

# Whelp Creek Watershed News

Fall 2010

## Nutrient Beneficial Management Practices Evaluation Project

### Whelp Creek Watershed Tour Draws Crowd

On the morning of August 10, 2010, about 50 people showed up at the Lacombe County parking lot to attend the Alberta Agriculture and Rural Development (ARD) annual tour of the Whelp Creek Sub-watershed.

After a short introduction, attendees proceeded to board a bus and visit some of the study sites of the Beneficial Management Practices (BMP) Evaluation Project, which is being carried out in the watershed in cooperation with local producers.

The first stop was a location where a manure application occurred on forage and Trevor Wallace (ARD) gave an invigorating talk on manure application technology. Two stops addressed livestock management, including a rotational grazing plan at a pasture site, and a bio-engineering project at another pasture site.

The tour also included an update on the regional groundwater study lead by Dr. Gro Lilbaek of the University of Alberta. The last stop was at the Whelp Creek diversion point to Lacombe Lake, where Dion Burlock, from Lacombe County, discussed the history and current situation.

Attendees represented a wide variety of interests, including industry, government, producers, and landowners. It was great to see so many people come out to see various aspects of the BMP Evaluation Project and to learn more about the watershed.



Trevor Wallace discussing manure application technology in the Whelp Creek Watershed.

### You're Invited!

Whelp Creek Watershed Group Meeting  
January 13, 2011, 7:00pm  
Greenway Inn, Lacombe

Topics discussed will be:

- Whelp Creek Water Quality
- Whelp Creek Summer tour and BMP's
- Funding Sources
- Potential Projects

Your input will make a difference.

For more information contact:  
Wiebe Buruma, 403-782-8036

Please feel free to bring a friend.

Government of Alberta ■  
Agriculture and Rural Development

## Surface Water Quality Update: Whelp Creek + Rain = High Nutrient and Bacteria Concentrations

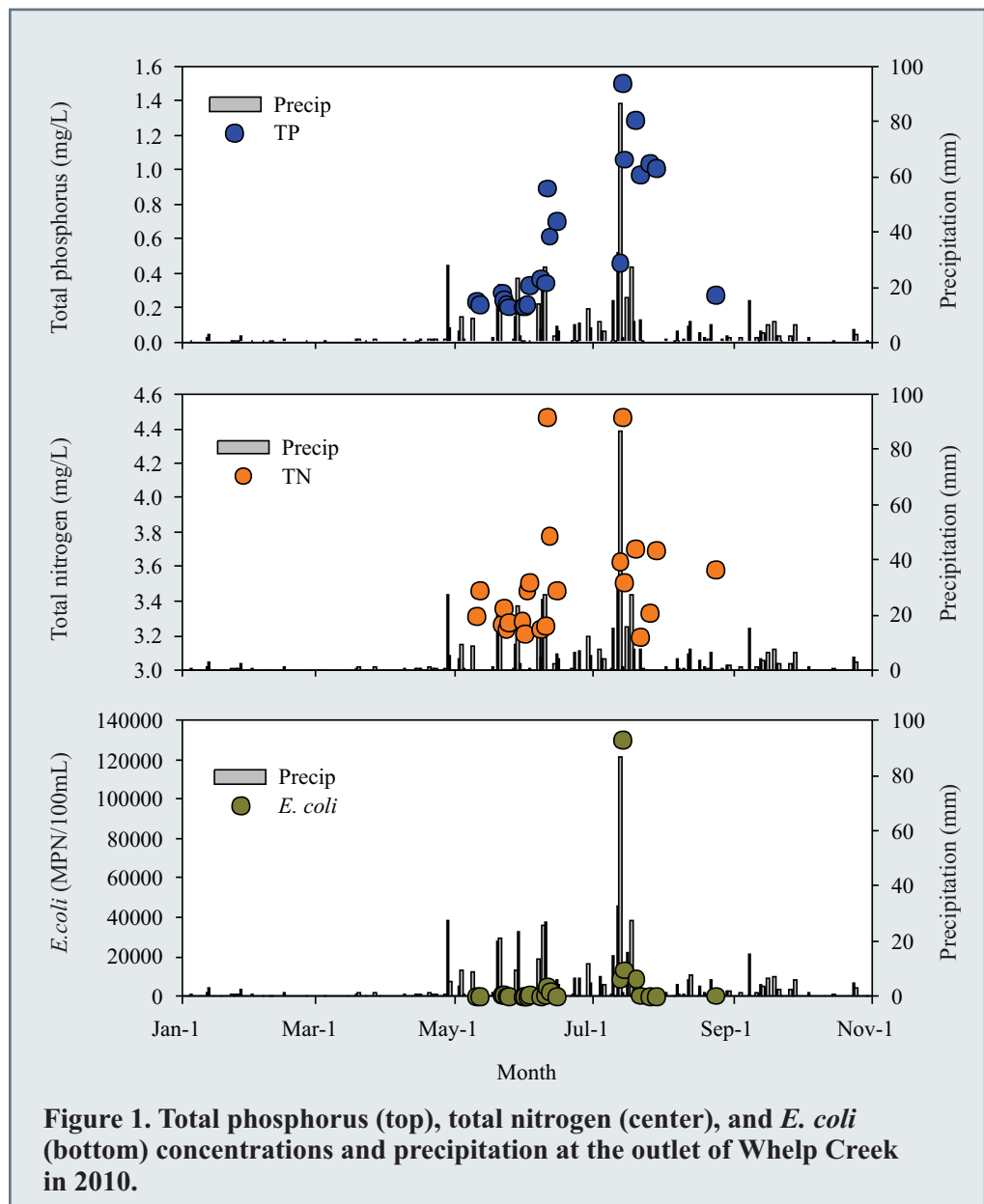
Rainfall accumulation in Whelp Creek during the summer months of 2010 were the largest of any monthly totals recorded since the beginning of the BMP Project in 2008. With this unique event, we took the opportunity to closely look at water quantity and quality at the outlet of Whelp Creek Sub-watershed.

In 2010, flow at the Whelp Creek Sub-watershed outlet was highest on July 14 at 1.48 m<sup>3</sup>/s. This peak occurred following 4 days of rain, which accumulated to 116 mm. To help visualize the peak flow, keep in mind that 1 m<sup>3</sup> is about 1000 liters of water so the flow at the outlet was about 1500 liters flowing by per second! This flow was 14 times higher than the peak flow in 2009 and 7 times higher than the peak flow in 2008.

Total phosphorus (TP) concentrations at the outlet, were highest on July 14, reaching 1.50 mg/L (Figure 1). This TP concentration was the highest we have measured during the BMP project at the outlet of Whelp Creek Sub-watershed. The majority of the TP (83%) was dissolved, which is typical of agricultural watersheds. Similar to TP, total nitrogen (TN) peaked with the high precipitation and flows on July 14 at 4.46 mg/L. This TN concentration, however, was also reached on June 11 when flows were not as high. The difference was that the TN concentration in June had a higher nitrate fraction, which is typical in Whelp Creek during the first part of the runoff season.

Concentrations of *Escherichia coli* (*E. coli*) in 2010 reached 130,000 MPN/100 mL on July 14 (Figure 1). *Escherichia coli* are indicators of fecal bacteria and the presence of these bacteria indicates fecal contamination from a warm-blooded animal. Previous years of data collected from Whelp Creek and other agricultural watersheds show that it is typical for bacterial contamination to be the greatest in the summer.

Overall, the largest rainfall and flow event in July 2010 resulted in the highest TP and *E. coli* concentrations measured at the WHC outlet since 2008. Rainfall also appeared to influence TN concentrations, with the highest concentration of 2010 measured during peak precipitation and flow.



## Off-stream Livestock Watering Systems – Protecting water quality

*“We have to protect our water. Because in the end, what we do to water, we do to ourselves.” – Robert Sanford.*

If we take a moment and reflect on this quote, we realize how true it actually is.

There are many ways producers can safeguard sensitive and key areas within a watershed. One of the most successful and practical measures a producer can take is to establish “off-stream watering” with livestock.

This article outlines proven methods utilizing new technology and sound principles to establish off-stream watering sites. Most of the materials are readily available from your local agricultural store or perhaps even from your farm/ranch.

Solar pumps are very popular in establishing off-stream watering in remote areas and are easy to set up. Basically, a pump operates on 12 or 24 volts and can move water from a nearby stream, lake or dugout into a trough. A float switch inside the trough will trigger the pump to turn on or off. Solar panels are used to keep the batteries charged.

### Surface water systems

The photo below shows a portable pumping system that houses the batteries, trough and solar panels. Various sizes of pumps are available depending on the lift needed and the number of livestock to water. For example, available pumps can range in lift from 2 to 45 feet (0.6 to 14 meters) and water from 13 to 592 cow/calf pairs per day.

Some of the positive aspects of systems are:

- Low maintenance – although batteries, float valve, pump and connections do need to be checked and maintained from time to time.
- Portable – these systems can be established virtually anywhere there is a good water source nearby.
- Durable – the solar watering system shown here is constructed of strong plastic and steel and it can withstand high winds and rubbing from cattle.

Costs of portable system:

- The initial cost. Some pumps can start at \$1,899 and be as high as \$3,489. This does not include the trough, pipe, fittings, solar panel(s), etc. However,



Portable solar watering system

it should be kept in mind that these systems can last for years and can be quite cost effective in comparison to the construction of a large dugout.

### Groundwater systems

Groundwater sources can also be used to establish an off-stream watering system. Pressured artesian wells fitted with a cap and a gate valve, allow water to flow into a nearby trough. A fitting cut into the top of the trough, with a hose connection will allow water to flow back to a desired stream or channel, while keeping cattle out of sensitive areas.

Some of the positive aspects of this groundwater system are:

- Low maintenance – There is no need for a float valve to trigger “system on” and “System off”. No batteries, switches, wire, etc. to maintain. Excess water flows back to the natural drain.

Cost of system:

- Costs to drill a well can be extensive – The wells used in the above picture were drilled using a government assistance program. Today, water well drilling assistance is also available through a government program called Growing Forward ([www.growingforward.alberta.ca](http://www.growingforward.alberta.ca)).
- Drilling a water well can be an intricate process – It entails proper planning including the hiring of a licensed driller.

These are some practices, tools and methods that can be used to entice cattle away from sensitive areas along water courses. Many more tools exist such as nose pumps, wind pumps, gravity feed systems, just to name a few. Again, producers can use these systems to help protect water quality.

For more information please contact Troy Ormann, Watershed Field Specialist with Alberta Agriculture and Rural Development toll free 310-0000 (403-381-7106).



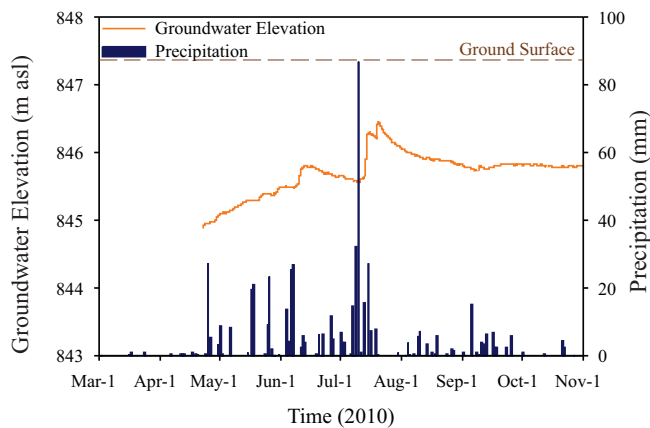
Groundwater well watering system

## Shallow Groundwater Update:

A shallow groundwater investigation was jointly initiated by ARD and the Department of Renewable Resources at the University of Alberta to support the Nutrient Beneficial Management Practices Evaluation project. Monitoring wells were installed within and directly east of the Whelp Creek Sub-watershed for the project. Groundwater monitoring of 27 wells, ranging from 3.5 to 4.0 m below the ground surface, was initiated in 2010. Throughout the spring, summer, and fall, water levels in the wells were measured and samples were collected for chemical analyses.

Groundwater generally moves from areas of higher elevation to lower elevation. Shallow groundwater level measurements indicate that the water table moves from the west across the watershed to the east. Shallow groundwater levels at the outlet fluctuated between 844 and 847 m above sea level (asl) (approximately 1.5 to 3 m below the ground surface) (Figure 1). Groundwater levels throughout the watershed were highest in the summer/early fall and lowest in the spring. The lower groundwater levels in the spring of 2010 may be attributed to lower precipitation and snowpack accumulations in the fall and winter of 2010. The rise in water levels in late summer/fall may be attributed to summer and fall precipitation, which was high from July to October 2010 relative to long-term averages.

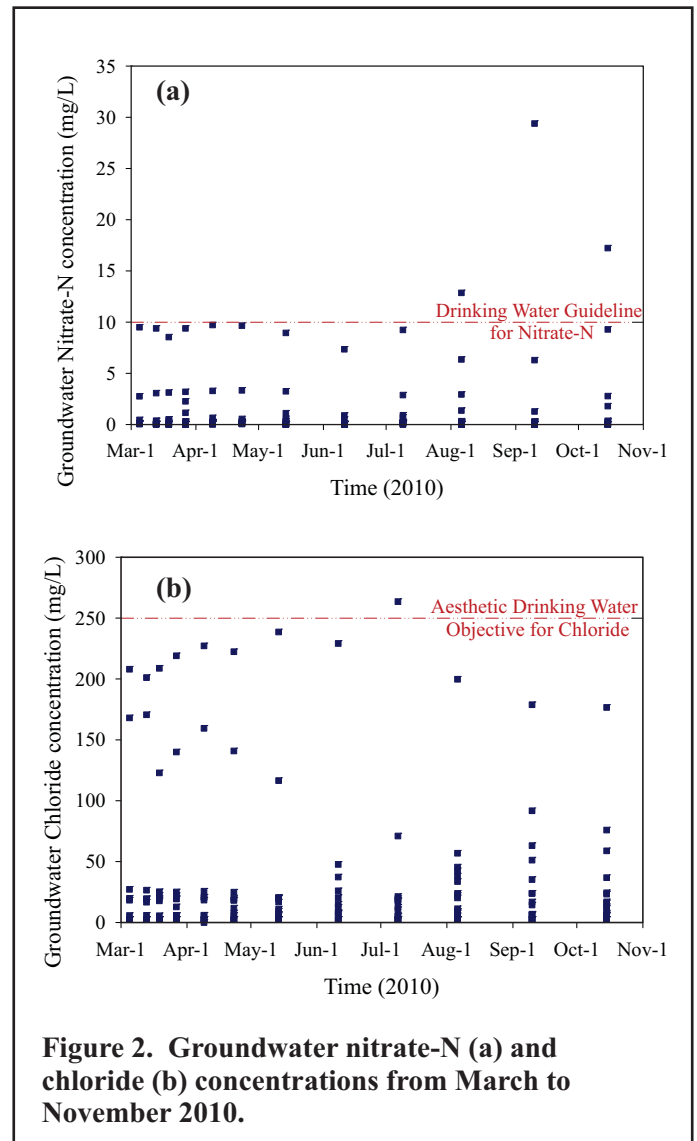
Shallow groundwater nitrate-N concentrations ranged from 0.01 to 29 mg/L and were generally



**Figure 1. Groundwater elevation and precipitation at the Whelp Creek Sub-watershed outlet (301) from March to November 2010.**

well below the guideline for drinking water (10 mg/L) that is applied to deeper domestic use wells (Figure 2a). All nitrate-N concentrations that exceeded the guideline were measured in one well and were only observed in the late summer/fall. Chloride concentrations measured in the shallow groundwater ranged from 2 to 264 mg/L and were usually below the aesthetic drinking water quality guideline (250 mg/L)(Figure 2b).

Overall, shallow groundwater levels were influenced by summer and fall precipitation, and drinking water quality guidelines were generally not exceeded.



**Figure 2. Groundwater nitrate-N (a) and chloride (b) concentrations from March to November 2010.**