEBS)

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Published January 2016

WHY DID WE DEVELOP THE WEBS GIS TOOL?

It is important to examine economic costs, water quantity/quality benefits and cost effectiveness of agricultural beneficial management practices (BMPs) at a watershed scale in order to understand their impact across the watershed, and to identify and target key areas with the highest potential impact. While farm economic, watershed hydrologic and integrated economic-hydrologic models contribute to our understanding of spatial variations and tradeoffs of BMP costs and benefits, they are typically very complex and not user-friendly for conservation practitioners to examine various scenarios of agricultural BMPs and improve cost effectiveness. User friendly tools are needed to fill this gap.



HOW DOES THE WEBS GIS TOOL WORK?

The (2013-2014) project team developed an interactive, open source GIS-based interface for the evaluation of BMPs across the watershed. This interface was applied to the Gully Creek watershed and assessed four representative BMPs, including conservation tillage, nutrient management, cover crop and water and sediment control basin.

The tool allows users to:

- Construct what if scenarios, including the implementation of one or multiple BMPs at one or multiple locations.
- Run the models and examine economic costs, water quantity/quality benefits, and cost effectiveness of BMPs using maps, charts, and tables.
- Develop BMP policy/management scenarios based on environmental targets or financial constraints.

WHAT ARE THE BENEFITS FOR USERS OF THE WEBS GIS TOOL?

The development of this tool is one of the first efforts in Canada to make complex modelling operational for watershed evaluation of agricultural BMPs. It has the potential to be transferred to other watersheds, based on three key steps:

- Basic datasets need to be prepared for topography, land-use, land management, soil, climate, water quantity and quality, and BMPs.
- Farm economic, watershed hydrologic and integrated modelling need to be set up, calibrated and validated.
- The open source GIS interface needs to be transferred to the new study site by linking the three modelling components with the interface and redeveloping the associated databases, and analysis and visualization functions.

Moving forward, the WEBS GIS tool should be expanded to include more BMPs for use in other watersheds across Canada. An online version of the tool could be developed to communicate to the public about the economic costs, environmental benefits, and cost effectiveness of agricultural BMPs.