

Watershed Evaluation of BMPs (WEBs) An Overview of the Thomas Brook Watershed Project

The Annapolis Valley of Nova Scotia is home to a large percentage of the province's tree fruit, berry crop and vegetable production units. Like many areas in Atlantic Canada, agriculture in this region is facing considerable environmental challenges resulting from both urban encroachment into rural areas and an increase in intensive livestock operations. Potential impacts to surface and groundwater quality include phosphorous enrichment, large-scale pathogen transport, nitrate leaching, and recharge of surface water from contaminated groundwater.

WEBs, the Watershed Evaluation of Beneficial Management Practices (BMPs), is a four-year national project designed to examine the use of BMPs – individual and combined – to mitigate surface water and groundwater quality issues. BMPs are farming practices designed to minimize potential impacts of agricultural activities on the environment. The economic impacts of incorporating BMPs are also being measured. To date, the effectiveness of BMPs has been tested primarily on plots or small fields. Through WEBs, the effects of BMPs are being evaluated at a micro-watershed scale on seven small watersheds across Canada. The results will be extrapolated to somewhat larger watersheds using appropriate modelling techniques.

WEBs projects are being undertaken with the participation of the landowners/producers in each watershed. Funding is provided largely through Agriculture and Agri-Food Canada's Greencover Canada program, with Ducks Unlimited Canada a major funding partner.

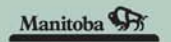
The Thomas Brook Watershed

The 760 ha Thomas Brook Watershed is located north of the town of Berwick, Nova Scotia. Thomas Brook is a small stream, with a main channel less than six kilometres long and rarely wider than two metres. The stream flows through valley farmland before discharging into the Cornwallis River, a major watershed for the Annapolis Valley. There are a variety of soil types within the Thomas Brook Watershed. Land uses include intensive agriculture and rural residential development. In addition to tree fruit, berry crops, and vegetables, other cropping includes corn, soybeans, and grains.

Why Study BMPs in the Thomas Brook Watershed?

The Thomas Brook Watershed is well suited for a WEBs project. Historical data is available from a comprehensive three-year surface water quality monitoring program which included the establishment of a network of five gauging stations within the watershed. This baseline information will assist in the strategic implementation of a series of BMPs. GIS inventories of the watershed are also available, including comprehensive aerial electro-magnetic imagery (LIDAR) for a digital elevation model, land use inventories, and soil mapping.

A background study on the Thomas Brook Watershed has identified surface water quality concerns at certain locations within the watershed. These concerns involve both E. coli and phosphorous loading. Loading sources are a mix of residential and agricultural. Recent investigations have also determined that high nitrate-nitrogen concentrations in groundwater can seep into surface waters during the summer months.



The Thomas Brook Study Approach

The watershed has been divided into four zones. BMPs will be implemented within two zones, while the remaining two will act as control zones. This, combined with the previous three years of monitoring, will allow comparisons to be conducted before and after BMP implementation. The effectiveness of the following three BMPs is being tested within the Thomas Brook Watershed:

- 1. Nutrient management plans (NMPs)** are being implemented with producers within one zone of the watershed to reduce nutrient loading to Thomas Brook. Soil sampling is being used along with cropping plans to determine appropriate nutrient application rates. Field monitoring will also be used to evaluate the effectiveness of this approach.
- 2. Farmyard runoff management** is being used to reduce and/or treat the amount of manure-contaminated runoff entering the watercourse. Diverting runoff away from manure-contaminated areas will reduce nutrient loading to the stream. Without diversion, runoff volumes can be too large for practical containment or treatment options. Other containment or treatment options may be considered at a later date.
- 3. Reduced stream access for cattle** through fencing and off-stream watering will reduce direct manure contamination and minimize streambank disturbance.

The Thomas Brook watershed study currently includes seven monitoring sites, four with automated flow sampling equipment, as well as two automated weather stations. In conjunction with Natural Resources Canada (Geological Survey of Canada), a series of wells will assist in monitoring potential nitrate-nitrogen contributions to groundwater. Additional sampling will be conducted at critical times and locations as the project proceeds.

In addition, cropping practices data will be collected and the costs of BMP implementation and maintenance will be determined.

Who is Involved?

The Thomas Brook project is being led by Agriculture and Agri-Food Canada and [Nova Scotia Agricultural College](#). Support is also provided by the [Nova Scotia Federation of Agriculture](#), [Nova Scotia Department of Agriculture and Fisheries](#), [Dalhousie University](#), the [Applied Geomatics Research Group](#) of the [Centre of Geographic Sciences](#), and the [Geological Survey of Canada](#). The local landowners are also a critical part of the project through their participation and cooperation with BMP implementation and evaluation.

Additional Information

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To find out more about the WEBS project in general, visit the [Greencover Canada Website](#) at: www.agr.gc.ca/env/greencover-verdir, or contact:

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