

# Watershed Evaluation of BMPs (WEBs) An Overview of the Lower Little Bow Watershed Project

The occurrence of sediment, nutrients and pathogens in surface water is a water quality issue within Alberta and throughout Canada. Agriculture can be a significant contributor of these contaminants.

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 sediment and runoff issues related to surface water quality. 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 Lower Little Bow Watershed

The 55,664 ha Lower Little Bow River Watershed is located within the Oldman River Basin in the south-western portion of Alberta. The WEBs project within the Lower Little Bow will focus on a micro-watershed (2565 ha) a short distance north of Lethbridge.

Land use in the Lower Little Bow includes a wide range of agricultural activities and intensities such as cow-calf operations on native range, dryland farming, intensive irrigated row-crop farming, and intensive livestock operations. Surficial geology consists mainly of glacial till. The upland terrain is hummocky with poorly-defined to well-defined knobs and kettles.

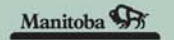
Soils in the watershed are primarily Orthic Dark Brown Chernozems, with some Orthic Brown Chernozems and Regosolic soils. The climate is dominated by strong chinook winds. Average annual precipitation is about 386 mm, of which approximately one-third falls as snow.

## Why Study BMPs in the Lower Little Bow Watershed?

The micro-watershed selected for study is well suited to the implementation of a WEBs project. Nutrients from manure and fertilizers, and bacteria from manure, are believed to be impacting water quality in the Lower Little Bow. Considerable associated background information is available on this watershed, much of it collected during the Oldman River Basin Water Quality Initiative (now Oldman Watershed Council).

Since 1999, Alberta Agriculture, Food and Rural Development (AAFRD) has quantified phosphorus, nitrogen, fecal coliforms and E. coli in surface runoff at ten monitoring stations along the Lower Little Bow River. Runoff from a micro-watershed within the basin has also been studied by AAFRD since 2002 as part of the provincial soil P-limits (phosphorus) study.

A local producer organization, the Lower Little Bow River Watershed Group, has also been active in the area since 2001.



## The Lower Little Bow Study Approach

The study is focused on evaluating the effect of five individual BMPs on surface water quality:

1. **Buffer strips** – the combined effect of vegetation type and buffer width on runoff water from irrigated fields will be evaluated using in-field buried runoff collectors.
2. **Manure management** – manure application based on nitrogen (N) versus phosphorus (P) plant uptake, with treatments geared to meet annual N uptake of crop, annual P uptake of crop, and P uptake for three years.
3. **Off-stream watering with fencing** – an 800 m reach on either side of the river has been fenced to eliminate cattle access to the riparian area, and an off-stream watering system installed. Water quality is being monitored upstream and downstream of the fenced area.
4. **Off-stream watering without fencing** – a winter and summer pasture used by 500 head of cattle will have an off-stream watering system installed. Water quality in the river before and after BMP implementation will be evaluated. A rainfall simulator may also be used to generate runoff adjacent to the river.
5. **Conversion of annual cropland to forages** – changeover will be evaluated on two irrigated barley fields adjacent to the river. A rainfall simulator may be used to generate runoff in the fields prior to and after conversion. Water quality of barley runoff will be compared to forage runoff.

The quality of the Lower Little Bow River will be evaluated before and after BMP implementation, and the individual effects of these BMPs will be evaluated so far as is practical.

The watershed in this study is unique because flow in the Lower Little Bow River is controlled by an irrigation reservoir and the watershed contains a wide range of agricultural practices.

The costs and benefits of the BMPs implemented will be evaluated using economic analysis to determine the most cost-effective BMPs using a “least cost per unit of water quality improvement” approach.

## Who is Involved?

The multidisciplinary study team consists of scientists and staff from Agriculture and Agri-Food Canada; [Alberta Agriculture, Food and Rural Development](#); [County of Lethbridge](#); [Department of Fisheries and Oceans Canada](#); the [University of Alberta](#); and [Ducks Unlimited Canada](#).

This WEBS project will maintain a strong linkage with the Rural BMP Team of the Oldman Watershed Council.

## Additional Information

For more information on the Lower Little Bow Watershed project, please contact:

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

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