

# CREDIT VALLEY CONSERVATION WATERSHED REPORT CARD

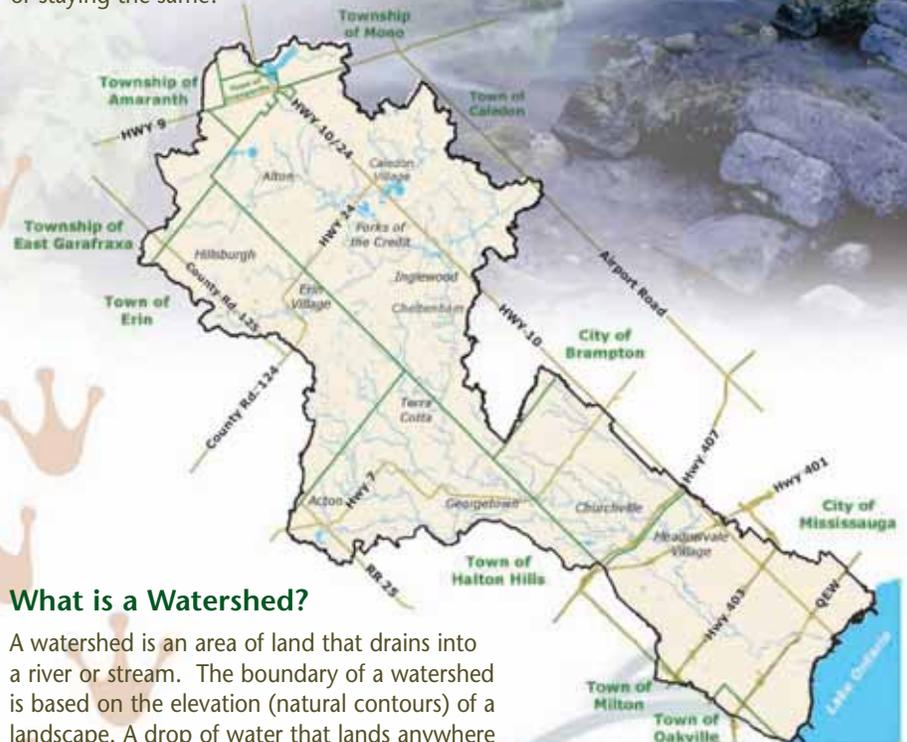
## WHAT DOES CVC MONITOR?

- **Land Use Change** - is the amount of land that has changed over time to artificially **HARDENED SURFACES** (roads, rooftops etc.). This can alter the hydrology, habitat structure, water quality and biodiversity of an ecosystem.
- **Groundwater** - is the water found below the earth's surface. We measure the movement and distribution of **GROUNDWATER** in soil and bedrock.
- **Hydrology** - is the study of the quantity and movement of water through the **WATER CYCLE**. We measure factors such as rainfall, snowfall, and stream flow.
- **Terrestrial Ecology** - is the study of **LAND ECOSYSTEMS**. We examine the health and biodiversity of forests, wetlands and river zones.
- **Fluvial Geomorphology** - is the science of assessing the **SHAPE & FORM** of a watercourse. We measure these characteristics and the forces that affect them (eg. stream flow and sediment).
- **Water Quality** - is the combination of the chemical, physical and biological characteristics of water. We measure **WATER QUALITY** variables such as the amount of metals, bacteria, nutrients and oxygen in the water.
- **Benthic Invertebrates** - are the **BUGS**, aquatic insects, worms and other related organisms that live on a stream bottom. The type of invertebrates we find can help us determine how clean the water is.
- **Fish** - are a key indicator of watershed health. We measure **FISH** characteristics such as the number, size, weight and type of species.

The following pages highlight a few of the above indicators used to determine the ecosystem health of the Credit River watershed.

## A Status Report on the Ecosystem Health of the Credit River Watershed

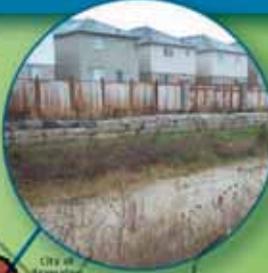
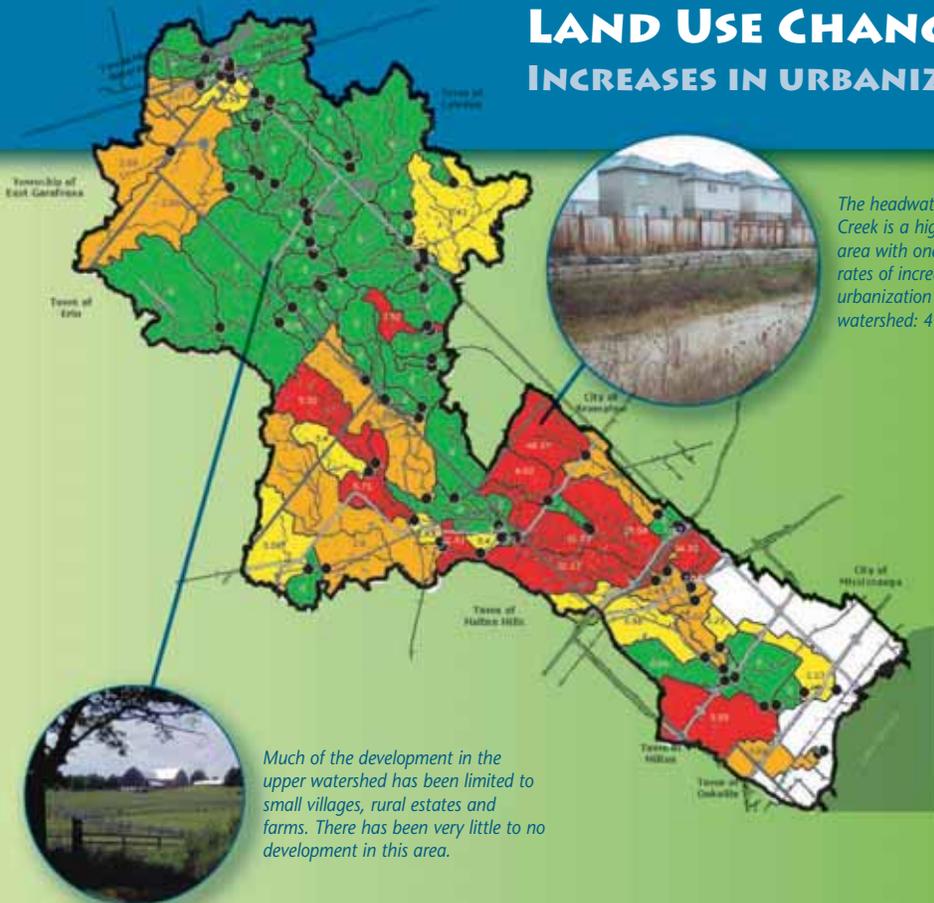
Have you ever wondered if the Credit River is healthy? Credit Valley Conservation is dedicated to the protection of the Credit River watershed's natural features and functions. In order for us to protect it, we need to constantly monitor it for change. The Integrated Watershed Monitoring Program tracks the health of the ecosystem by monitoring specific environmental indicators. The program answers such questions as: What do the indicators tell us about the health of the watershed? Are they getting better, worse or staying the same?



## What is a Watershed?

A watershed is an area of land that drains into a river or stream. The boundary of a watershed is based on the elevation (natural contours) of a landscape. A drop of water that lands anywhere inside this boundary will eventually end up at the mouth of the Credit River, before emptying into Lake Ontario. This determination of boundaries is based on the natural shape of the land and means that the watershed falls across municipal boundaries. Credit Valley Conservation helps to manage the natural resources found in the Credit River watershed.

# LAND USE CHANGE INCREASES IN URBANIZATION



The headwaters of Fletcher's Creek is a highly developed area with one of the greatest rates of increase of urbanization in the watershed: 48% per year.



Much of the development in the upper watershed has been limited to small villages, rural estates and farms. There has been very little to no development in this area.

The area of the landscape that is covered with a hardened, impermeable surface (i.e. rooftops, roads) is a good representation of urbanization.

Depending on the amount of hardened surfaces in an area, alteration of the landscape may negatively affect the ecosystem. Stream stability, stream flows, aquatic and terrestrial habitat and communities and surface and groundwater quality and quantity (Schueler, 2004) are all factors that may be affected by impermeable surfaces.

Schueler, T. 2004. An Integrated Framework to Restore Small Urban Watersheds: Version 1.0 Manual 1. March 2004. Center for Watershed Protection. Ellicott City, MD.

## MAP LEGEND

Land Use Change	
Green	0-2%
Yellow	3-10%
Orange	11-26%
Red	> 26%

Groundwater	
Blue	Excellent
Yellow	Fair
Green	Good
Red	Poor

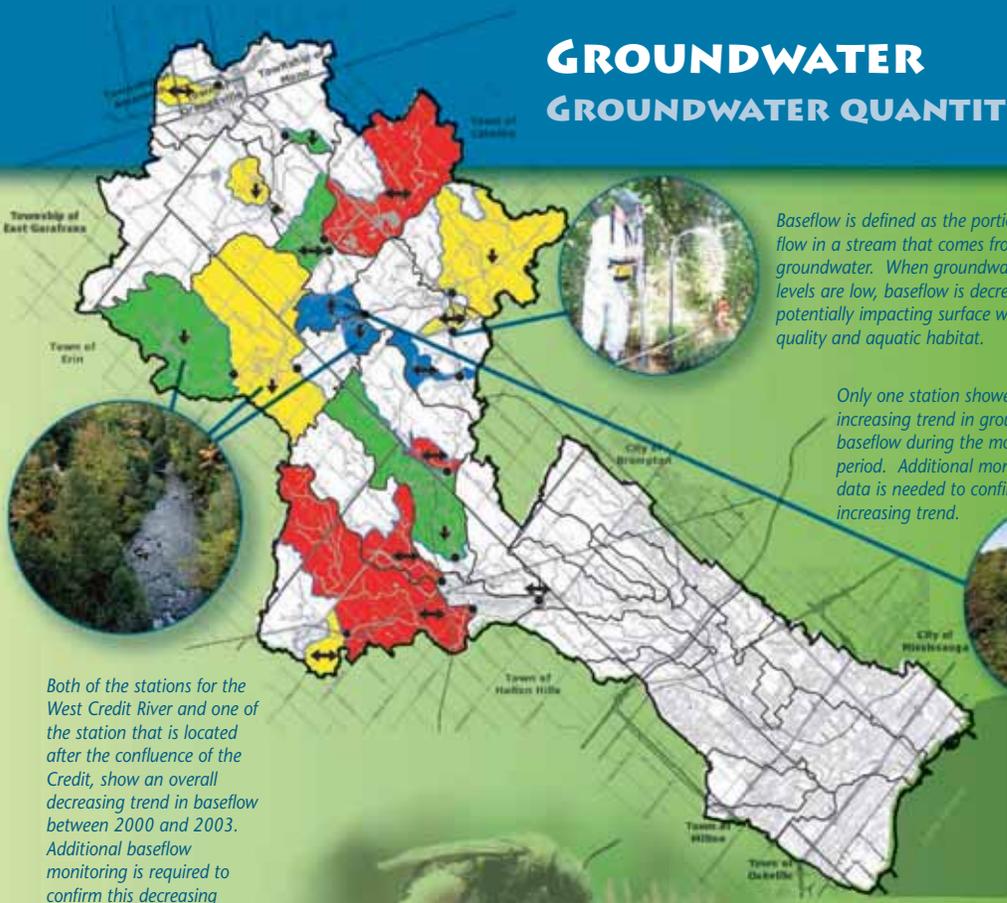
Water Quality			
Blue	Excellent	Red	Poor
Green	Good	Orange	Marginal
Yellow	Fair		

Fish	
Blue	Excellent
Green	Good
Yellow	Fair
Red	Poor

- Not enough data
- Monitoring station



# GROUNDWATER GROUNDWATER QUANTITY

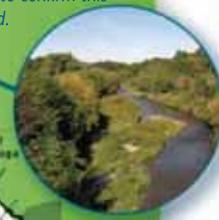


Baseflow is defined as the portion of flow in a stream that comes from groundwater. When groundwater levels are low, baseflow is decreased potentially impacting surface water quality and aquatic habitat.

Only one station showed an increasing trend in groundwater baseflow during the monitoring period. Additional monitoring data is needed to confirm this increasing trend.



Both of the stations for the West Credit River and one of the station that is located after the confluence of the Credit, show an overall decreasing trend in baseflow between 2000 and 2003. Additional baseflow monitoring is required to confirm this decreasing trend.



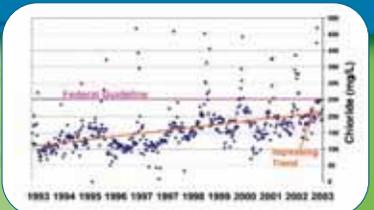
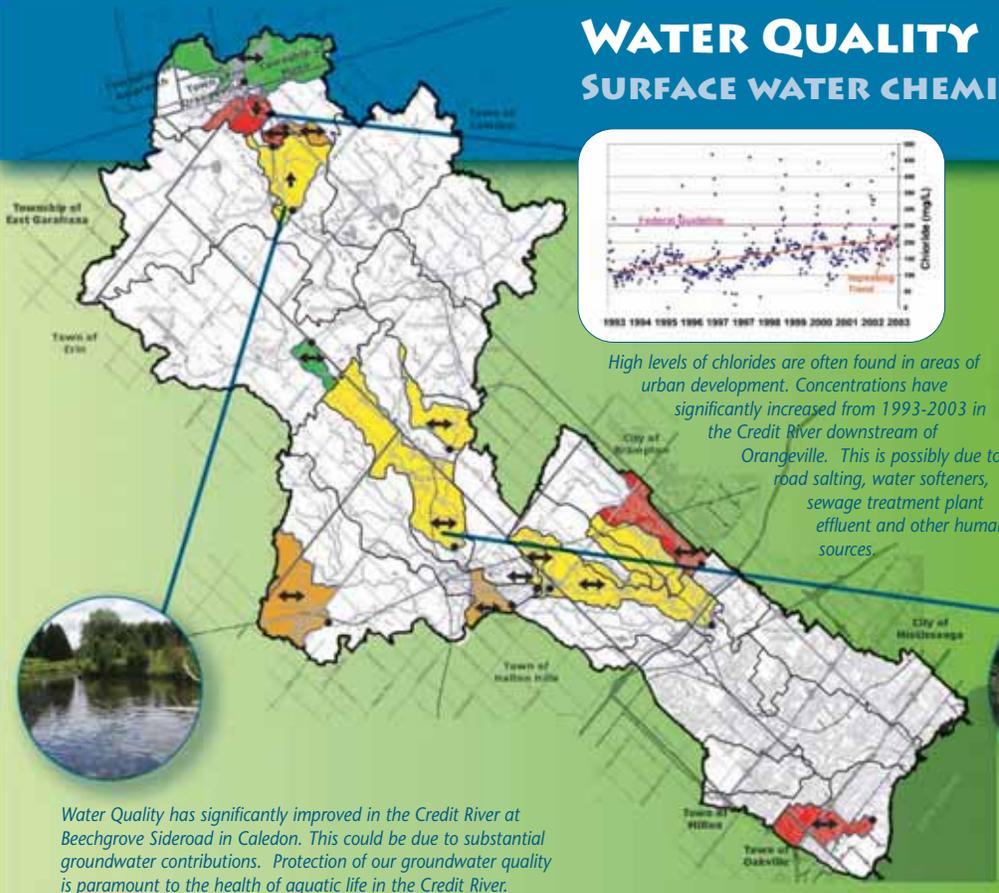
Baseflow provides the water necessary to dilute contaminants and to support healthy habitat conditions and a healthy aquatic ecosystem.

Factors that could impact the amount of water moving into the ground include the amount of rain or snowfall or increases in the amount of urbanization, irrigation or aggregate extraction.



# WATER QUALITY

## SURFACE WATER CHEMISTRY



High levels of chlorides are often found in areas of urban development. Concentrations have significantly increased from 1993-2003 in the Credit River downstream of Orangeville. This is possibly due to road salting, water softeners, sewage treatment plant effluent and other human sources.



Water Quality has significantly improved in the Credit River at Beechgrove Sideroad in Caledon. This could be due to substantial groundwater contributions. Protection of our groundwater quality is paramount to the health of aquatic life in the Credit River.



Water quality samples are analyzed for over 50 parameters. CVC identified nine water quality parameters of concern to the watershed that have federal or provincial guidelines/objectives, including nutrients, bacteria, metals and water temperature.

# FISH

## FISH COMMUNITY COMPOSITION



Electrofishing is the method we use to collect data on fish communities. We stun the fish, catch them in a net, weigh, measure and record them and release them back to the river unharmed. We could not do this work without help from volunteers.



Located on Shaws Creek, this station is the most productive in the entire watershed. It is located in a relatively natural area and has all native fish species, including the sensitive brook trout. This sites recent decline in fish health may be attributed to extreme weather, flow patterns or even angling pressure.

Mullet Creek is located in a highly developed area. The area was developed prior to the more stringent stormwater controls we have today. At this station, we are lucky to capture 3 fish in total!



Data collection throughout the watershed has resulted in the identification of almost 50 different fish species.

The most common species recorded is the minnow blacknose dace.

Field data is calculated into an Index of Biotic Integrity to rate overall fish community health from excellent to poor. Overall, 16 out of 36 stations were excellent or in good health, 11 were fair, and 10 were in poor health.

The results indicate that most sites are either relatively stable or the variability is too great to detect a trend.



## OTHER CONSIDERATIONS

Factors that can modify or stress any of the indicators we monitor include physiography, climate and land use change.

The Credit River is made-up generally of three physiographic zones (areas of common topography and geology): upper, middle and lower. These areas have different characteristics such as water movement through the system, and the types of habitat that may be found.

Climate can influence the landscape and its biodiversity through everyday weather patterns, weather extremes and long-term shifts, also known as climate change.

Land use practices, as presented earlier in this report, can strongly influence ecosystem health.

## WHAT DOES THIS ALL MEAN?

### Where does my drinking water come from?

Some of us in the watershed get our water from the ground. However, the majority of the population in the watershed gets their water from Lake Ontario. The Credit River provides major contributions to Lake Ontario.

### Are the fish safe to eat?

Refer to the Ministry of the Environment's Guide to Eating Ontario Sportfish for a detailed breakdown by fish and location.

### We need to continue to monitor the Credit River watershed.

Ecosystems are dynamic and complex. Although we cannot make strong conclusions based on these results, we can start to understand the variability of systems.

### We need to continue to monitor different indicators.

Each indicator represents a different component of the ecosystem. Each indicator will respond to changes in the environment at different times and in different ways. Until we understand the connection of all of these indicators, it is important for us to continue to monitor many variables.

### Is the Credit River watershed healthy?

The watershed is relatively healthy in most areas. However, those areas that have intense human activities (e.g. development, farming, sewage treatment plants) show declining trends in overall health. If growth continues and human impacts are not managed well, further declines in the health of the ecosystem are expected.

### Want to help?

If you would like to take part in improving the health of the watershed, contact us for volunteer opportunities or make a donation through the CVC Foundation.

To receive a more **Detailed Summary** of the results, or a **Technical Report** outlining the methodology and analysis, please contact Credit Valley Conservation (see contact information noted below).

## WITH SUPPORT FROM OUR PARTNERS:

Region of Halton

Region of Peel

County of Dufferin

County of Wellington

City of Brampton

City of Mississauga

Town of Caledon

Town of Erin

Town of Halton Hills

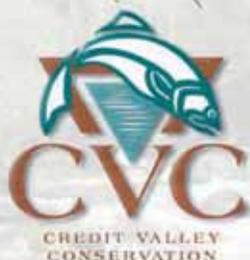
Town of Mono

Town of Orangeville

Township of Amaranth

Township of East Garafraxa

## FOR MORE INFORMATION:



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The results of this report card are based on 5 years of data collection (1999-2003).

www.creditvalleycons.com

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