

Water Quality Report
May 2007
Bluewater Shoreline Residents' Association

What is the Bluewater Shoreline Residents' Association Trying to Achieve?

Our long term goal is to make improvements in the water quality of the ravines and the beaches of Lake Huron in the Municipality of Bluewater so that the water testing consistently meets the provincial standard (<100 E. coli cfu per 100 ml of water) 100% of the time. A shorter term goal is to demonstrate a sustainability trend through ongoing reductions in the percentage of time that ravine and lake water testing yields results that are above the provincial standard.

Executive Summary

The issue of water quality in Huron County has been studied extensively. From 1996 to 2006, at least 16 studies and reviews have been conducted. For over ten years, BSRA and member associations have supported the idea that communities should work together in a cooperative manner to deal with all sources of contamination. We have believed that this approach is the best way to make improvements in water quality.

The July 10th 2006 manure spill in the Municipality of Bluewater provided an opportunity to review progress in addressing local water quality issues and has generated this report. The conclusion of this review is that other than meetings and reports, no specific effective recommendations to improve water quality have been implemented. None of the leading causes has been dealt with satisfactorily. The Zurich lagoons have not been upgraded, a mandatory septic inspection program has not been introduced, and the Nutrient Management Act has not had the desired results in reducing contamination from agricultural manure management. As a consequence there has been no measurable improvement in water quality during this time.

The spill provided insight into procedures currently followed by Ministry of Environment, the provincial ministry with lead responsibilities related to keeping water free of pollutants and contaminants that could harm the environment and human health. Since manure is organic the Ministry does not treat manure spills with the same level of intervention as a chemical spill and has at least twice with local spills chosen not to contain or treat manure spills but rather allowed the spill to flow into lake Huron. BSRA believes this is not a sound environmental practice. While the Ministry is aware of ongoing surface water contamination, aside from some limited research, it has not taken any effective action to deal with longer term health risks and loss of use of the natural environment. In fact the Ministry appears to focus only on water column contamination unaware or unconcerned about the long term health risks associated with pathogen survival in stream and lake sediment beds. Additionally the Ministry has failed to conduct an up-to-date risk assessment related to ongoing water quality contamination in Bluewater.

The spill has demonstrated that agricultural manure management practices have a significant impact on water quality. However spills are a relatively infrequent event. Test results and analysis of manure sources clearly point to common agricultural practices related to manure storage, use of manure as a nutrient source and manure disposal as a major source of water contamination. The Ministry uses compliance and enforcement as a central means of fulfilling its mandate. However

charges are seldom laid in relation to water contamination due to manure. The impact of normal farming practice has not been addressed sufficiently. As lakeshore populations continue to grow and livestock activities continue to expand, this issue will become an even greater concern for rural residents of Bluewater and Ontario. The Ontario Ministry of Environment focuses most of its efforts on only the manure spills portion of the issue, and is unable to address the larger issue of common manure management practices. In effect, at the present time much of the agriculture industry has been given an exemption from environmental protection legislation.

BSRA plans to continue to participate in local community attempts to address water quality issues. Ongoing water quality testing and reporting of results and continuing to work with community efforts to respond to this issue will be the main focus. Additionally, encouraging local and senior levels of government including responsible ministries to deal effectively with this issue will continue in the future.

Purpose of this Report:

On July 10, 2006, an agricultural manure spill took place in the St. Joseph watershed. The spill and events immediately following the spill have focused attention on several issues regarding water quality in the Municipality of Bluewater. This report presents an overview of information collected over a 10-year period, it identifies the current issues, and it makes recommendations for further action.

Background:

In 1996 the St. Joseph Shores Property Owners' Association initiated water quality testing in Lake Huron and the ravine that flows through the subdivision of St. Joseph Shores. Complaints by property owners about illness from contact with ravine and lake water and also the perception that there was a reduction in the quality of the water in the lake led to the testing of water quality. Testing was expanded in 2003 by the Bluewater Shoreline Residents' Association (BSRA) because many lakeshore residents along the whole 25 kilometers of shoreline within the Municipality of Bluewater raised significant concerns about ravine and lake water quality. The Municipality of Bluewater has supported water quality testing and continues to support a joint project measuring a representative number of ravines and beaches to determine if there is any improvement in water quality.

The results have been published for every year. They can be found in Appendix A and on the BSRA website at www.bsra.ca. These results indicate a pattern of ongoing contamination in which the ravines transport a steady flow of contaminated water into the lake. Ravine readings show a pattern of spikes in readings from week to week suggesting that there are frequently occurring events/incidents/episodes. They also show that there may be a continuous steady stream of pollutants running into the ravines. It is commonly believed there are three main sources of contamination: agriculture-related contamination, municipal sewage systems, and septic systems. However, only one of the ravines contains a municipal sewage lagoon. Therefore it seems clear that the leading sources of contamination are agricultural manure management practices and septic systems.

Occasionally, some individuals point to wildlife as a source of contaminants. However, our analysis indicates that this is not a major factor in Bluewater.

BSRA has worked with various community groups and government departments to better understand issues and identify and implement corrective action. These groups include the following: Municipality of Bluewater, Ausable Bayfield Conservation Authority (ABCA), Huron County Health Unit (HCHU), GAP Laboratories, Huron County Water Protection Steering Committee, Ontario Ministry of Environment, St. Joseph Shores Property Owners' Association, individual watershed property owners and lakeshore property owners in Bluewater. Projects have focused on water quality testing, identification of contamination sources, the development of corrective actions, promotion of water quality stewardship and the improvement of communications between lakeshore and inland property owners.

The manure spill in the St. Joseph ravine on July 10, 2006 served as a forceful catalyst in the community. It caused BSRA to review ten years of study and activity on the water quality issue, and it prompted the decision to write this report.

Methodology

BSRA has re-analyzed our ten years of research, reviewed available studies and reports, met with local officials, summarized the results, and developed five groups of recommendations. The analysis and review included the following:

- Historical testing results
- Information provided by G.A.P. Enviro-Microbiological Services, a private laboratory
- Interviews/discussions with Huron County Health Unit, Ministry of Environment officials, and involved property owners
- Ministry of Environment's actions and explanations related to the July 10th spill
- BSRA Presentations to Bluewater council
- Ministry of Environment and Huron County Health Unit's presentation to Bluewater council
- Review of October 18th 2006 meeting with Ministry of Environment
- Circle process discussions (New Directions Research Project)
- Review of local media reports
- Water Quality Studies conducted in Huron County.

Observations/Results/Conclusions:

Water Testing:

- 1) Water quality is not improving. The percentage of time test results are over the provincial standard is not showing improvement. The ravines continue to be a concern as the tests climb well above the Provincial standard over 70 percent of the time ⁽¹⁾ In addition, significant spikes in the ravine results suggest episodes or specific events that result in short term (usually a couple of days) extremely high (10+ times standard) readings ⁽¹⁾. There appears to be a correlation between spikes in results and rainfall ^(1,2).
- 2) The introduction of pathogens to the watershed causes water column contamination, which is relatively short term in duration. However it appears ⁽²⁴⁾ pathogens settle into the sediment of the ravines and subsequently the lake where they survive for extended periods of time ^(24, 33, 32). It appears that this has resulted in the ravine beds and the near-shore lakebed being contaminated on an ongoing and long-term basis. Every time the beds are disturbed or stirred up the water column is contaminated ⁽²⁴⁾. This results in an increased health risk to people who contact ravine

or lake water ⁽⁵⁾. Most at risk are the elderly, the young and anyone with compromised immune systems ⁽²⁾.

- 3) Creeks and ravines are a means of major loadings of E. coli reaching the lake ^(24, 21, 22, 18).
- 4) Soil types, tiled fields, and water course works have created an effective drainage and flood control system that drains fields in the watershed with maximum efficiency ^(24, 22, 27). The practice of applying untreated manure on fields, manure storage practices and the trend towards liquid manure systems in agriculture coupled with rainfall which has the effect of flushing the system, as in the July 10th manure spill, may explain the spikes in our test results. No other plausible explanation has been brought forward.
- 5) Agricultural runoff has been shown to be a major source of the fecal bacteria that affects the bacterial water quality ^(24, 19, 25, 27).
- 6) The July 10th spill demonstrates agriculture-related activities are at least one of the sources of water contamination ⁽⁶⁾.

Health Risks and Public Awareness:

- 7) Many factors have caused residents to believe that surface water contamination is creating significant risks to their health. These factors include the following: continuing property owner and tourist complaints about poor water quality in the lake and ravines; GAP laboratory's study results pointing to longer term health risks caused by the survival of pathogens in the ravine and lake beds ^(24, 18, 32, 33); BSRA water quality testing results ⁽¹⁾; and Huron County Health Unit beach warning signs ⁽²⁾. Yet lack of specific corrective action by the province of Ontario and a limited focus on the water column by responsible government ministries ^(8, 9, 10) implies a belief that there are no significant human health risks ⁽¹⁸⁾.
- 8) The Ministry of the Environment assumption that "the lake has sufficient assimilative capacity" to deal with these pollutants is a short-term view that may fail to protect our lakes sufficiently for the future ⁽⁹⁾.
- 9) The level of public concern about polluted water appears to be rising as local, provincial, national, and international events have focused media attention on this issue ^(18, 25, 29). These events include the problems with Lake Winnipeg, local statements by national figures such as Maude Barlow and Elizabeth May, media discussions about Toronto beaches, reports of the failure of municipal sewage treatment systems around the Great Lakes, and publicity given to environmental concerns by the Stéphane Dion campaign.
- 10) Test results ⁽¹⁾ demonstrate a loss of enjoyment of natural environments (the ravines and beaches) due to ongoing water column and sediment contamination ⁽¹⁸⁾.

Response:

- 11) In the Bluewater community there tends to be a polarization of views on the water quality issue. Issues are frequently articulated in terms of an urban vs. rural context ⁽¹³⁾. This is also sometimes seen as a conflict among agricultural, residential, and recreational interests.
- 12) Relevant legislation and consequently ministry responsibilities are not clear. Federal requirements seem to suggest provincial responsibility for implementation of federal legislation. Yet provincial ministries seem focused only on provincial legislation ⁽⁹⁾. The Canadian Environmental Protection Act calls for very strong measures to protect against contaminants.

However, the Province is expected to implement the federal legislation and it appears to provide a lower degree of protection. There exists a whole matrix of government organizations and legislation involving three levels of government, and this matrix is not sufficiently transparent. It is difficult for the public to comprehend.

13) Ontario appears to be lagging behind some other jurisdictions in responding to the issue of agricultural practices impacting on water quality⁽¹⁸⁾.

Recommendations:

1) The Federal Government should:

- Clarify relevant Federal and Provincial legislation, legislative implementation responsibilities and accountabilities for the public.
- Assist the Province of Ontario in funding the BSRA recommended demonstration project and participate in the project's implementation.

2) The Ontario Ministry of Environment should:

- Fund and conduct a Quantitative Microbiological Risk Assessment to assess the ongoing human health risk in exposure to ravine and lake water. (This is a relatively new and promising process.)
- Establish and support an agricultural and conservation **Demonstration Project** that would confirm delivery mechanism theories and sources of contamination. Based on existing research, this approach would build on studies currently under way by ABCA. By selecting a suitable short ravine or branch of a ravine in Bluewater and establishing a demonstration project using new technologies (such as anaerobic digesters) and water course procedures (such as wetland creation) to ensure that no pathogens are introduced to the fields or water courses drained by the selected ravine, the impact of agricultural manure management practices and potentially faulty septic systems on water quality can be determined.
- Conduct a review of current testing and containment procedures during responses to water column contamination events and immediately stop the practice of using Lake Huron as a dilution lagoon.
- Enhance efforts to protect natural environment and public health related to surface water quality.
- Protect surface water quality by being proactive in dealing with pollutants at source, rather than accepting the frequently heard view that dilution in the lake is an acceptable long-term solution.
- Conduct an analysis of new research results that suggest testing of sediments is necessary to understand longer-term health impacts of water column pathogen contamination.
- Study the effectiveness of assigning agricultural environment officials.

- Take a lead in ensuring a coordinated provincial government response by enhancing coordination and cooperation among all provincial ministries in responding to surface water quality issues in Ontario.
- Develop and implement a manure spill response plan that coordinates activities of responsible organizations at all levels of government and minimizes public health risks and damage to the natural environment.

3) The County of Huron should:

- Review available information and determine if additional health warnings are necessary.
- Review the local emergency response plan to ensure that it meets the expectations of the Province.
- Support the request for a Quantitative Microbiological Risk Assessment.
- Continue to fund the Huron County Water Protection Steering Committee.
- Continue to fund the Clean Water Project.
- Implement a mandatory septic inspection program.

4) The Municipality of Bluewater should:

- Continue its lead role in government response to the water quality issue.
- Upgrade the Zurich Lagoons to ensure no watershed contamination occurs from the system.
- Continue to fund water quality testing in Bluewater.
- Consider imposing controls on livestock expansion until senior levels of government are able to implement effective measures to ensure safe surface water quality.
- Support the creation in Bluewater of processes such as the building of anaerobic digesters to create the necessary infrastructure to provide alternatives to spreading manure on fields.
- Encourage senior levels of government to respond to the surface water quality issue in a more effective manner.

5) BSRA and the Municipality of Bluewater should:

- Review the effectiveness of community based efforts in achieving improvements in water quality. Alternative strategies such as legislation, enforcement, direct political intervention, senior government ministries, government watchdogs, environmental organizations, and public awareness should be identified and evaluated in terms of probability of effectiveness.

References:

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- 6) BSRA July 10th Spill Update July 14, 2006
- 7) BSRA 2006 Water Quality Study Agreements with ABCA and HCHU
- 8) July 10th spill, MoE Issues
- 9) BSRA conclusions from MoE meeting Oct. 2006
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- 31) 2006 Ontario Environment Commissioner's Report
- 32) Pathogens in Livestock Waste, their potential for movement through soil and environmental Pollution; 1994, Applied Soil Ecology
- 33) Survival of cryptosporidium parvum ... in river water: influence of temperature and autochthonous microorganisms; 1997, Water Science and Technology.
- 34) Multimedia Modeling for Quantitative Microbial Risk Assessment – coping Report, 2005, Conestoga Rovers and Associates
- 35) MoE letter to John Gillespie, November 15, 2006

Appendix A: BSRA Water Quality Beach and Ravine Testing Results from the past 10 years - E. coli cfu/100ml

Date	Wildwood	Houston Heights			St Joseph			Ridgeway		
	Ravine	North	Ravine	South	North	Ravine	South	North	Ravine	South
2006										
Sep 21	330		250			260			480	
Sep 14	160		190			220			860	
Sep 07	110		40			70			1,420	
Aug 31	230	10	230	10	24	80	30	24	690	32
Aug 24	290	14	90	10	24	40	45	520	1,170	167
Aug 17	270	10	250	10	45	110	14	14	610	50
Aug 10	900	14	570	33	10	390	10	2,285	990	156
Aug 03	4,800	455	2,360	709	577	11,200	1,249	3,240	26,100	3,450
Jul 27	8,500	341	3,200	528	1,149	65,000	85	566	11,600	740
Jul 20	770	14	1,350	190	10	20	17	10	400	35
Jul 13	1,350	24	1,760	28	17	16,200	71	17	2,210	74
Jul 06	470	125	840	109	169	260	192	79	2,160	71
Jun 29	350	55	7,400	55	192	880	53	35	1,270	20
Jun 22		46		45	10		10	35		22
Jun 15		10		10	10		10	10		14
Jun 08		39		14	39		28	79		175
2005										
Aug 31		230	250	400	260	550	370	490	990	760
Aug 24		110	35	10	7	2,100	20	10	1,200	1,000
Aug 17		-	7	10	40	38	30	30	360	30
Aug 03		80	124	160	40	134	30	30	620	20
Jul 27		250	1,270	180	70	4,000	60	260	1,510	290
Jul 20		10	800	10	90	1,720	20	60	74	150
Jul 13		10	93	10	10	49	10	10	2,100	10
Jul 06		10	194	10	10	226	30	110	2,290	70
Jun 29		10	480	80	10	330	80	20	1,120	30
Jun 22		40	1,170	50	410	920	210	340	2,100	340
Jun 15		590	8,800	500	1,300	13,700	2,200	1,200	14,300	1,200
2004										
Sep 01		88	177	32	24	2,400	81	19	520	8
Aug 25		1	99	5	20	250	2	2	730	5
Aug 18		30	220	70	20	200	80	59	49	61
Aug 11		57	270	41	199	240	171	40	1,050	36
Aug 04		102	7,500	260	195	1,450	136	171	2,600	310
Jul 28		930	8,400	810	130	3,800	520	340	22,700	7,700
Jul 21		9	2,400	11	28	2,500	5	1	2,100	8
Jul 14		1,160	29,800	1,030	150	4,700	360	390	4,100	380
Jul 07		170	1,500	132	840	9,400	410	123	6,900	1,700
Jun 30		7	340	7	31	1,140	26	16	1,620	25
Jun 24		3,000	1,500	2,000	150	1,400	220	60	1,710	41
Jun 15					1,760	340	2,960			
2003										
Aug 28		10	750	210	30	1,200	50	180	780	140
Aug 21		60	120	70	80	70	60	80	370	70
Aug 07		20	200	20	110	610	190	160	640	160
Jul 31		10	20	20	10	80	40	20	610	30
Jul 24		170	380	120	70	130	50	50	380	10
Jul 17		100	750	190	40	430	90	50	690	80
Jul 10		20	270	20	470	770	100	40	1,000	80
Jul 03					3	120	50			
Jun 25					500	1,400	100			
Jun 18					450	115	1,400			
Jun 11					90	124	120			

Appendix A: BSRA Water Quality Beach and Ravine Testing Results from the past 10 years - E. coli cfu/100ml

Date	St Joseph			Date	St Joseph		
	North	Ravine	South		North	Ravine	South
2002				1998 cont'd			
Aug 28	90	50		May 21	705	210	
Aug 22	220	140		May 14	30	1,200	
Aug 07	225	300		May 07	50	200	
Jul 31	800	820		May 06	50	240	
Jul 24	195	1,100		May 05	170	450	
Jul 18	265	170		May 04	355	770	
Jul 11	10	10		Apr 30	10	20	
Jul 04	210	650		Apr 29	10	60	
Jun 27	1,625	3,000		Apr 28	10	70	
Jun 12	160	70		Apr 27	30	140	
Jun 05	345	380		Apr 23	10	210	
May 16		120		Apr 22	10	220	
2001				Apr 21	10	130	
Aug 29	65	100		Apr 20	10	350	
Aug 22	70	80		Apr 16	120	40	
Aug 15	1,150	80		Apr 02	130	160	
Jul 25	395	910		Mar 26	260	180	
Jul 18	65	20		Mar 19	190	310	
Jul 11	35	370		1997			
Jun 27	280	240		Dec 05	122		
Jun 13	40	440		Nov 28	42		
Jun 07	90	230		Nov 19	8		
May 30	70	140		Nov 13	4		
May 23	310	1,300		Nov 05	102		
2000				Oct 14	20		
Oct 25	100	1,200		Oct 08	6		
Oct 18	100	50		Sep 30	32		
Oct 11	60	720		Sep 24	6		
Oct 04	60	720		Sep 24	6		
Sep 27	110	110		Aug 29	220		
Sep 20	330	180		Aug 21	970		
Sep 06	1,000	1,000		Aug 14	30		
Sep 01	190			Aug 07	168		
Aug 23		220		Jul 31	32		
Aug 16	1,000	1,000		Jul 24	10		
Aug 11	180			Jun 26	147		
Aug 04	350			1996			
Aug 02	1,000	1,000		Aug 08	1,016		
Jul 28	1,000			Aug 01	1,090		
Jul 26	215	80		Jul 25	734		
Jul 21	200			Jul 18	1,126		
Jul 19	140	190		Jul 11	1,013		
Jul 14	440			Jul 04	363		
Jul 07	210			Jun 27	549		
Jun 30	240			Jun 19	600		
May 31	40	150		Jun 17	311		
May 10		1,700		Jun 12	600		
Apr 26	10	40		Jun 10	235		
Apr 19	10	10		Jun 05	600		
Apr 12	30	60		Jun 03	153		
Apr 05	10	10					
Mar 29	20	10					
Mar 22	10	10					