

Watershed Evaluation of BMPs (WEBs) An Overview of the Salmon River Watershed Project

British Columbia's Salmon River Watershed has long been home to the cornerstone industries of agriculture – livestock in particular – and forest harvesting. However, in conjunction with expanding urban development, these two industries can have a negative impact on water quality in the Salmon River by contributing to sediment, nutrient, and pathogen loading. In the case of agriculture, the implementation of improved management practices to reduce the impact of livestock on water quality will clearly benefit the watershed.

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 Salmon River Watershed

The Salmon River, located in the Fraser River Basin, is a major contributor of water to Shuswap Lake in south-central British Columbia's dry Interior Plateau. The river is about 150 km long and drains a 1,500 km² area. Peak stream flows occur during April, May and June, with low flows from late summer and through the winter. Forest harvesting, agriculture and urban development have been steadily increasing along the river and river valley in recent years.

Dairy farming, beef ranching, and forage crop production are the most common agricultural activities in the watershed. Most of the approximately 325 farms have cattle and use irrigation water from the Salmon River to produce forage for winter feeding.

Why Study BMPs in the Salmon River Watershed?

Cattle from the ranches in the Salmon River Watershed normally graze in the uplands from late spring to early fall and spend the winter adjacent to the river, where they are fed and calving takes place. With cattle concentrated adjacent to the river during wintertime, riparian areas can be negatively impacted. Without proper fencing, off-stream water supply and controlled cattle access, nutrient, pathogen and other contamination of the Salmon River can occur through surface runoff, groundwater seepage, soil erosion, sedimentation, and from direct cattle access to the river.

Water quality data have been collected for more than 25 years in the Salmon River Watershed. Data indicate that water quality challenges continue and that conditions are not improving. Current water quality does not fully support the designated water uses in the watershed and is compromising the health of the valuable salmon fishery.

An effective water quality monitoring and meteorological infrastructure already exists within the watershed. The Salmon River Watershed Roundtable has been working toward watershed sustainability since 1993. Activities have included watershed planning, stream and bank restoration, and water quality and quantity monitoring. The organization is comprised of representatives from landowners, forestry and other industries, First Nations communities, various government agencies, and non-government organizations.



The Salmon River Study Approach

WEBs will test the effectiveness of two key BMPs in the Salmon River Watershed:

1. **Restricted livestock access** – At each of three sites, a portion of the pastured riparian area has been fenced to exclude cattle access while a downstream, adjacent portion remains unfenced. The impact of cattle on water quality and the riparian zone itself will be evaluated by comparing data from the fenced area with that of the unfenced area. Controlled cattle crossings will also be installed where required.

Water quality sampling will take place at staged locations – on the upstream end where the river enters the fenced riparian area, midstream at the point where the river leaves the fenced area and enters the unfenced riparian area, and at the downstream end of the unfenced area.

2. **Off-stream watering** – Off-stream watering systems have been installed at each of three sites in winter feeding areas which have been relocated away from an unfenced portion of the river. The impact these watering systems have on encouraging cattle to avoid the river, the associated redistribution of manure away from the river and the effect on water quality will be measured.

The greatest impact of the beef industry on nutrient, bacterial and sediment loading to the Salmon River likely occurs during the winter months, from late fall to late spring. During this period, stream flows are low and cattle are concentrated near the river. As a result, contaminant sampling will be intensified during that time period. Water chemistry, microbiology, sediments, and stream flow will be measured, and riparian soil and vegetation conditions will also be assessed. Both overland transport of contaminants into the river, as well as in-stream contamination, will be monitored.

Who is Involved?

The WEBs multidisciplinary team is led by scientists and staff from Agriculture and Agri-Food Canada, with participation from: British Columbia Ministry of Agriculture, Fisheries and Food (now the [British Columbia Ministry of Agriculture and Lands](#)); British Columbia Ministry of Water, Land and Air Protection (now the [British Columbia Ministry of Environment](#)); [Ducks Unlimited Canada](#); the [Salmon River Watershed Roundtable](#); [Environment Canada](#); the [University of Victoria](#) and the cooperating landowners/producers.

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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