

# Whelp Creek Sub-Watershed

July 2008

## Towards Improved Water Quality in Whelp Creek

This document provides an update on the preliminary 2008 Whelp Creek Sub-Watershed water quality results and what is being done to understand and reduce impacts on the water quality. The connection between the Whelp Creek and Lacombe Lake is also discussed below.

### What water quality data are currently being collected in Whelp Creek?

Alberta Agriculture and Rural Development (ARD) initiated a 5-year study, "Nutrient Beneficial Management Practice Evaluation Project 2007 to 2011". As part of this study, a sub-watershed of Whelp Creek was selected. Water was occasionally sampled at several locations in 2007 for preliminary study analysis. In 2008, 20 water quality monitoring stations were established in partnership with interested farmers and landowners. Water samples are being taken from spring snowmelt to winter freeze up, as long as the creek is flowing. Water sampling is more frequent when surface runoff occurs. Samples are being analyzed for phosphorus, nitrogen, and bacteria.

### What is the quality of water in the Whelp Creek Sub-Watershed?

Water quality is greatly influenced by weather and is naturally highly variable. Thus, in order to determine water quality properly, a large number of water samples needs to be taken during a wide range of weather conditions and for several years.

Preliminary assessment of 2008 water quality at the outlet of the Whelp Creek Sub-Watershed indicates that water quality is variable, but generally exceeds the total nitrogen and phosphorus water quality guidelines for the protection of aquatic life. Like other agricultural streams in Alberta, bacteria counts in Whelp Creek tend to be the highest in the warm summer months.

### What about bacteria?

**Total Coliforms:** A group of closely related, mostly harmless bacteria originating from many different sources such as soil, vegetation, sediment, and animal waste (livestock, wildlife and humans).

**Fecal Coliforms:** A subset of total coliform bacteria that are found in the gut of warm blooded animals. The presence of fecal coliforms indicates that the water may have been contaminated with feces, which could be of livestock, wildlife, or human origins.

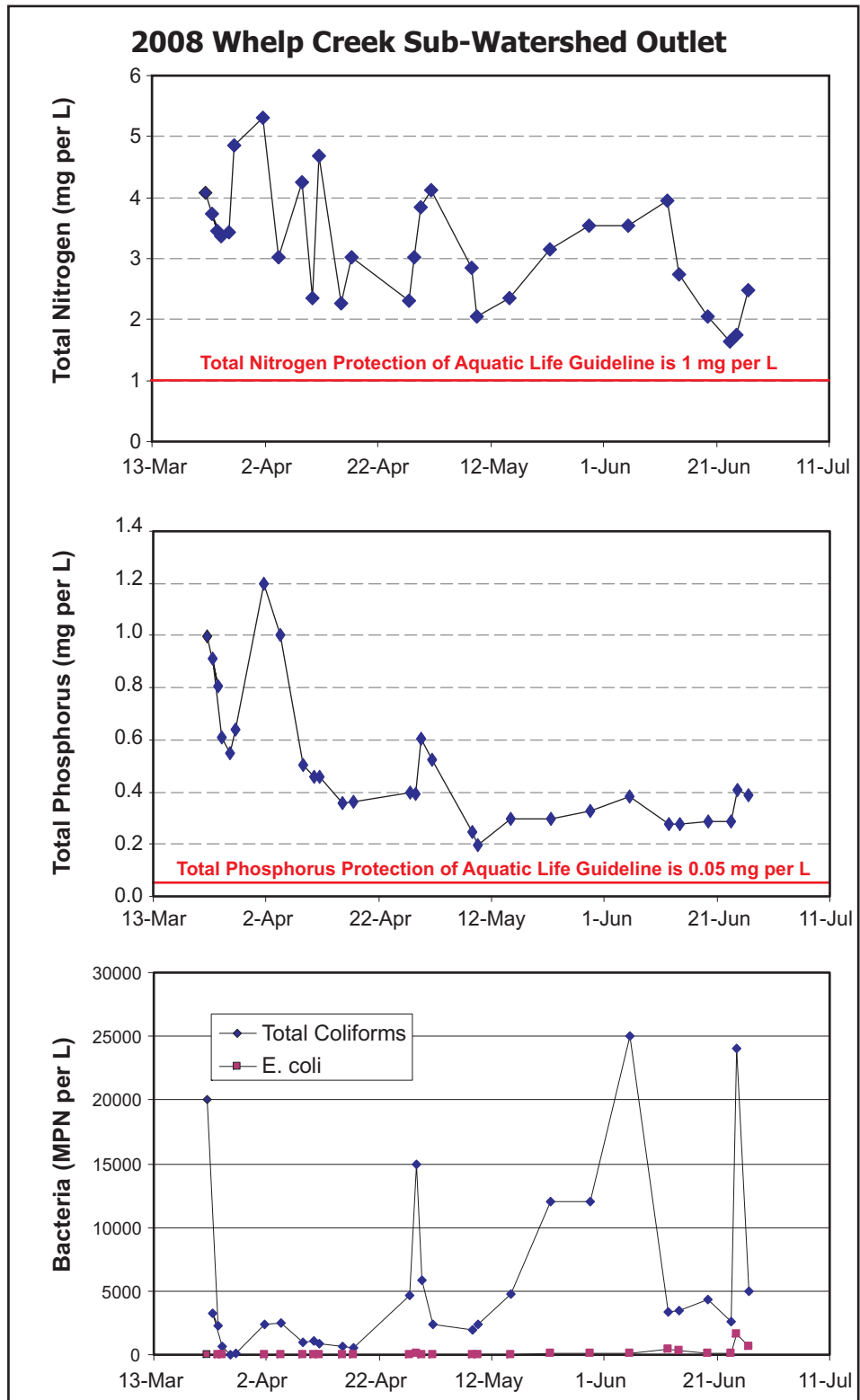
***Escherichia coli (E. coli):*** A subset of fecal coliform bacteria. Some strains of *E. coli*, such as the H0157, may cause illness but not all strains are harmful.

The ARD study measures bacteria in water. However, data should not be compared to guidelines as sampling procedures did not meet the required specifications. The bacteria data are only being used to make relative comparisons for the purpose of the study.



## Does agriculture impact water quality in Whelp Creek?

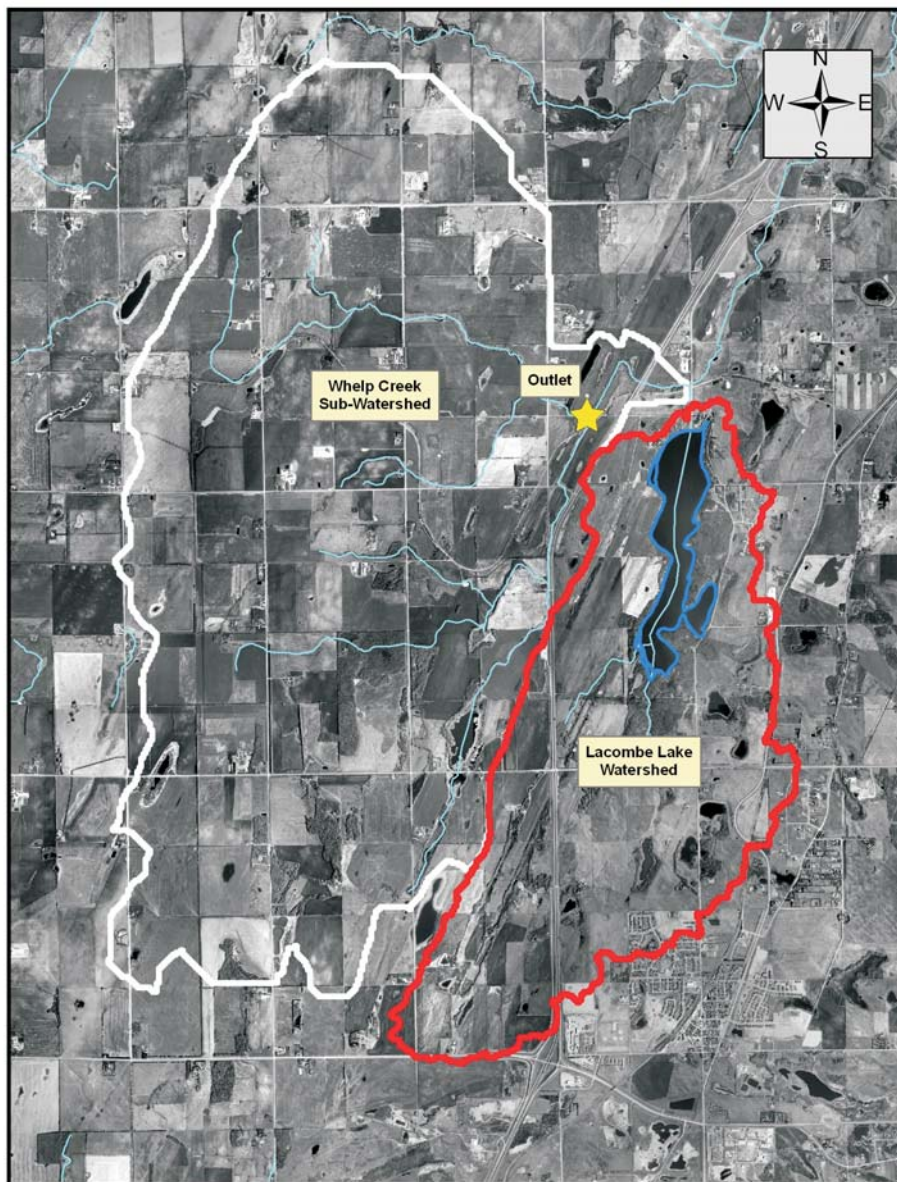
Yes, high intensity agriculture, like the activity in Whelp Creek, does have an impact on water quality. It is common for agricultural streams to exceed nitrogen and phosphorus guidelines for the protection of aquatic life, and exceedances are most likely in watersheds that are intensively farmed. This well established knowledge highlights the need for nutrient beneficial management practices in agriculture (i.e. practices that prevent nutrients from reaching surface water bodies). In addition, efforts should be made to reduce risks of fecal contamination in Whelp Creek, particularly during the summer months.



## Why do guidelines exist?

Water quality guidelines are established to ensure water is acceptable for a number of different uses. Guidelines exist for agriculture, protection of aquatic life, recreation, and drinking water. All waterbodies in Alberta need to protect aquatic life (the animals and plants that live in water), but not all waterbodies are used for swimming, bathing, irrigating crops, or watering livestock. Therefore, guidelines must be applied appropriately and in some cases, like Whelp Creek, guidelines for recreation and irrigation are not applicable.

## Whelp Creek Sub-Watershed and Lacombe Lake Watershed



A watershed is the area of land that drains into a stream or lake. The quality of water in a stream or lake will be impacted by the land management in its watershed. Nutrients, such as nitrogen and phosphorus can increase algal growth in lakes, and this can subsequently deteriorate water quality. Possible sources of nutrients from the landscape may include: agricultural manure and inorganic fertilizers, soil, household septic fields, municipal effluent, livestock, wildlife, and decaying vegetation.

### How does water quality in Whelp Creek compare to Lacombe Lake?

There needs to be caution when comparing the water quality of Whelp Creek and Lacombe Lake because they are very different types of waterbodies.

Small, intermittent streams such as Whelp Creek tend to be complex to characterize because of changes throughout the seasons and years. Surface runoff, in-stream processes and groundwater contributions complicate the interpretation of water quality data.

Lakes are also complicated to characterize. Lacombe Lake is relatively shallow and the water quality of the lake is dependent on several inlets, groundwater movement and natural processes. Whelp Creek is just one of several water sources for the lake. As with any standing body of water, eutrophication, or nutrient enrichment, will occur naturally.

## Are the diversions from Whelp Creek negatively impacting Lacombe Lake?

Currently, there is insufficient information to answer this question.

Long-term water quality and flow data are required to answer this question. At a minimum, data are needed to:

- 1) Characterize the water quality in Lacombe Lake by taking multiple water samples throughout several years. The sampling program must include samples from different depths, locations, and during turnover events.
- 2) Characterize the water quality at the diversion point of Whelp Creek during the time when water is diverted.
- 3) Determine the load contribution of the Whelp Creek diversion relative to the total load received by Lacombe Lake for the chemical water quality parameter of interest. The load calculation requires the measurement of the total flow volume of the diverted water from Whelp Creek.

It is certain that any diversion from Whelp Creek to Lacombe Lake results in the contribution of some nutrients to the lake. This would be true for any water that flows into Lacombe Lake. If the diversions from Whelp Creek occur in the spring (March to May), *E. coli* bacteria concentrations in the creek tend to be low and thus, are not a concern.

### What is meant by load contribution?

The calculation of the total mass load of a contaminant being carried in a stream assists in determining the magnitude of impact on a downstream water body. Mass load is a calculation of the total mass of a substance, usually expressed in kilograms, that is carried past a particular point on a stream or river for a given time period (i.e. during a diversion).

## What is being done to improve water quality in Whelp Creek?

The local producers in the Whelp Creek Sub-Watershed are taking a proactive approach to try to mitigate the impacts that their agricultural activities may have on the water quality of Whelp Creek. They are participating in the ARD study to implement and test Beneficial Management Practices (BMPs) to improve water quality and to identify the most cost effective BMPs.

In addition, a local sub-watershed group has recently established. This group is comprised of local farmers and residents that are working to address concerns in the Whelp Creek Sub-Watershed. The watershed group is dedicated to improve the Whelp Creek Sub-Watershed for future generations.

For more information:

Phil Boehme

Alberta Agriculture and Rural Development

Lacombe, Alberta

Phone: 403-783-8035

Email: [phil.boehme@gov.ab.ca](mailto:phil.boehme@gov.ab.ca)

Nutrient Beneficial Management Practice Evaluation Project 2007 to 2011

WEBSITE: [www.agric.gov.ab.ca](http://www.agric.gov.ab.ca) > type the project title in the 'search' option

