YORK REGION'S

WATER Resources

5.0 YORK REGION'S water resouces

The text in this chapter relates to the indicators of health for York Region's water resources. These are found in table form in section 5.9. The text of this section should be read in conjunction with the table.

5.1 WATER USE and conservation

Water Use

Most of the water that is used in York Region has travelled a long distance before it reaches our taps. About 20% of our municipally-supplied water comes from 35 Regional production wells that pump groundwater from the Oak Ridges Moraine. About 5% of our water comes from Lake Simcoe. The remaining 75% is withdrawn from Lake Ontario and purchased from the City of Toronto.

In 2005, about 203,184 (or 92%) of the residential properties in York Region received their water from the municipal water supply. The remaining 8% of residential properties take their water from private wells. On an average day in 2003, a total of 296 million litres of municipally-supplied water was used in York Region. About 63% of this was for residential use, 26% was for business, industry and institutions, 6% was used by miscellaneous sources, and 5% was lost to the system through leakage.[1]

Key Findings:

- *203,184 (or 92%) of the residential properties in York Region receive water from the municipal water system*

Water Conservation

Efficient use of water is good for both the environment (because it reduces the impact on water resources and reduces the energy required to treat and transport the water) and the economy (because it is cheaper to conserve water than it is to build new treatment capacity). Studies show that water efficiency can cost as little as one-fifth the cost of new infrastructure and provide the same amount of water.[2]

The Region's water efficiency program – Water for Tomorrow – started in 1998. The Program engages homeowners, apartment dwellers, small businesses, industries and institutions in the business of saving water and using it more efficiently. This is done by providing water-saving devices such as early-closing toilet flappers and low flow showerheads, by auditing water use, and by educating users about the benefits of water conservation and engaging them in water-saving actions. The Program has also targeted a major inefficiency – leakage in the system itself – by inspecting all 1,800 kilometres of watermains in York Region and repairing the leaks that were found.[3]

The results of the Water for Tomorrow Program have been tremendous. By the end of 2004, approximately 78,000 households, 200 schools and over 14,000 businesses had participated in the Water for Tomorrow program. In 2004, these efforts resulted in a savings of 22.4 million litres a day. This represents 7.4% of the estimated daily usage of treated water.[4] The Program reduces the impact of watertaking on York Region's water resources, and saves taxpayers money.(See section 3.2.8 of this report for more detailed information on the Water for Tomorrow Program).

About 5,000 students a year take part in the York Children's Water Festival in which they learn about water conservation, quality, protection and other water-related issues.

Key Findings:

- *77,955 households, 14,305 businesses and 195 schools participated in water conservation activities through the Water for Tomorrow program between 1998-2004.*
- *In 2004, 22.4 million litres of water was saved a day through water conservation efforts. This is 7.4% of the average daily use.*
- *5,000 students a year on average have attended the York Children's Water Festival since 1999.*

5.2 DRINKING water quality

York Region Water System

The York Region Water System is a two-tier system in which the Region has responsibility for the production, treatment, storage and delivery of water to the local municipalities. The municipalities are responsible for distribution to users, service connections, fire protection and billing to homeowners/users. The water supply comes from both surface water (Lake Ontario and Lake Simcoe) and groundwater sources (from 35 Regional production wells).

Drinking water is tested extensively for a wide range of physical, chemical, and microbiological parameters at the point of treatment (the point of entry to the distribution system). Drinking water is also tested within the distribution system at Regional storage facilities and pumping stations, and at the point of use by local municipalities. In 2004, for example, there were 16,340 samples tested on treated drinking water from Regional water treatment facilities and 12,604 samples tested by the local municipalities. The Region produces annual reports on drinking water quality and these are available to the public.

Figure 5.1 provides a summary of the number of samples collected by York Region and the local municipalities between 2000 and 2004, along with the number of adverse water quality reports. On occasion between 2000 and 2004, some water quality parameters were detected in trace concentrations slightly above the Ontario Drinking Water Standards (ODWS). When this happens for a health-related parameter, the Region sends an Adverse Water Quality Report to both the York Region Health Services Department and the MOE Spills Action Centre. The Region also takes immediate corrective action, including re-sampling as necessary. For all Adverse Water Quality reports generated between 2000 and 2004, corrective action (including re-sampling) resulted in the water quality meeting the ODWS. The drinking water produced by York Region is of a consistently high quality that meets the compliance requirements of Ontario's drinking water regulations (O. Reg. 170/03).

Figure 5.1

Number of Water Samples and Adverse Water Quality Reports in the York Region Water System (2000-2004)

System	2000		2001		2002		2003		2004	
	number of samples	number of adverse reports	number of samples	number of adverse reports	number of samples	number of adverse reports	number of samples	number of adverse reports	number of samples	number of adverse reports
Regional	14,368	7	22,432	2	23,085	10	14,949	5	16,340	3
Municipal	3,754	22	10,845	42	11,160	36	11,753	43	12,604	42
Totals	**18,122**	**29**	**33,277**	**44**	**34,245**	**46**	**26,702**	**48**	**28,944**	**45**
PERCENT ADVERSE REPORTS	**0.16%**		**0.13%**		**0.13%**		**0.18%**		**0.16%**	

Source: Water and Wastewater Branch, York Region Transportation and Works Department, 2005.

Key Findings:

- *The drinking water supplied from York Region sources and treatment plants is of a consistently high quality relative to the health-related ODWS and applicable provincial regulations.*
- *The percentage of adverse water quality reports from the York Region Water System relative to the number of samples from 2000 to 2004 was consistently very low and corrective action and re-testing resulted in the ODWS being met.*

Boil Water Advisories

Boil Water Advisories (BWAs) are issued by the York Region Health Services Department to protect the health of users of a particular water supply or system when bacterial contamination (e.g., *E. coli*) is identified through water sampling or when inadequate treatment may result in bacterial contamination. A BWA informs the public on what precautions to take before using water for drinking and other purposes until the safety of the drinking water system is confirmed or re-established. BWAs may also be issued as a precaution, following the recommendations of the Walkerton Inquiry.

The number of Boil Water Advisories issued in York Region from 2000 to 2004 is provided in Figure 5.2 and explanations of the numbers are provided below.

Figure 5.2

Number of Boil Water Advisories (2000 to 2004)

Type of System	2000	2001	2002	2003	2004	Total
Regulated Municipal Systems	2	0	0	0	2	**4**
Regulated Private Systems	1	0	4	3	1	**9**
Unregulated Communal Systems	ND	2	20	30	37	**89**

Source: Health Protection Division, Public Health Branch, York Region Health Services Department, 2005.

Regulated Municipal Systems include the entire production, treatment, storage and distribution system in York Region. Regulated Municipal Systems had very few (4) BWAs between 2000 and 2004. In September 2000, York Region's Medical Officer of Health issued a BWA to the community of Ansnorveldt. Improvements to the Ansnorveldt distribution system were completed in 2004 and the BWA was lifted in December 2004. The other three BWAs were isolated incidents within the distribution system that were lifted upon re-sampling of the water. Under the Drinking Water Systems Regulation (O. Reg. 170/03) issued under the *Safe Drinking Water Act*, Regulated Municipal Systems are required to monitor their water for 170 different parameters and report any adverse results to the local health unit and the MOE.[5]

Regulated Private Systems are large, privately owned water systems such as those serving strip malls, or designated systems that serve high risk populations such as schools, daycares or long-term care facilities. These systems experienced 9 BWAs between 2000 and 2004. These systems also monitor water quality according to O. Reg. 170/03.

Until 2005, Unregulated Communal Systems were defined as small, non-municipal water systems such as those in restaurants, community halls, churches and trailer parks. BWAs on Unregulated Communal Systems have increased since 2000 because of increased monitoring, more stringent standards arising from the recommendations of the Walkerton Inquiry and the release in 2004 of the MOHLTC's Draft Protocol for the Issuance of a Boil Water or Drinking Water Advisory. From 2000 to 2004, a total of 89 BWAs were issued for Unregulated Communal Systems. Beginning in 2005, Unregulated Communal Systems will be required to test and report adverse drinking water quality under the MOE's new Drinking Water Systems Regulation O. Reg. 170/03.

Key Findings:

- *Regulated Municipal Systems had very few (4) BWAs between 2000 and 2004.*
- *Regulated Private Systems experienced 9 BWAs between 2000 and 2004.*
- *Unregulated Communal Systems had a high number (89) of BWAs between 2000 and 2004.*

5.2 DRINKING water quality
continued

Residential Private Wells Serving Single Households

Approximately 17,500 or 8% of the residential properties inYork Region obtain their water for domestic use from private wells. These wells are either shallow dug wells or drilled wells that reach depths of up to 150 metres. In general, shallow wells are more at risk from contamination than those that are drilled deep into bedrock. The best available estimate from the MOE water well record database is that there were approximately 23,880 wells in York Region in 2002. Unfortunately, this database is known to be incomplete and to include wells that are no longer in use and wells that are used for geotechnical and monitoring purposes.

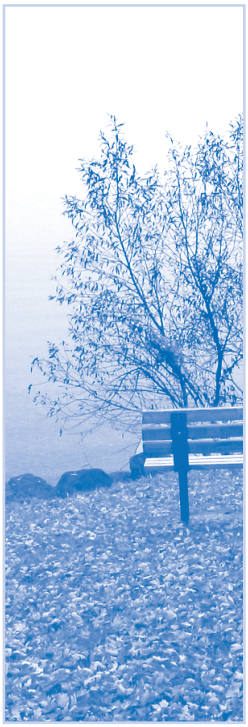
The owners of private wells are responsible for having their water supplies tested. York Region Health Services encourages well owners to conduct bacterial testing through the private well water education and outreach program. In 2002, in the wake of the Walkerton *E. coli* outbreak, there was an increased demand for testing with 10,862 samples submitted to York Region. In 2004, 8,282 water samples were submitted for testing, down 24% from 2002.[6]

Because there can be multiple samples from single wells, and participation is voluntary, data from the voluntary testing program are not indicative of the quality of groundwater in York Region. Indicators of groundwater quality and quantity will be developed for the next SOE Report.

Key Findings:

- *8,282 requests were made to have private well water samples tested in 2004.*
- *This was a drop of 24% from the number of requests (10,862) made in 2002, in the wake of the Walkerton E. coli outbreak.*

5.3 HEALTH of lakes



Kettle Lakes

One of the unique natural resources in York Region is its kettle lakes which (like the Oak Ridges Moraine) are a legacy from the last Ice Age. These small, round lakes were formed when pieces of ice became buried by glacial debris. When the glaciers retreated, this buried ice melted and formed depressions (or "kettles") in the landscape. Over time, these depressions gradually filled with water to become the kettle lakes we know today. Kettle lakes are unique in that they are quite isolated from other aquatic systems (i.e., they are not fed by streams, nor do streams lead out of them). Because water does not move through them, the impact of pollution in kettle lakes can be magnified. There are an estimated 700 kettle lakes in York Region, with the largest being Lake Wilcox and Musselman Lake.

Lake Wilcox:

There has been concern about the health of Lake Wilcox for many years because of the development around it. In response to public concern about water quality, the health of fish populations and the growth of aquatic plants, the Town of Richmond Hill adopted the Lake Wilcox Remediation Strategy in 1996. Since then, the Town has addressed 15 of the 17 high priority recommendations included in the Strategy. These were aimed at reducing phosphorus concentrations, improving oxygen concentrations in the bottom waters and improving fish habitat. As a temporary measure, the Town operated a "LakeLung" from 1998 to 2000, which added oxygen to the bottom waters of the lake. When the LakeLung was damaged by ice in the winter of 2001, the Town decided to tackle the most significant outstanding remedial measure – the removal of phosphorus that is stored in the lake. This is necessary to return the lake to a healthy, self-sustaining state. A study was carried out to evaluate potential phosphorus treatment technologies. In June 2005, the Town started a one-year pilot project to evaluate the effectiveness of the selected treatment technology that is designed to remove phosphorus from water. Recent water quality sampling results from Lake Wilcox are provided in Figure 5.3.

Figure 5.3

Water Quality Results from Lake Wilcox (2000 to 2004)

Parameter (in mg/L ice free means)	2000	2001	2002	2003	2004
Hypolimnetic dissolved oxygen	3.59	1.39	2.98	2.63	1.89
Total phosphorus	0.039	0.040	0.039	0.037	0.030
Total Kjeldahl nitrogen	0.98	0.99	0.77	0.88	0.90
Ammonia + Ammonium	0.229	0.119	0.080	0.098	0.116
Nitrate and nitrite	0.027	0.043	0.015	0.016	0.037

Source: Planning Department, Town of Richmond Hill, August 2005.

Oxygen concentrations in the hypolimnion (bottom waters) of Lake Wilcox are well below the Provincial Water Quality Guidelines of 6 mg/L and continue to decline, which is a concern for the health of fish communities. Total phosphorus may have decreased slightly in Lake Wilcox between 2002-2004.

Limited information is available on the other kettle lakes in York Region. This is a significant gap in understanding of York Region's water resources.

Key Findings:

- *Oxygen levels in bottom waters are still a concern for Lake Wilcox.*
- *The Town of Richmond Hill has addressed 15 of 17 recommendations from the Lake Wilcox Remediation Strategy and is currently pilot testing technology to remove stored phosphorus from the lake.*
- *Limited information is available on the other kettle lakes in York Region.*

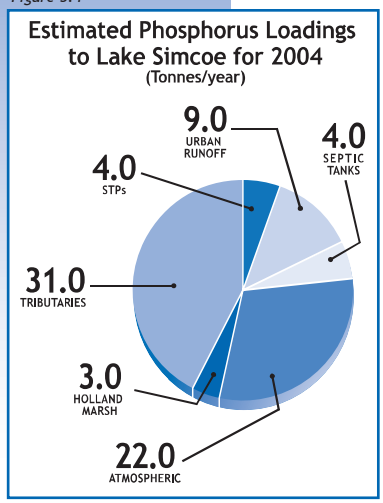
5.3 HEALTH of lakes continued

Lake Simcoe

Lake Simcoe is the largest lake in York Region and the source of drinking water for the communities of Keswick and Sutton. It also provides process and cooling water for many local industries and accepts discharge from a number of sewage treatment plants. A major recreational resource, Lake Simcoe contributes an estimated $200 million annually to the local economy through the people who use it for boating, cottaging, camping, swimming and fishing.

In response to concerns about deteriorating water quality and a declining coldwater fishery, LSRCA and its partners, including The Regional Municipality of York, launched the Lake Simcoe Environmental Management Strategy (LSEMS) in 1990. The aim of the Strategy is to reduce phosphorus loading to the lake and restore a naturally reproducing coldwater fishery.

Figure 5.4



Source: MOE and LSRCA Presentation, October 20, 2005.

The partners of the LSEMS program have been working since 1990 to reduce annual phosphorus loads to the target of 75 tonnes per year. The loads increased from 100 to 102 tonnes per year between 1990-1998, and have now decreased to 72 tonnes per year in 2004 (data to be published by MOE).[7] The concentration of phosphorus in the deeper areas of the lake has also been decreasing over this period. These numbers indicate that the efforts to reduce phosphorus have been successful. It should be noted, however, that the annual loading is highly dependent on the amount of precipitation. The years between 1998-2004 have been relatively dry, thus accounting for the most of the decrease in phosphorus loads. Monitoring of atmospheric deposition has become more sophisticated, and the implementation of over 600 remedial projects has substantially reduced phosphorus loads. Phosphorus reduction activities will need to continue to ensure that phosphorus levels are maintained at or below the target.[8] This will require vigilance and focusing of efforts on near shore areas that are still experiencing excessive growth of aquatic vegetation. The phosphorus in Lake Simcoe comes from multiple sources including atmospheric deposition, agricultural runoff, stormwater, septic tank leakage and discharges from Water Pollution Control Plants in Simcoe County, Durham Region and York Region. Figure 5.4 shows the loadings from various sources including the Holland Marsh, used for agriculture. About half of the loadings come from non-point sources (rivers) and stormwater (urban runoff). A small percentage (less than 1%) of the annual phosphorus loading in 2004 came from York Region Water Pollution Control Plants. More detail is provided in section 5.8.

Despite large increases in the number of people living in the Lake Simcoe watershed, average total phosphorus levels in the lake have dropped over the last 20 years and were generally lower in 2000-2003 than in 1980-1983 at most stations where measurements were taken. One of the factors in the decrease in phosphorus concentrations is improved sewage treatment. It should be noted however, that phosphorus levels are still too high and ongoing intervention is critical for the health of the lake.

Chloride concentrations are currently almost double the levels seen in the early 1980s, reflecting increased urbanization of the watershed. Dissolved oxygen in deep waters – a limiting factor for the survival and reproduction of coldwater fish – was consistently below the LSEMS objective of 5 mg/L in 2000-2003 (see section 5.6). In the 20 years between 1980-1983 and 2000-2003, there were significant declines in phytoplankton volume and increases in clarity, some of which may be attributable to the presence of zebra mussels that became established in the lake around 1995.[9]

Key Findings:

- *Loading of phosphorus to Lake Simcoe increased from 100 tonnes/year in 1990 to 102 tonnes/year in 1998 and decreased to 72 tonnes/year in 2004. The LSEMS target 75 tonnes/year.*
- *Less than 1% of the loadings of phosphorus comes from York Region Water Pollution Control Plants.*
- *Average total phosphorus levels in Lake Simcoe decreased between 1980-1983 and 2000-2003 at most measuring stations. However, phosphorus levels are still too high, and ongoing intervention is critical for the health of the lake.*
- *Dissolved oxygen levels in Lake Simcoe's bottom waters are consistently below the LSEMS objective of 5 mg/L, which limits the ability of coldwater fish species to survive.*

5.3 HEALTH of lakes continued

LINKS BETWEEN PHOSPHORUS and OXYGEN in WATERBODIES

Phosphorus is an essential nutrient for all living organisms. But too much phosphorus in aquatic systems can lead to rapid growth of algae. This is called eutrophication and while it occurs naturally over geologic time, it may be accelerated by agricultural and urban runoff that increases loading of nutrients and organic substances to lakes, rivers and streams. When nutrient enrichment occurs, "algal blooms" - unsightly mats of green vegetation - may appear and clog waterways. When this algae dies, its decomposition depletes oxygen levels in the water and puts stress on the fish living there. Extremely low oxygen levels can lead to an inability to reproduce and the death of fish. Eutrophication can also impair the recreational value of water bodies and raise the cost of drinking water treatment.

Oxygen is a necessary element to all forms of life and adequate dissolved oxygen is necessary for good water quality. As dissolved oxygen levels in water drop below 5.0 mg/L, aquatic life is put under stress. The lower the concentration, the greater the stress. Oxygen levels that remain below 1-2 mg/L for a few hours can result in large fish losses.

Source: MOE Guideline F-8 http://www.ene.gov.on.ca/envision/gp/2250.htm

5.4 HEALTH of rivers

York Region contains seven major watersheds - four that flow north into Lake Simcoe (the Black, Holland and Maskinonge Rivers and Pefferlaw Brook), and three that flow south into Lake Ontario (the Don, Humber and Rouge Rivers). In addition, York Region contains many smaller tributaries including small portions of the Duffin and Petticoat Creek watersheds. This section of the report provides a snapshot of the health of the seven major rivers by looking at three aspects - water quality, flows and vegetative cover.

Water Quality

LSRCA has 6 water quality monitoring stations within York Region as part of the Provincial Water Quality Monitoring Network. TRCA has established a network of water quality monitoring stations across its watersheds and tracks the level of pollutants over time through its Regional Water Monitoring Program. For this report, we examined the concentrations of four key water quality parameters.

Two nutrients - total phosphorus and nitrate - are related to sewage disposal, agricultural use of fertilizers and animal wastes. *E. coli* is an indicator of fecal contamination. Chlorides are related to road salt runoff,sewage treatment and industrial effluents.

As seen in Figure 5.5, a high percentage of the samples taken between 2001 and 2004 from the Humber, Don and Rouge Rivers exceed the Provincial Water Quality Objectives (PWQOs) for Total Phosphorus and *E. coli*, with water quality in the Don River being the worst of the three. By contrast, the Canadian Water Quality Guideline (CWQG) for nitrates was never exceeded during this time period.

Figure 5.5

Total Phosphorus, Nitrate and *E.coli* in River Water (2000 to 2004)

Watershed Monitoring Station	Percent of samples that Exceed Water Quality Objectives		
	Total Phosphorus	Nitrate	*E.Coli*
Humber River (83004)	43	0	46
Humber River (83020)	86	0	40
Don River (85003)	50	0	96
Don River (85094)	100	0	79
Rouge River (97009)	50	0	46
Rouge River (997018)	64	0	44
Rouge River (97777)	33	0	82
Black River*	77	0	
Maskinonge River*	100	0	
East Holland River*	100	0	
Pefferlaw Brook*	60	0	

- *Interim PWQO for Total Phosphorus is 0.03 mg/L*
- *Interim CWQG for nitrate is 13 mg/L*
- *PWQO for E. coli is 100/count/100 ml*
- **data for 2004 only*

Source: Toronto and Region Conservation Authority, July 2005.

There is no PWQO for chlorides, but studies show that lethal effects on aquatic organisms can take place at levels as low as 870 mg/L. Background chloride concentrations in the Toronto area are about 10 to 25 mg/L and concentrations over 1,000 mg/L have been measured during snowmelt conditions. Median values of samples taken in York Region range from 49 to 85 mg/L in the Humber, 63 to 168 mg/L in the Rouge, and 210 to 367 mg/L in the Don River watershed. As with the other water quality parameters, the level of chlorides is highest in the Don River. It is important to note that chloride concentrations reported for both the Don and two of the Rouge River stations did not include samples taken between March and June. This time period coincides with snowmelt conditions, when chloride concentrations would be expected to be higher. Therefore, values reported here likely underestimate chloride concentrations in these two watersheds.

Key Findings:

- *Concentrations of Total Phosphorus and E. coli frequently exceed PWQO in York Region rivers.*
- *The PWQO for total phosphorus is most frequently exceeded in the Don, Maskinonge and East Holland Rivers.*
- *Nitrates meet the CWQG at all times.*
- *Chlorides are below lethal concentrations for aquatic organisms.*

Flows

The increase in impermeable surfaces associated with urbanization can fundamentally alter river flows, leading to rivers that are "peaky" or which have too little flow most of the time and very high flows during rainfall events when stormwater rushes into them. Flow data has now been obtained from TRCA and LSRCA and can be used to track flow levels in York Region's rivers over time.

Figure 5.6

Percentage Forest Cover by Watershed within York Region

Watershed	Forest Cover
Pefferlaw Brook	51%
Black River	41%
Holland River	23%
Maskinonge River	22%
Humber River	17%
Rouge River	9%
Don River	8%

Source: Geomatics Branch, York Region Planning and Development Services Department, 2005.

Vegetative Cover

In their natural state, York Region's watersheds were mostly covered by forest. Much of the forest has been lost through the clearing of land for agriculture and urbanization. Some of this loss has been offset through the creation of the York Regional Forest and other more recent reforestation initiatives. To protect ecosystem function and the health of rivers, Environment Canada recommends a minimum forest cover of 30%, and many conservation authorities have adopted this target. Forest cover in York Region's 7 major watersheds varies greatly from the highly urbanized Don River Watershed with a mere 8% forest cover to the relatively rural Pefferlaw Brook Watershed, which contains 51% forest cover. Only 2 of the 7 watersheds currently meet the 30% Environment Canada target for forest cover. This suggests that it is important to target the watersheds with less forest cover in reforestation strategies.

Key Findings:

- *On a watershed basis in York Region forest cover varies from a low of 8% (the Don River) to a high of 51% (Pefferlaw Brook).*
- *Only 2 of the 7 major watersheds in York Region meet the Environment Canada target of 30% forest cover.*

5.5 groundwater

Groundwater is a vital part of the hydrologic (water) cycle. It plays an essential role in sustaining rivers, streams, lakes, wetlands, and aquatic systems. Groundwater is also important in terms of socio-economics as it is used by industries, farms and for municipal and private water supplies in York Region. Despite its importance as a resource, a meaningful indicator of quality and quantity of groundwater at a regional scale has not been developed at the time of writing of this report. The Region is currently working with conservation authorities to produce such a measure. When this is in place, it will serve as an important indicator for future SOE Reports.

This section profiles some of the important work that has been carried out to protect groundwater in York Region.

Regional Groundwater Management Strategy

In 2001, the Region began to develop a comprehensive Groundwater Management Strategy in partnership with the MOE, adjacent municipalities, and conservation authorities. The primary partnership has been the York Peel Durham Toronto Groundwater Management Strategy Study (YPDT Study). This group includes the four municipalities and nine conservation authorities with jurisdiction in the Oak Ridges Moraine Area.

In the first stage of the Groundwater Management Strategy, technical studies were carried out to characterize and better understand groundwater resources. To date, this work has included:

- compilation of historical data into a consolidated database
- development of a regional framework for understanding subsurface geological conditions
- site-specific studies around municipal wells
- installation of sentry wells around high risk municipal wells
- development and calibration of a numerical groundwater flow model
- inventory of potential sources of contamination to water supplies
- inventory of water use

This information forms a base for the development of appropriate Regional policies and programs to ensure long-term protection of groundwater resources, both in terms of quality and quantity.

Wellhead Protection

One important component of the technical work has been the delineation of time-of-travel based zones around York Region's municipal wells. These zones are intended to identify areas where there is risk that activities could lead to contamination of a drinking water supply. These areas are currently being proposed as wellhead protection areas. Policies relating to wellhead protection have been adopted into the Regional Official Plan for the portions of the delineated wellhead protection areas that lie within the Oak Ridges Moraine Area. The Region is continuing to work toward developing appropriate policy for wellhead protection areas in parts of the Region where the Oak Ridges Moraine Policies do not apply.

Improperly abandoned wells can provide a pathway for contaminants to move from the surface to aquifers below. Although sealing and proper "abandonment" of non-used wells is a requirement under Ontario Regulation 903, there is currently no accurate record of the condition of wells that are no longer in use. York Region is continuing to work with the MOE and conservation authority partners to improve the knowledge on unused wells and to increase confidence that unused wells have been sealed properly.

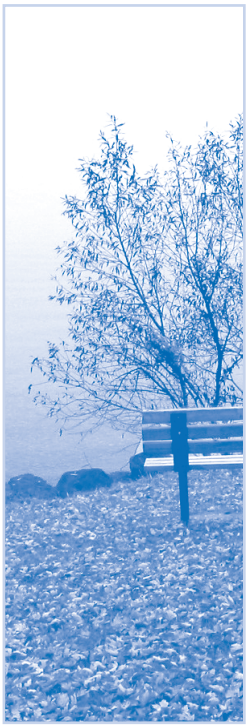
5.5 groundwater
continued

Source Protection

York Region will soon be working with conservation authority partners and citizens to develop a strategy for drinking water source protection that will be consistent with the regulations on Drinking Water Source Protection that are expected from the Province. The focus of this work will primarily be municipal water supplies, but there will be some consideration of the implications to private water supplies. Some of the groundwater work completed to date by the Region may require updating depending on the content of pending regulations and technical guidance. Additional work to achieve a confident level of protection of our drinking water resources is expected to include:

- confirmation and validation of the delineated wellhead protection area zones
- assessment of aquifer vulnerability for shallow and deep aquifer systems
- identification of significant recharge areas
- local-scale threat assessment to identify existing and future threats to quantity and quality of water supply, assess the risk, and prioritize actions
- consultation with the public for input into available options for protecting the quantity and quality of the drinking water resources
- development of a combination of regulatory and voluntary policies and programs to protect the quantity and quality of the water supply
- development of appropriate public communication and education strategies to improve public confidence in the safety and security of public water supplies

5.6 HEALTH of fish communities



Lake Simcoe Fish Populations

Recent studies show that there has been a consistent decline since 1983 in total estimated summer fishing effort on Lake Simcoe (i.e., the number of total hours people spent fishing on the lake). The reasons for this decline in summer fishing interest (at odds with the increase in interest in winter fishing over the same period) are not known. Fisheries experts are also concerned about two other trends in Lake Simcoe. The first of these is a large shift in fishing effort to Cook's Bay, which potentially places significant stress on the northern pike and largemouth bass populations for which the Bay is the primary habitat. The second concern is a large decrease in the "catch per unit effort" for lake trout. In 1988, an angler took on average 6 to 8 hours to catch a lake trout; in 1993 this required 17 hours.

Populations of lake trout and lake whitefish – both coldwater species – are supported by stocking in Lake Simcoe and are not self-sustaining. There have been recent findings by MNR since 2001 showing some evidence of naturally reproducing lake trout and lake whitefish. To help sustain the coldwater fishery, MNR stocks about 100,000 lake trout and 150,000 lake whitefish annually. The decline in the populations of lake trout and lake whitefish started in the 1970s and is linked to excessive inputs of nutrients that lead to low levels of oxygen in bottom waters in the summer months.[10] (See section 5.3 of this report).

The good news about the Lake Simcoe fishery has mainly to do with warmwater species. The smallmouth bass fishery is increasingly being recognized as one of the finest in North America. Lake Simcoe is also considered a premier location for yellow perch fishing. Largemouth bass populations appear stable and fishing for them is popular in weedy places like Cook's Bay.

Key Findings:

- *Populations of lake trout and lake whitefish in Lake Simcoe continue to be supported by stocking.*
- *Populations of yellow perch and smallmouth and largemouth bass in Lake Simcoe are robust and attract considerable angling interest.*

Index of Biotic Integrity

The Index of Biotic Integrity (or IBI) is a powerful indicator of the health of aquatic ecosystems. It measures the health of fish communities using 9 different measures. These include the number of species found, the presence of local indicator species, the composition of the fish community and the abundance of fish. Monitoring of these factors allows an IBI index to be calculated on a sliding scale from 9 (the worst) to 45 (the best) for streams and rivers. TRCA carried out IBI monitoring at 76 locations on the Don, Humber and Rouge Rivers within York Region from 2002 to 2004. None of the stations had a rating of "very good". The greatest proportion of high IBI scores were found in the Humber River watershed, where 43.8% of locations were scored as "good". In the Rouge River watershed, 33.3% of the locations had IBI scores that were "good", while in the Don, only 15.4% scored as "good". Overall, 8 of the sites with a "fair" IBI score were at the top of that category with a score of 27 points. The IBI scores tell us that there are still good quality streams in York Region. Sampling by LSRCA in 2004 across all the watersheds draining into Lake Simcoe yielded 44 sites with a "good" and 3 with a "very good" IBI ranking.[11]

INDEX OF BIOTIC INTEGRITY

Rating	Score
Poor	9 -20
Fair	21-27
Good	28-37
Very Good	38-45

Key Findings:

- *47% of locations in the Lake Simcoe watershed had "good" or "very good" IBI scores.*
- *43.8% of the locations in the Humber River watershed had "good" IBI scores.*
- *33.3 % of the locations in the Rouge River watershed had "good" IBI scores.*
- *15.4% of the locations in the Don River watershed had "good" IBI scores*

5.6 HEALTH of fish communities
continued

Contaminants in Fish

If they are present in water, certain persistent toxins (such as PCBs, dioxins, pesticides and heavy metals) can accumulate in fish over their lifetime. If concentrations in fish become high enough, this poses a health hazard to people who consume them. The concentration of toxins in fish also provides an indicator of the health of the environment.

In its Guide to Eating Ontario Sport Fish (which is available at York Region Health Services offices and many LCBO stores), the MOE provides guidance on how often fish can safely be eaten from lakes and rivers in Ontario.[12] This is reported as the number of meals that can be consumed a month per species per size of fish. Generally, the bigger the fish, the higher the level of contaminants. Selected data from the 2005-2006 Guide to Eating Ontario Sport Fish are presented in Figure 5.7. This shows that there are restrictions on eating some sizes of 20 species of fish caught in various water bodies in York Region. Additionally, some sizes of 8 species should not be eaten at all. It should be noted that there are 25 species from various waterbodies for which there are no restrictions on consumption. Anglers should consult the MOE Guide for more complete information.

Generally, levels of persistent organic contaminants in fish in York Region are consistent with those that were reported for 1997. Exceptions to this are the higher levels in lake trout and walleye from Lake Simcoe. This may reflect a slight increase in the release of persistent contaminants to this watershed.

Figure 5.7

Fish Consumption Restrictions (2005)

Body of Water	Species of Fish	Restriction	
		No more than 4 meals/month	Should Not Be Eaten
Holland Marsh Canals	largemouth bass	>12 inches (30 cm)	
	black crappie	> 12 inches (30 cm)	
	carp	>30 inches (75 cm)	
Mill Pond	largemouth bass	>16 inches (40 cm)	
Milne Reservoir	largemouth bass	>10 inches (25 cm)	
	rock bass	>6 inches (15 cm)	
	carp	>16 inches (40 cm)	
Lake Simcoe	lake trout	>18 inches (45 cm)	>20 inches (50 cm)
	walleye	>18 inches (45 cm)	>24 inches (60 cm)
	northern pike	>30 inches (75 cm)	
	smallmouth bass	>16 inches (40 cm)	
	largemouth bass	>12 inches (30 cm)	>16 inches (40 cm)
	rock bass	>10 inches (25 cm)	
	whitefish		>20 inches (50 cm)
	ling	>22 inches (55 cm)	
	carp		>30 inches (75 cm)
	bowfin	>20 inches (50 cm)	>26 inches (65 cm)
Lake Wilcox	largemouth bass	>12 inches (30 cm)	>14 inches (35 cm)
	black crappie	>10 inches (25 cm)	
	carp	>22 inches (55 cm)	>24 inches (60 cm)

Source: Adapted by York Region Health Services from MOE 2005-2006 Guide to Eating Ontario Sport Fish.

Key Findings:

- *There are restrictions on eating some sizes of 20 species of fish caught in various water bodies in York Region because of contaminants.*
- *Some sizes of 8 species caught at some locations should not be eaten at all.*
- *Generally, levels of contaminants are similar to those found in 1997.*
- *Higher levels of contaminants were found in 2005 in lake trout and walleye from Lake Simcoe than were found in 1997.*

5.7 beaches

The York Region Health Services Department monitors the water quality at 18 York Region beaches from 5 lakes under the Beach Management Protocol set out by the MOHLTC from mid-June until Labour Day in September. The goal of the York Region Beach Sampling Program is to protect York Region residents and visitors from waterborne illness and injury. The Program exceeds the minimum provincial standards by monitoring private beaches that serve high risk or more vulnerable populations and public beaches that do not have lifeguards.

Figure 5.8

Beaches Monitored by York Region and Number of Days Posted or Closed in 2004

Name of Beach	Municipality	Lake	Number of Days Posted or Closed*
Balfour Beach	Georgina	Simcoe	5
Claredon Beach	Georgina	Simcoe	28
De La Salle Beach	Georgina	Simcoe	23
Franklin Beach	Georgina	Simcoe	9
Holmes Point	Georgina	Simcoe	14
Island Grove	Georgina	Simcoe	0
Jackson's Point Beach	Georgina	Simcoe	21
Keswick Beach	Georgina	Simcoe	0
Maple Leaf Beach	Georgina	Simcoe	0
Paradise/ Willow Beach	Georgina	Simcoe	17
Parkwood Beach (Glenwoods)	Georgina	Simcoe	30
Peninsula Motel Beach	Georgina	Simcoe	7
Port Bolster Beach	Georgina	Simcoe	42
Willow Beach Dock	Georgina	Simcoe	7
Recreation Island (Seneca)	King	Seneca	7
Sunset Beach	Richmond Hill	Wilcox	39
Cedar Beach	Whitchurch-Stouffville	Musselman	11
Shadow Lake Beach	Whitchurch-Stouffville	Shadow	0

*Source: Health Protection Division, Public Health Branch, York Region Health Services Department, 2005. *Out of a total of 83 monitored days.*

Industrial discharges, municipal sewer systems, septic systems, agricultural run-off, waterfowl and marine traffic can affect beach water quality. Individual sample bacterial counts may vary considerably because of rainfall, surface run-off, water turbidity, wind direction, air and water temperature, bather load and time of sampling. The York Region Health Services Department posts beaches when the results of water samples exceed the provincial standard of 100 *E. coli*. per 100 ml of water. Bathing in water with elevated *E. coli* levels can cause illness in bathers, including skin, ear, eye, nose and throat infections, as well as stomach disorders.

York Region Health Services has also closed public beaches because of potential hazards posed by blue-green algae blooms, water turbidity (lack of clarity) and chemical/sewage spills (see Figure 5.9). When a public beach is closed people are prohibited from swimmingin the water.

Figure 5.9

Closed Beaches (2000-2004)

Date	Beach	Reason for Closure
2000	-	No closures
2001	-	No closures
Aug. 2 - Nov. 5, 2002	Shadow Lake Beach	Blue-green algae
July 24 - July 26, 2002	Willow Beach	Turbidity
Aug. 15 - Aug. 20, 2003	Balfour Beach Claredon Beach Keswick Beach Maple Leaf Beach (North Gwillimbury) Parkwood Beach (Glenwoods)	Sewage spill
July 20 - Aug. 10, 2004	Sunset Beach	Turbidity

Source: Health Protection Division, Public Health Branch, York Region Health Services Department, 2005.

5.7 beaches
continued

The indicator that is used for this report is percentage of potential swimming days that beaches in the Region are posted or closed as unsafe for swimming and other water sports. It is calculated by dividing the "number of beaches" multiplied by the "number of days monitored" into the "total number of postings and closures for all beaches" multiplied by 100.

In 2004, beaches were posted or closed for 17.4% of potential swimming days. This was an increase over the 7.2% posted or closed in 2000. While the overall numbers increased, in 2004 some monitored beaches were posted less than in previous years and some, such as Shadow Lake, not posted at all. Other beaches were posted many more times than in previous years, and this has led to an increased total percentage overall. In general, since 2000, there has been a steady increase in the percentage of potential swimming days that York Region Beaches are posted or closed. This increase is related to many factors including: an increase in the number of beaches monitored, an increase in bather load (the number of people swimming in a particular area) and an increase in waterfowl populations. In addition, beaches were posted more often after heavy rainfalls.

In 2005, York Region will be reviewing the Beach Program methodology for collecting and analyzing beach water quality data.

Key Findings:

- *In 2004, beaches were posted or closed for 17.4% of potential swimming days.*
- *This was an increase over the 7.2% of potential swimming days for which beaches were posted or closed in 2000. However there has been great variation in postings and closures, with some beaches being posted or closed more often, and others being posted less often, or not at all.*
- *Since 2000, there has been a steady increase in postings and closures for a variety of reasons.*

5.8 STORMWATER, WASTEWATER and sewage

Stormwater

Stormwater is created when rain falls on the impervious parts of our modern cities – our roofs, streets and parking lots. To deal with stormwater, we have developed complex stormwater systems that drain it away from buildings and streets, store it (sometimes with treatment) and then release it into nearby watercourses. While these systems are very good at preventing surface and basement flooding, they do not adequately deal with the pollution of receiving waters, altered flows in rivers and streams, and impacts on fisheries.

Stormwater is the leading contributor of pollution to urban waterways. Stormwater picks up metals, oils and greases from roads, animal waste from parks, pesticides from gardens, and litter. Even with the best treatment, a significant amount of this is deposited into watercourses. Urbanization also changes the basic hydrology of watersheds (how water moves and is stored). Rivers in urbanized watersheds are sometimes referred to as "peaky", meaning the flows are too low under ordinary circumstances and too high when it rains. When it rains in our urban centres, large volumes of stormwater rush into rivers and streams, increasing the risk of surface flooding and increasing the erosion of riverbanks.

Level 1 stormwater treatment (also called "Enhanced Protection") is the highest level of treatment of stormwater set out by the Ministry of the Environment in its S*tormwater Management Planning and Design Manual 2003*. There are three levels of protection, with the goal to maintain or enhance existing aquatic habitat, based on the amount of suspended solids removed for the different end-of-pipe stormwater management facilities. With Level 1 or 'enhanced protection' stormwater treatment, an average of 80% of suspended solids are removed from the stormwater discharge, usually through a series of settling ponds. The removal of suspended solids also removes many pollutants, which adhere to the solid particles.[13]

Data on the percentage of urban area in York Region serviced by the new standard of level 1 stormwater treatment were not available at the time of writing this report. This would be a good indicator to use for future reports.

Key Findings:

- *Information was not available on the extent of the urban area in York Region that is serviced by Level 1 stormwater treatment.*

Wastewater and Sewage

Wastewater is any water that has been adversely affected in quality and contains waste materials or pollutants dissolved or suspended in it. Wastewater includes the water you flush down your toilet, water that drains from your bathtub, sink and washing machine as well as wastewater produced by businesses and industries in their manufacturing processes.

About 89% of residential properties (or 195,582) in York Region are serviced by the municipal wastewater system. The remaining residential properties are on septic systems.

York Region's municipal wastewater collection system consists of approximately 200 kilometres of pipe constructed of polyvinyl chloride plastic, ductile iron, asbestos cement or concrete. These range in size from collectors that are .46 metres (1.5 feet) in diameter to the larger trunk systems that deliver wastewater to the treatment plant, which have a diameter of 2.4 metres (8 feet). The wastewater collected in the collection system is taken to the 7 small Water Pollution Control Plants (WPCPs) run by the Region, or via the York Durham Sewage System to the Duffin Creek WPCP, which is operated by the Region of Durham.

5.8 STORMWATER, WASTEWATER and sewage continued

- As noted in section 3.2.9, the Region has a number of initiatives to ensure that its wastewater systems are leading edge. These include the development of Master Plans, funding ($1.058 billion for wastewater infrastructure over the next 10 years {2005-2014}), use of the "OPTimize Works Program" to ensure best practices are followed, and staff training and upgrading.

Key Findings:

- *89% of residential properties (or 195,582 properties) in York Region are serviced by the municipal wastewater system.*

Discharges to York Region Lakes and Rivers from WPCPs

Figure 5.10 provides data on loadings of phosphorus, nitrogen and ammonium to York Region lakes, rivers and streams from Regional WPCPs for 2000 to 2004. Loadings of all three substances have decreased since 2000, with phosphorus loadings reduced by 4%, nitrogen by 30% and ammonium by 44%. Total phosphorus loadings to Lake Simcoe watersheds dropped from 705 kg in 2000 to 646 kg in 2004, a decrease of 8%.

Figure 5.10

Loadings of Phosphorus, Nitrogen and Ammonium from York Region WPCPs to York Region Lakes and Rivers in kg (2000-2004)

Parameter	2000	2001	2002	2003	2004
Phosphorus	728	715	614	604	702
Nitrogen	23,274	27,901	20,437	19,169	16,305
Ammonium	18,544	22,043	14,490	13,131	10,371

Source: Water and Wastewater Branch, York Region Transportation and Works Department, April 2005.

Key Findings:

- *Loadings of phosphorus, nitrogen and ammonium to York Region lakes and rivers from York Region WPCPs decreased 4%, 30% and 44% respectively between 2001 and 2004.*
- *Loadings of phosphorus to Lake Simcoe from York Region WPCPs decreased 8% between 2001 and 2004.*

Industrial Discharges to Sanitary Sewers

The Region has a new Sewer Use By-Law that was passed by Council in January 2005. The By-Law sets limits on the types and strength of discharges that can be made to the sewer system. The aim of the By-Law is to prevent damage to environment, the sewer system itself (especially Water Pollution Control Plants), and Regional staff operating the plants. The By-Law requires industries that are known to deal with potentially hazardous materials to complete a Waste Survey. Regional By-Law Enforcement Officers randomly sample industries to check compliance with the Sewer Use By-Law.

Industries that are found to be contravening the Sewer Use By-Law are notified that they have committed a by-law infraction. For a specific group of conventional parameters, the Region can impose surcharge agreements under which an industry can discharge in excess of the By-Law limits to a prescribed amount in return for payment of additional sewage service rates to compensate the Region for any additional costs of operation, repair, and maintenance of the sewage works. The Region can also require non-compliant industries to develop a compliance program to prevent, reduce, or control the discharge of sewage or storm water from the discharger's premises into the municipal sewer system, with the objective of attaining compliance with By-Law requirements. Individuals found to be discharging illegally can, on conviction, be fined from $10,000 up to $25,000 and corporations can be fined up to $100,000.

The number of industries inspected for compliance with the Sewer Use Bylaw decreased from 483 industries in 1997 to 117 in 2004. The reason for this was that in recent years, inspection was focussed more on those industries that were known to have a history of non-compliance. However, the number of industries inspected began to increase in 2005. As of September 2005, 176 inspections had already been completed as part of an annual summer student project aimed directly at issuing waste report surveys.

Key Findings:

- *Of the 117 industries inspected in 2004, 22 were notified of Sewer Use Bylaw infractions,44 were placed on sewer surcharge programs, and 14 were placed on compliance programs.*

5.9 spills

Spills are defined by the MOE under the *Environmental Protection Act* as "releases of pollutants into the natural environment from a structure, vehicle, or other container that are abnormal in light of all circumstances of the discharge". While spills can be discharged to land, air or water, this section is included in the water chapter as most pollutants eventually end up in water. Spills must be reported immediately to the MOE, the municipality where the spill occurred, the owner of the pollutant and the person having control of the pollutant. A key trigger to determine whether a spill needs to be reported is whether it has (or is likely to have) an "adverse effect". In the *Environmental Protection Act*, an "adverse effect" is defined as any one or more of the following:

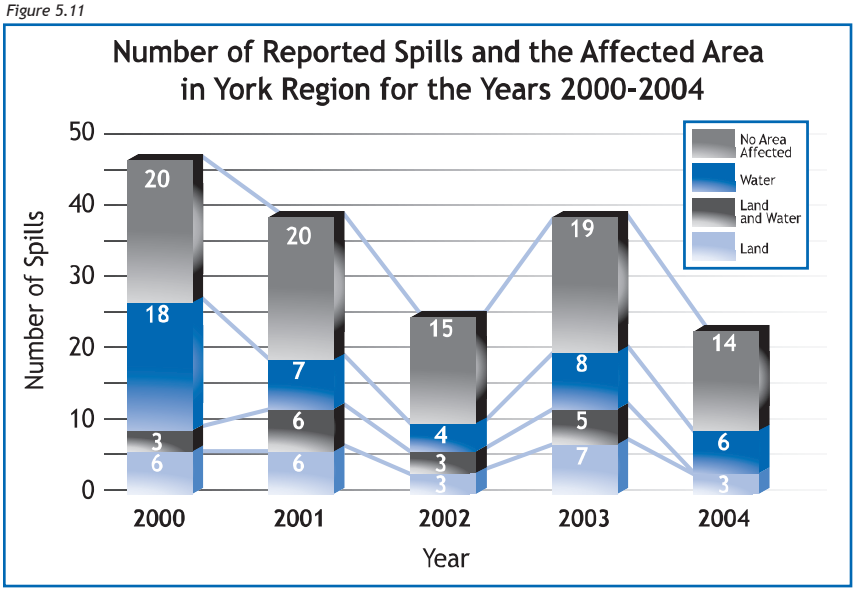
- impairment to the quality of the natural environment - air, water, or land;
- injury or damage to property or animal life;
- harm to any person;
- adverse health effects;
- safety risk;
- making property, plant, or animal life unfit for use;
- loss of enjoyment of normal use of property; and
- interference with the normal conduct of business.

Until 2004, spills were required to be reported if the spill caused or was likely to cause an adverse effect. New amendments that are now in effect require spills to be reported based solely on the characteristics of the pollutant (i.e., if the substance itself will cause or is likely to cause an adverse effect).

As an indicator, the number of spills is a reflection of the care with which chemicals and wastes are treated. There are many strategies for reducing the risk of spills, including education and training, improved material handling procedures and technologies, and the use of backup systems such as impermeable curbs to contain spills if they take place.

Spill data for this report have been collected from the Region's Spill Response Information Management System, Water and Wastewater Branch. Notification of all reportable spills is made to the MOE Spills Action Centre. The data show that there were 23 reported spills in York Region in 2004, down from 47 in 2000 and 39 in 2001 and 2003. The number of spills and the affected areas are shown in Figure 5.11. It should be noted that many of these spills (14 or 60% of total spills reported in 2004, for example) were contained and did not affect the surrounding area.

Figure 5.11



Source: Spill Response Information Management System, Water and Wastewater Branch, Transportation and Works Department, York Region, 2005.

5.9 spills continued

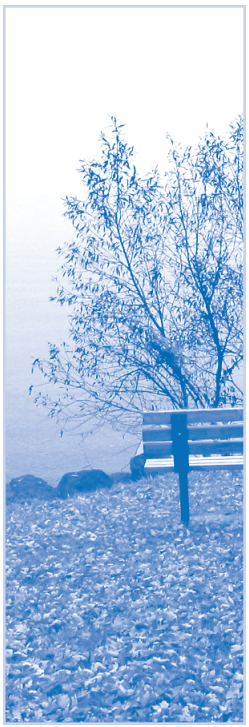
The spills reported between 2000 and 2004 came from a variety of public and private sources. Over that time, 43 spills into a waterbody were reported. Two of these were sewage spills from Regional facilities. They are described below.

Black River: From May 25-27, 2001, approximately 1,000 cubic metres of sewage escaped into the Black River from the Woodriver Bend Pumping Station, located in the Sutton community in the Town of Georgina. The public was advised immediately to refrain from contacting, or consuming, water from the Black River in the Woodriver Bend area. Test results of water taken from the Black River in Sutton on May 31, 2001 indicated that the water quality at that time met Provincial Water Quality Objectives.

Tannery Creek: As a result of the Canadian/American power outage of August 14, 2003, sewage from the Aurora Pumping Station was discharged into Tannery Creek. Tannery Creek runs north from Aurora through Fairy Lake in Newmarket to Cook's Bay on Lake Simcoe. The discharge was contained and the Pumping Station was operational within 2 hours. Testing conducted by the York Region Health Services Department indicated that beach water quality on Lake Simcoe was within acceptable standards. Water supplies from both municipal and private systems were not affected by the sewage discharge.

It is worth noting that most sewage treatment facilities are designed with the ability to bypass to a nearby watercourse, i.e., a river, stream, lake or stormwater retention pond, in the event of a spill. All bypassing structures are authorized in the Certificates of Approval that are issued by the MOE to operators of sewage treatment facilities. These sorts of mechanical failures rarely occur in pumping stations. The Region's strong preference is to minimize the potential of mechanical failure by constructing gravity sewers wherever practical.

The remaining 41 spills to waterbodies mainly included spills of diesel or gas line fuel and motor or hydraulic oil (in most cases due to traffic accidents), septic waste (due to septic system failure), various chemicals and in some instances unknown material.



Key Findings:

- *The number of reported spills in York Region has decreased from 47 in 2000 to 23 in 2004.*
- *In 2004, 3 of these spills were to land, 6 were to water and 14 of these spills did not affect the surrounding area.*

York Region's Indicators of Health for Water follow on the next three pages.

5.10 indicators of health WATER

CATEGORY	INDICATOR	STATUS in 2000 REPORT	STATUS in 2005 REPORT	TRENDS/COMMENTS
WATER USE AND CONSERVATION	Number of residential properties on municipal water supply	-	203,184 or 92% of total properties (2005)	-
	Per capita use of treated municipal water	385 litres per day (1997)	236 litres per day (2004)	38.7% decrease in per capita use
	Participation in Regional water conservation activities and programs	-	77,955 households, 14,305 businesses and 195 schools in the Water for Tomorrow program between 1998-2004; 5000 students a year on average attended York Children's Water Festival between 1999-2005.	-
	Litres of water saved per day through water efficiency and percentage of total water used	-	22.4 million litres per day or 7.4% of average daily use saved (2004)	Have exceeded target for daily water savings
DRINKING WATER QUALITY	Quality of drinking water supplied by the Region (measured at treatment plants after treatment)	Meets all health-related Ontario Drinking Water Objectives (1997)	Meets all health-related Ontario Drinking Water Standards (2004)	No change
	Quality of drinking water for the York Region municipal system (measured as the percent compliance with health-related parameters of Ontario Drinking Water Standards)	99.84% compliance (2000)	99.84% compliance (2004)	Quality of drinking water and compliance remain consistently high
	Number of boil water advisories issued for the regulated municipal systems (York Region and area municipalities)	Data not collected by York Region prior to 2000	2 (2004) 0 (2003) 0 (2002) 0 (2001) 2 (2000)	-
	Number of boil water advisories issued for Regulated Private Systems	Data not collected by York Region prior to 2000	1 (2004) 3 (2003) 4 (2002) 0 (2001) 1 (2000)	-
	Number of boil water advisories issuedfor Unregulated Communal Systems	Data not collected by York Region prior to 2000	37 (2004) 30 (2003) 20 (2002) 2 (2001)	High number of boil water advisories
	Number of private well water samples submitted for analysis	Not collected	8,282 (2004) 7,636 (2003) 10, 862 (2002)	24% decrease in requests for tests of private well water

5.10 indicators of health WATER

CATEGORY	INDICATOR	STATUS in 2000 REPORT	STATUS in 2005 REPORT	TRENDS/COMMENTS
HEALTH OF LAKES	Phosphorus loading to Lake Simcoe	100 tonnes/year (1990)	102 tonnes/year (1998) 72 tonnes/year (2004)	Decrease attributable to remediation and low rainfall; LSEMS target is 75 tonnes/year;
HEALTH OF RIVERS	Phosphorus concentrations in key watersheds	Mean annual phosphorus levels exceed the target for all rivers (1995)	PWQO exceeded in Humber 43 to 86% of time; in Don 50 to100% of time; in Rouge 33 to 64% of time (2001-2004) PWQO exceeded in Black River 77% of time; in Maskinonge 100% of time; in East Holland 100% of time; in Pefferlaw Brook 60% of time (2002-2004)	High frequency of exceedances of Provincial Water Quality Objectives (PWQO) for total phosphorus
	Nitrate concentrations in key watersheds	-	Canadian Water Quality Guidelines (CWQG) met all the time in Humber, Don and Rouge (2001-2004) CWQG met all the time in Maskinonge River, East Holland River, Black River and Pefferlaw Brook (2002-2004)	Not a concern at this time
	E. coli concentrations in key watersheds	-	PWQO exceeded in Humber 40 to 46% of time; in Don 79 to 96% of time; in Rouge 46 to 82% of time (2001-2004)	High frequency of exceedances of Provincial Water Quality Objectives
	Chloride concentrations in key watersheds	-	Median values of samples range from 49 to 85 mg/l in the Humber; 63 to 168 mg/l in the Rouge; 210 to 367 mg/l in the Don (2001-2004); Canadian Environmental Protection Agency (CEPA) Guidelines exceeded in East Holland River 12% of time; CEPA Guidelines met all the time in Black River, Maskinonge River and Pefferlaw Brook (2002-2004)	Not found at levels that are lethal to aquatic life
	Percentage of forest cover in key watersheds	-	Forest cover ranges from 8% for the Don River to 51% for the Pefferlaw Brook watershed (2005)	-
HEALTH OF FISH COMMUNITIES	Ability of coldwater fish to spawn successfully in Lake Simcoe	Populations of lake trout and lake whitefish supported by stocking; population of cisco continuing to dwindle (1997)	Populations of lake trout and lake whitefish supported by stocking; population of cisco unknown (2003)	Coldwater fish are not self-sustaining, and must be supported by stocking
	Aquatic Ecosystem Health (Index of Biotic Integrity)	-	"Good" IBI scores: Humber 43.8% of locations; Rouge 33.3% of locations; Don 15.4% of locations. For the Lake Simcoe watershed: "Very Good" IBI scores at 3 and "Good" scores at 44 of the 136 total sites monitored (2004)	Still have some good quality fish habitat in the Region
	Level of contaminants in sport fish	Restrictions on eating large and smallmouth bass, yellow perch, and walleye in some areas (1997)	Restrictions similar to 1997 except for higher levels of contaminants in Lake Simcoe lake trout and walleye	Contaminant levels increasing in some Lake Simcoe fish

5.10 indicators of health WATER

CATEGORY	INDICATOR	STATUS in 2000 REPORT	STATUS in 2005 REPORT	TRENDS/COMMENTS
BEACHES	Percentage of potential swimming days that beaches in the Region are posted or closed as unsafe for swimming and other water contact sports	7.2 % postings and closures (2000)*	17.4% postings and closures (2004)	Increasing trend
STORMWATER WASTEWATER SEWAGE	Number of residential properties on municipal wastewater system	-	195,582 properties; 89% of total residential properties (2005)	-
	Annual loadings of phosphorus into rivers and lakes from Water Pollution Control Plants	728 kg (2000)	702 kg (2004)	4% decrease
	Annual loadings of nitrogen and ammonium into rivers and lakes from Water Pollution Control Plants	Nitrogen loading: 23,274 kg Ammonium loading: 18,544 kg (2000)	Nitrogen loading: 16,305 kg Ammonium loading: 10,371 kg (2004)	30% decrease in nitrogen loading and 44% decrease in ammonium loading
	Number of industries placed on sewer surcharge programs, notified of Sewer Use Bylaw infractions and placed on compliance programs	483 industries inspected; 23 placed on surcharge programs; 42 notified of bylaw infractions; 17 placed on compliance programs (1997)	117 industries inspected; 44 placed on surcharge programs; 22 notified of bylaw infractions; 14 placed on compliance programs (2004)	-
SPILLS	Number of spills reported to the MOE Spills Action Centre	72 (1997)	23 (2004) 39 (2003) 25 (2002) 39 (2001) 47 (2000)	Decline in number of spills reported

*Information changed from 2000 SOE Report to include postings and closures rather than postings only.