

Zurich Drain Water Quality Enhancement Project



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Acknowledgements

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Special thanks are extended to the Private Landowners of the Pergel Gully watershed that allowed us on their property for a stewardship visit and provided us with access to the drain from their property. The data we collected helps to better understand the current conditions of the Pergel Gully and will help to track improvements in water quality as stewardship actions are undertaken. Your time and efforts will help to provide a healthier watershed for all.

Thank you to the lakeshore residents for their continued interest in keeping Lake Huron clean and enjoyable for everyone.

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Introduction

Issues surrounding water quality have been ongoing around the Lake Huron shoreline for many years. Recently, the Ministry of the Environment led Lake Huron Science Committee reported that multiple sources of potential pathogens contribute to potentially degraded conditions in the Lake and its tributaries (Ministry of the Environment 2005). Three of these identified sources include sewage treatment plant discharges, agricultural-based activities and faulty septic systems. The variability in the potential sources of pollution, suggests that one possible approach to addressing the complicated issues around water quality is to better understand the sources in one specific basin. The Zurich Drain, also known as the Pergel Gully (reference will be to the Pergel Gully for the remainder of the report except for the Zurich Drain Water Quality Enhancement Project) (area 25 km²) (Figure 1) was chosen for assessment primarily due to the local community interest in improving conditions in the tributary.

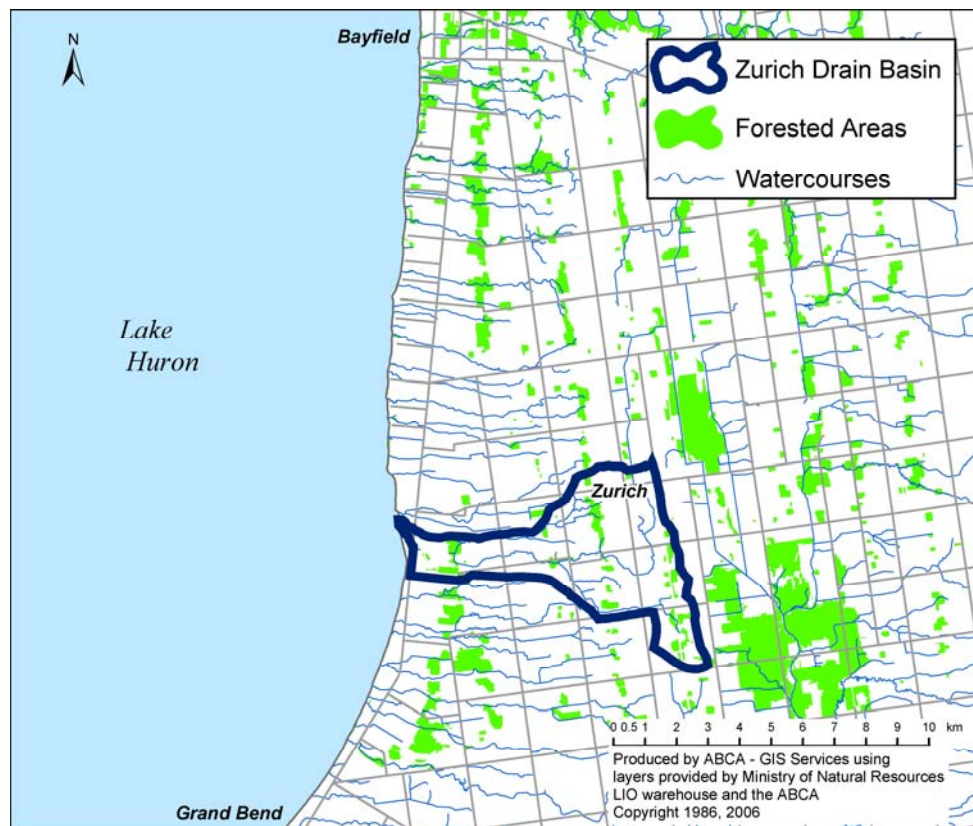


Figure 1: Location of the Pergel Gully watershed.

The overall goal of this project is to enhance environmental quality, particularly water quality in the Pergel Gully. To meet this goal this project used a number of approaches. These approaches are broadly categorized as:

- 1) Outreach – communication to Pergel Gully residents about the project and potential funding opportunities around the implementation of beneficial management practices (BMPs); and

- 2) Stewardship – agricultural and rural, non-farm BMPs; and
- 3) Assessment – drain walks and monitoring will provide the community with feedback about the quality of the water, which will let us know if we are meeting our goal. An examination of the Zurich lagoon discharges will also be included.

The most effective approach to improve water quality conditions is the uptake of relevant BMPs and ongoing sound land management. The Zurich Drain Water Quality Enhancement Project is part of a larger Environment Canada initiative, the Adopt a Watershed Project.

This report summarizes the outreach, stewardship and water quality assessment activities undertaken in 2006 and 2007, and provides a summary of an evaluation of the project undertaken in early 2008.

Methods

Outreach

The initial outreach involved sending a letter to all Pergel Gully landowners (Appendix A), explaining the project and the process. In addition to this, Citizen Ambassadors (i.e., community working group members) visited landowners within the Pergel Gully watershed (beginning March 2006) to:

- a. inform them about the project
- b. request drain access
- c. determine their interest in:
 - i. having technical assistance from Ausable Bayfield Conservation Authority (ABCA) to identify “best bets” for water quality improvement
 - ii. completing an Environment Canada survey

If the landowner was interested in having a stewardship visit they were contacted by ABCA stewardship staff, and a time was set to meet. In cases where the landowner had a specific project or BMP in mind, ABCA staff visited the site and the potential project was documented (i.e., photo and/or written description). Funding opportunities (i.e., Environmental Farm Plan and Huron Clean Water Project), and the methods required to go about obtaining funding were then discussed. If the landowner did not have a specific project or BMP in mind, potential projects were discussed during, or after, a visual assessment of the property. If the landowner was eligible for Environmental Farm Plan (EFP) funding, workshop dates and EFP representative contact information was also provided. These meetings were an essential part of building trust with the landowners.

In terms of the Environment Canada survey, landowners were asked if they would complete a survey. They were informed that it was being conducted by Environment Canada to gain background information in order to build environmental incentive programs. It was also stressed that all information collected was confidential and would not be used to penalize landowners.

Additional outreach was achieved through various media coverage of the project (i.e., local newspapers, radio interviews and a conference).

Stewardship

Stewardship actions refer to any farm or rural non-farm BMPs. These actions were separated into ‘identified’, ‘initiated’ and ‘completed’ projects depending on their status at the time of this report. It should be noted that these projects only recognize those projects that the ABCA is aware of, and the numbers do not reflect projects that are undertaken without the assistance of ABCA.

Assessment

Several methods were used to assess the water quality within the Pergel Gully watershed in order to provide a more comprehensive understanding of potential sources of contamination and the effectiveness of the BMPs that were being undertaken.

Drain walks

Drain walks involved physically walking specific portions of the Pergel Gully. The purpose of such walks was to gain a better understanding of the water connections on the landscape and to identify potential remedial action.

Water & Sediment sampling

Monitoring water quality in the tributary was a key component of the Adopt a Watershed project because monitoring helps enable program managers to determine the effectiveness of the communication and stewardship strategies being attempted in the 25 km² watershed. Monitoring water quality at the various locations within the watershed was to provide feedback about the success of the implementation of various rural BMPs; the program was not intended to penalize co-operating landowners. Consequently, monitoring results for individual landowners was kept confidential. This confidentiality was, and continues to be, an integral part of the trust that is built between the landowners and the ABCA.

In 2006, the ABCA proposed a three level monitoring program (Table 1). Water samples were collected at eight sites within the Pergel Gully watershed. These sites were chosen on the basis of their accessibility and their ability to isolate the different tributaries that compose the Pergel Gully. Both upstream and downstream sites were chosen to provide an inclusive look at the entire watershed.

A comprehensive monitoring approach was proposed for one location in the watershed, at site GULZUR8. The ABCA has monitored nutrients (i.e., nitrite/nitrate, total kjeldahl nitrogen, ammonia, total phosphorus and dissolved phosphorus), total suspended solids (TSS) and *Escherichia coli* (E. coli) at GULZUR8 since 2003. Furthermore, this location at Highway 21 is near the outlet of the tributary, but would not be influenced by Lake Huron water under high lake levels.

Table 1: Water quality indicators and sampling frequency in the Pergel Gully proposed in 2006 and followed in 2007 (*Sediment sampling for E. coli at GULZUR8 was completed in 2007 only).

Sampling Regime	Sites	Indicators	Frequency
Level 1	GULZUR8	Ministry of the Environment – Nutrient Management Program Indicators, E. coli (sediment)*	twice a month in April and May and once a month from June to November, and on rain events between April and November
Level 2	GULZUR4, GULZUR6	nitrite/nitrate, total kjeldahl nitrogen, ammonia, total phosphorus and dissolved phosphorus, TSS, E. coli	twice a month in April and May and once a month from June to November, and on rain events between April and November
Level 3	GULZUR2, GULZUR11, GULZUR12, GULZUR13, and GULZUR14	E. coli	twice a month in April and May and once a month from June to November, and on rain events between April and November

In 2006, the Ministry of the Environment (MOE) committed to sampling one location in the Pergel Gully, GULZUR8. Sampling at GULZUR8 was completed by the ABCA, twice a month in April and May and once a month from June to November, and on rain events between April and November, 2006. Rain event sampling was determined through the use of a permanent rain gauge station (Varna), in addition to data collected by rain gauge volunteers in the Zurich area. In order to sample, there had to be at least a 10 mm accumulation of rain. The samples from GULZUR8 were analyzed for the suite of indicators currently being evaluated through the MOE Nutrient Management Program at an MOE laboratory (Etobicoke, Ontario).

Two additional sites (GULZUR4 and GULZUR6) were monitored for nutrients (i.e., nitrite/nitrate, total kjeldahl nitrogen, ammonia, total phosphorus and dissolved phosphorus), TSS and E. coli. Sampling at these two locations was completed by the ABCA, twice a month in April and May and once a month from June to November, and on rain events between April and November, 2006. An additional five sites (GULZUR2, GULZUR11, GULZUR12, GULZUR13, and GULZUR14) were sampled for E. coli, only. Sampling at these five locations was completed by the ABCA, twice a month in April and May, once a month from June to November, and on rain events between April and November, 2006. All samples from GULZUR2, 4, 6, 11, 12, 13 and 14 were sent to the ALS Laboratory Group in London, Ontario for processing.

Sampling in 2007 took place exactly as it did in 2006, with the addition of sediment sampling for *E. coli* at GULZUR8. Sediment sampling was undertaken according to MOE sediment sampling protocol, and sent along with the water samples for analysis. In 2007 all samples from all sites (GULZUR2, 4, 6, 8, 11, 12, 13 and 14) were sent to an MOE laboratory (Etobicoke, Ontario) for analysis.

Means were calculated for the nutrient and sediment concentrations, and geometric means were calculated for *E. coli* concentrations. Geometric means were also calculated for the *E. coli* concentrations for the sediment at GULZUR8.

E. coli concentrations in the Pergel Gully at GULZUR8 were also compared to historic concentrations from the late 1980s and mid- to late 1990s. These samples were collected by the ABCA, and in some instances the Bluewater Shoreline Residents' Association (BSRA), and maintained in a water quality database.

Benthic sampling

Chemical and bacteriological sampling of water provides information about the current water conditions. Living organisms, such as benthic invertebrates, provide a potentially more integrative measure of ecosystem health. Benthic invertebrate samples have been collected at GULZUR8 on a biannual schedule since 1998. Benthic samples have also been opportunistically collected from seven other locations in this watershed since 1998. Benthic sampling was therefore proposed for all water quality stations sampled in 2006 (GULZUR2, 4, 6, 8, 11, 12, 13 and 14). In 2007, only GULZUR8 was sampled.

Lagoon assessment

Within the Pergel Gully watershed a wastewater treatment plant is located within the former Village of Zurich. This plant operates on a facultative lagoon system with seasonal discharges in the spring and fall. These discharges are released into the Pergel Gully, and as a result represent a potential source of contamination. *E. coli* concentrations from the Zurich lagoon discharge were obtained from the Ministry of Environment and the Municipality of Bluewater for the years of 2001 to 2007. The geometric mean was calculated for each year.

Results

Outreach

Three participants (Citizen Ambassadors) in the community working group worked to contact 39 landowners, 16 of which have had a stewardship visit by ABCA staff (Table 2). Two of these landowners contacted ABCA after receiving the letter outlining the project (Appendix A), while the remaining landowners got involved after speaking with a Citizen Ambassador, or with ABCA staff.

Table 2: Number of landowner visits and outreach.

	Farm	Rural Non-Farm	Total
Number of Landowners	43	17	60
Ambassador Visit/Contact	31	8	39
Have they had a stewardship visit?	13	3	16

Stewardship

Over the past two years the Zurich Drain Water Quality Enhancement Project has yielded the identification of 46 environmental improvement projects. Nineteen projects have been initiated or completed (Table 3). Please note that these projects are only projects that the ABCA can account for and these numbers do not reflect works undertaken by individuals that wished to act privately.

Table 3: Number of completed, initiated and identified remedial action projects and project descriptions.

	Number of Projects	Project Description
Completed Projects	14	Cement yard, eavestroughs (2), well upgrade, buffer (2), septic system fixed, berms/catch basins, milkhouse waste upgrade, manure storage upgrade (2), trees, pasture management/fencing, erosion control
Initiated Projects	5	Eavestroughs (2), trees, well upgrade, washwater filtration system
Identified Projects	27	Erosion control (5), trees (4), fencing (2), manure storage upgrade (4), eavestroughs (3), well upgrade (3), well decommission, buffer, fuel tank upgrade, closing discs, tile shut-off, filter strip
Total	46	

In 2006, three landowners were successful in securing funds through the Huron Clean Water Project, while one landowner was able to obtain funding through the EFP. Four additional landowners took the EFP workshop. In 2007, four landowners were assisted with applying for funds through the Huron Clean Water Project and all four were approved for funding. These same four landowners have also applied to the EcoAction program and are currently waiting for notification on their approval. If approved, the five

initiated projects listed above are anticipated to go forth in the Spring of 2008, bringing the total number of projects completed in this watershed to 19.

In regards to the Environment Canada Waste Management & Biodiversity Conservation Survey, 95 surveys were completed (Note: some of these surveys were conducted with landowners outside of the Pergel Gully watershed).

Assessment

Drain walks

In 2006, drain walks were conducted on June 6, July 13 and October 30 and covered approximately 5 km of the entire drain length. During these walks, areas of remedial action were noted, and two potential erosion control projects were identified (Figure 2). A significant wetland area currently in woodland was also noted.

In October of 2007, a drain walk was undertaken along a 270 m portion of the drain during which a significant erosion control project was identified. This project has since been completed (Table 3).



Figure 2: Potential erosion control projects identified along the Pergel Gully in 2006 (top photos) and 2007 (bottom photo).

Water sampling

In 2006-2007 a total of 40 sampling events were conducted between April and November, including 25 rain events, at eight sites throughout the watershed (Table 4).

Table 4: Water quality sampling events in 2006 and 2007.

Year	Sampling Events	Rain Events
2006	22	14
2007	18	11
Total	40	25

Typically, nutrient (phosphorus and nitrogen) and E. coli concentrations in the drain were greater than objectives or guidelines established for these indicators (Tables 5 and 6, and Figure 3). In addition, water quality indicator concentrations were elevated following rain events (Tables 5 and Figure 3). Nutrient, sediment and E. coli concentrations were generally lower in 2007 than they were in 2006 however this may be attributed to the very dry summer experienced in 2007.

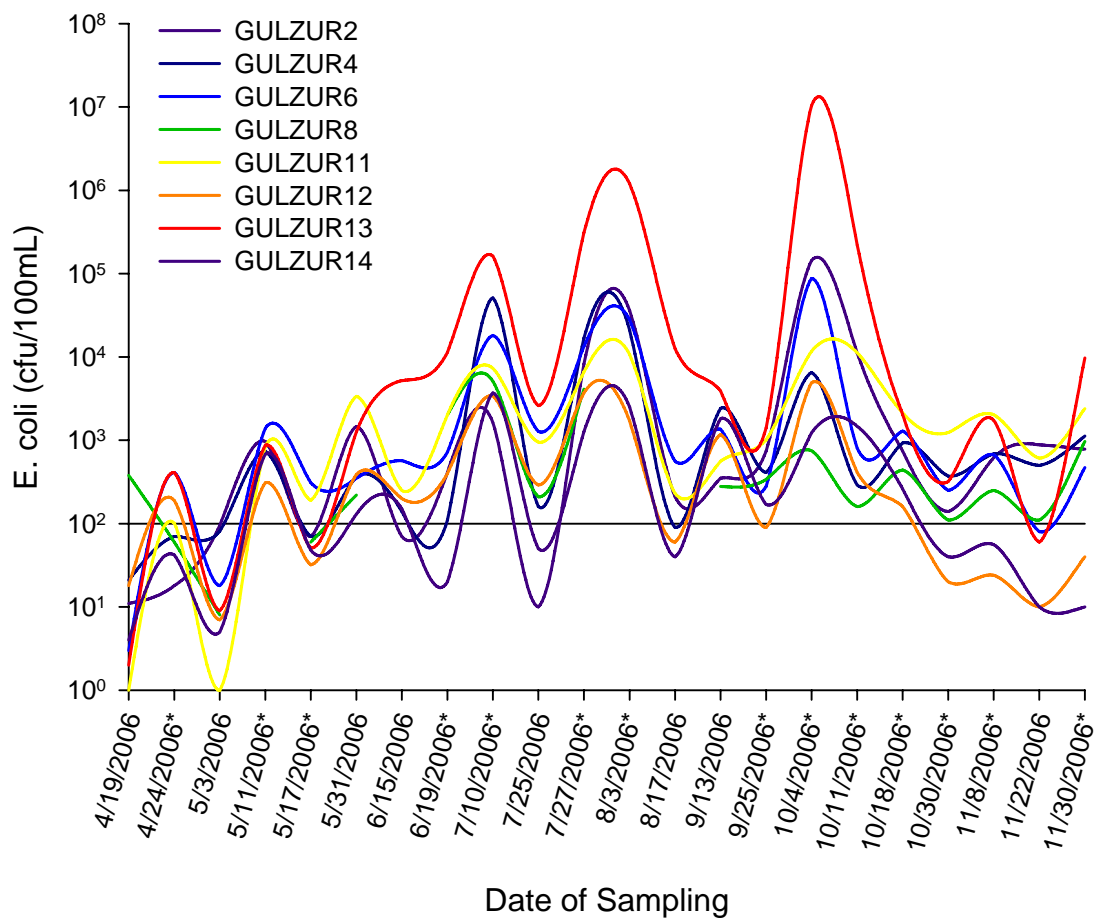
Table 5: Mean nutrient and sediment data summarized for three locations in the Pergel Gully (GULZUR4, 6, 8). TP = Total Phosphorus; TDP = Total Dissolved Phosphorus; TKN = Total Kjeldahl Nitrogen; TSS = Total Suspended Solids (TP standard is a Provincial Water Quality Objective – PWQO. The Canadian Guideline for the Protection of Aquatic Life for nitrate and nitrite is 2.93 mg/L and 0.06mg/L, respectively. The Ammonia standard is a PWQO for un-ionized ammonia, with the concentration and effects on aquatic life dependent on pH and temperature. Provincially, a TSS concentration standard does not exist. Ministry of the Environment suggested that 0-50 mg/L TSS is the typical range of concentrations for this area's streams).

Parameter (mg/L)	Standard (mg/L)	Pergel Gully			
		All Events		Rain Events	
		2006	2007	2006	2007
TP	0.03	0.14	0.07	0.18	0.08
TDP	-	0.04	0.03	0.06	0.04
Nitrate	2.93	3.31	2.13	4.05	2.59
Nitrite	0.06	0.21	0.04	0.20	0.05
Total Ammonia	0.02	0.25	0.18	0.23	0.22
TKN	-	2.09	1.17	1.83	1.25
TSS	0-50	30	11	41	11

Table 6: Percentage of time E. coli concentrations within the Pergel Gully watershed were above varying standards and values for 2006 and 2007.

Standard	Exceedances	
	2006	2007
Percentage of time above Recreational Guideline (100cfu/100mL)	75%	69%
Percentage of time above Ausable Bayfield watershed geometric mean (233cfu/100mL)*	63%	51%
Percentage of time above 1000cfu/100mL	35%	18%
Percentage of time above 10000cfu/100mL	12%	2%

* Ausable Bayfield watershed geometric mean represents 497 samples across the entire watershed between 2002-2005 (Veliz et al. 2006).



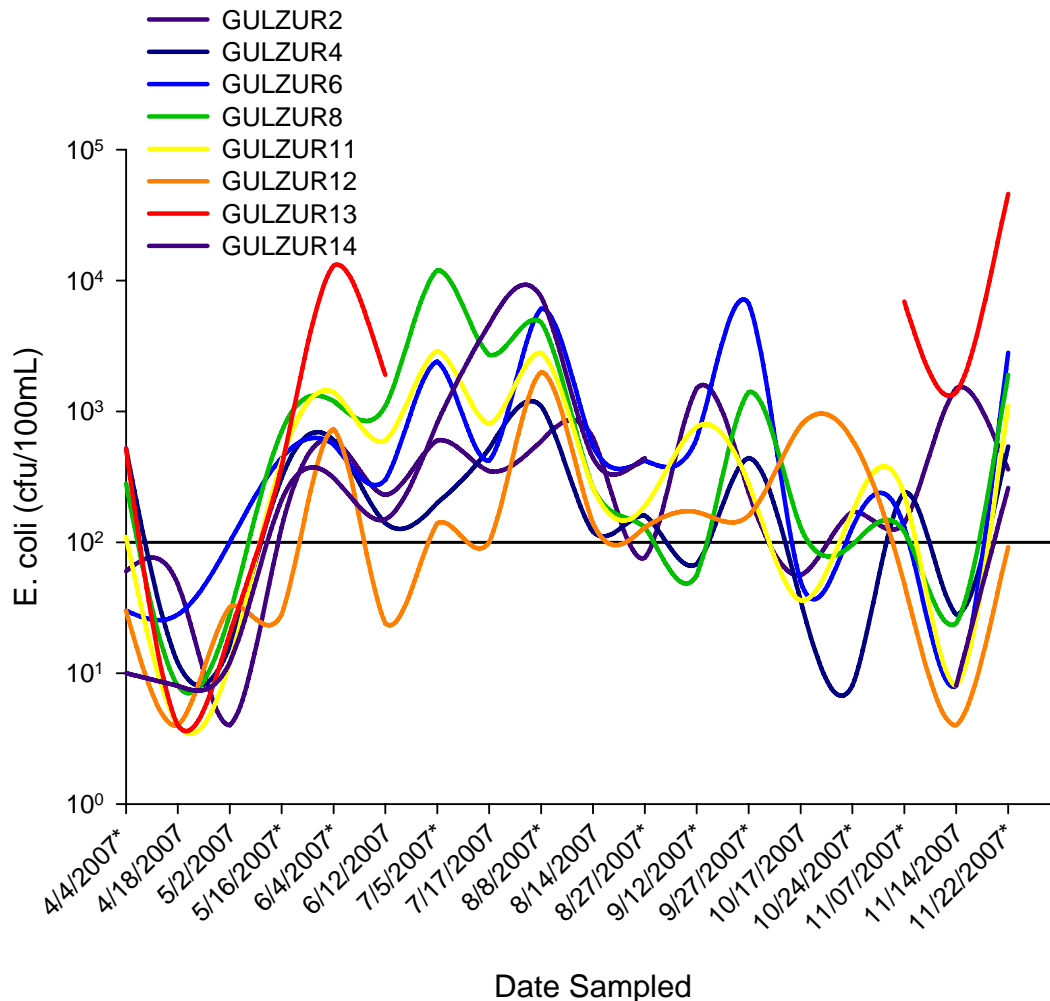


Figure 3: E. coli concentrations (cfu/100mL) at various sites within the Pergel Gully watershed between April and November 2006 (top) and 2007 (bottom). Black line represents the Ministry of Health Guideline (100cfu/100mL). * denotes a rain event sampling.

Overall, E. coli concentrations at Highway 21 (GULZUR8) in 2006 and 2007 were similar to the concentrations found in previous years. Furthermore, these overall concentrations were similar to the E. coli concentrations found in the gully approximately 20 years ago (Figure 4). A maximum value was recorded at GULZUR8 (19600 cfu/100mL) on July 13, 2006 following a manure spill, which also coincided with a rain event. Because this test occurred on a separate monitoring run outside of the routine sampling protocol mentioned above it is not included in Figure 3, but it is included in the data for Figure 4.

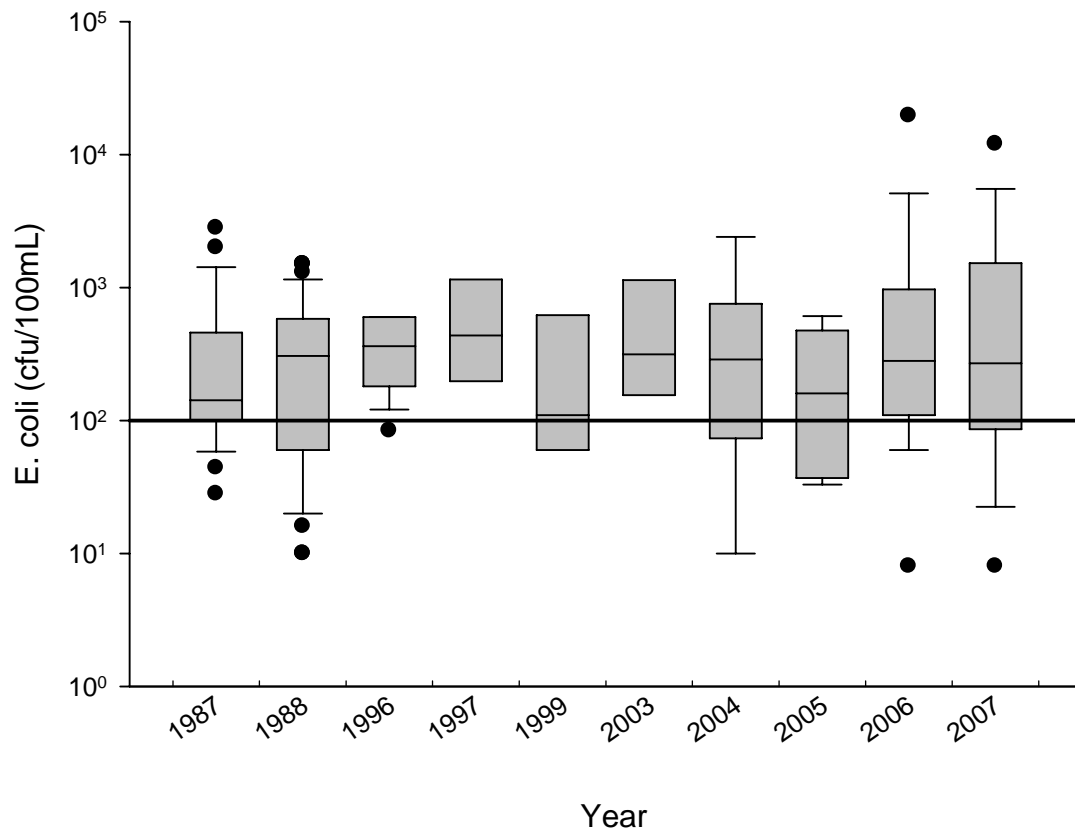


Figure 4: Historic *E. coli* concentrations (cfu/100mL) and more recent *E. coli* concentrations between 2003-2007 at GULZUR8. Outliers (circles) represent values below or above the 10th and 90th percentiles. Highest outlier in 2006 represents an extreme event monitored on July 13, 2006. Black line represents the Ministry of Health Guideline (100cfu/100mL).

Sediment sampling

Sediment sampling occurred 14 times throughout 2007 from May until November, with nine of these being rain events (Figure 5). In general the *E. coli* levels in the sediment were greater than the recreational guideline as was the concentration of *E. coli* in the water column above the sediment (note that this guideline is specifically for water and that there is currently no guideline pertaining to *E. coli* concentrations in sediment). There may be a lag time between when we see elevated *E. coli* concentrations in the sediment versus the water column, however continued sampling and multiple site analyses need to be conducted before conclusions such as this can be made.

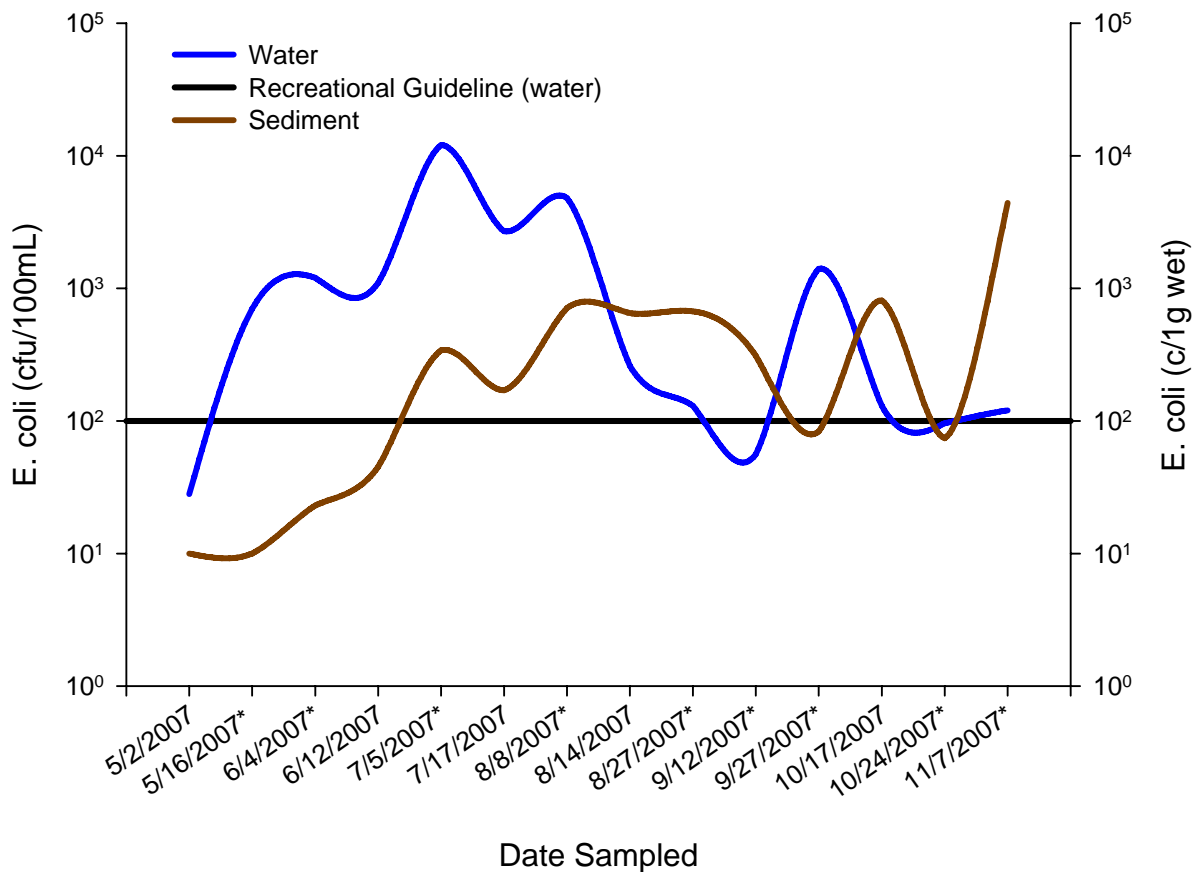


Figure 5: Sediment sampling for E. coli at GULZUR 8. Black line represents the Ministry of Health Guideline (100cfu/100mL) for swimming in recreational waters. No guideline exists for E. coli in sediment. * denotes a rain event sampling.

Benthic sampling

Benthic sampling was undertaken at all eight sites during the fall of 2006. Samples were sent to a Benthic Invertebrate Taxonomist (Mr. Bill Morton) for analysis (i.e., identification and enumeration) and the results are presented below as scores according to a modified version of Hilsenhoff's (1988) Family Biotic Index (Mandaville 2002) (Table 7). These scores were then given a grade similar to the process used in the Ausable Bayfield Conservation Authority Watershed Report Card (Veliz et al. 2006). All sites received an 'F' grade which indicates degraded conditions throughout the watershed. Results for 2007 are still pending at this time.

Table 7: Benthic scores and associated grades for eight sites within the Pergel Gully watershed.

Site	Benthic Score	Grade
GULZUR2	6.58	F
GULZUR4	6.61	F
GULZUR6	8.66	F
GULZUR8	7.22	F
GULZUR11	9.62	F
GULZUR12	7.09	F
GULZUR13	9.80	F
GULZUR14	9.41	F

Lagoon assessment

Since 2001, waste effluent from the Zurich lagoon is typically discharged to the Pergel Gully in April and November (Table 8). *E. coli* concentrations from the effluent discharged from the Zurich lagoon occasionally exceeded the Ministry of Health Recreational Guideline (100 cfu/100mL) between 2001 and 2005. Elevated concentrations of *E. coli* occurred more frequently in 2006. In order to address the elevated *E. coli* levels that were recorded during the Fall 2006 discharge, a chlorine disinfection program was implemented for the Spring and Fall 2007 discharges.

Table 8: *E. coli* concentrations and geometric means (cfu/100mL) of the discharged effluent from the Zurich lagoon from 2001-2005. 1 = effluent from cell 1; 2 = effluent from cell 2. Dash (-) = no discharge.

	2001		2002		2003		2004		2005		2006	2007
Discharge	1	2	1	2	1	2	1	2	1	2	n/a	n/a
April	134	1212	-	1	16	1176	2	229	3	217	433	54
October	-	1	-	-	-	-	-	-	10	-	-	-
November	1	3	-	1	76	2793	324	623	410	-	24189	223
December	-	-	-	1	-	-	-	-	-	-	-	-
Overall geometric mean	14		1		251		98		40		3239	71

Summary

Numerous sources of contamination are recognized to contribute to nutrient and pathogen enrichment in the nearshore of Lake Huron and its tributaries (Ministry of Environment 2005). The goal of this report was not to identify the origin of these potential pollutants, but rather to report on the overall water quality conditions in the Pergel Gully, and the stewardship actions currently being employed to improve upon these conditions.

An important first step in a community driven project like this is education (Gale et al. 1996). This was accomplished through the use of a letter to all landowners, as well as Citizen Ambassadors, who were well known members of the community. This method was chosen not only to foster the community working group, but also to provide a less intimidating encounter as opposed to the ABCA making initial contact. The Citizen Ambassador approach resulted in more landowners becoming engaged compared to the number of landowners making contact after the letter that was initially sent out. Throughout the project there were 39 visits by the Citizen Ambassadors. At least 41% of these landowners were willing to meet further with ABCA staff for a stewardship visit. Moreover, the landowners that have been visited have been very forthcoming about potential stewardship projects on their property. This level of interest in a stewardship visit is remarkable, considering similar studies have yielded little interest in stewardship activities in a watershed of similar size and with a higher number of landowners (Prout 2006). For the landowners that did not care to have a stewardship visit, several explanations have been suggested, which include: a) not wanting to get involved with government; and b) not wanting to partner with the Conservation Authority because of past permitting issues. It was also suggested that for future work, Citizen Ambassadors should bring an ABCA staff member with them on their initial visit so landowners are immediately introduced to a live person as opposed to just having someone, who they are not familiar with, call them from the Conservation Authority.

As a result of the Zurich Drain Water Quality Enhancement Project (Adopt a Watershed Project), 19 stewardship projects have been completed or initiated, while 27 more have been identified. It is unlikely that these projects would have occurred without the incentive of this project. For the 27 projects that remain at the 'identified' stage, the lack of completion is likely due to a) inadequate funding; b) a feeling that there is not a problem, or not understanding how they may be connected to it (i.e., no drains on their property); c) the difficulty of being outside the norm in a small agricultural community; d) a difficulty understanding why these actions are necessary now; or e) a matter of age (i.e., some landowners feel they are too old and that it does not make economic sense for them to invest in environmental solutions at this stage). In the bigger picture however, these are minor issues compared to a lack of willingness to become engaged in an environmental enhancement process such as those that had no interest in having a stewardship visit.

In addition to these stewardship actions, four landowners within the Pergel Gully watershed have taken the new edition of the EFP workshop, with plans to use the available funding for stewardship projects. Several landowners have also been assisted with funding applications through the Huron Clean Water Project which has helped to foster the partnership between the landowners and the ABCA. Four landowners have also submitted projects for approval under the EcoAction Community Funding Program.

In 2005-2007, the Huron Clean Water Project, which provides grants for projects such as clean water diversion, erosion control, fragile land retirement, livestock fencing and wellhead protection/decommissioning, granted funds for 512 separate projects throughout Huron County (area = 3,397 km²). In comparison to this number of projects completed in Huron County in three years, the 19 projects initiated/completed in the 25 km² Pergel Gully watershed is a respectable accomplishment.

The main intent of the water quality information was to use the data as baseline information from which future conditions could be tracked. This data was not to be used to penalize landowners and therefore exact locations of the sampling stations were kept confidential. The water quality information collected in 2006 and 2007 also helped to explain existing conditions. Particularly useful were the drain walks, which helped to identify areas of remedial action that were likely having a direct effect on water quality.

In 2006, and to somewhat of a lesser degree in 2007, concentrations of nutrients (nitrogen and phosphorus), and concentrations of *E. coli* at all eight sites monitored were elevated compared to the standards acceptable in surface waters. This baseline information also highlighted several locations that were frequently contributing relatively high counts of *E. coli*. Furthermore, monitoring following rain events resulted in typically higher concentrations of nutrients and *E. coli*. These monitoring results combined with stewardship visits and drain walks allowed for the identification of some “chronic” sources. In some instances these chronic sources were quite obvious during site visits and even notable from the road. Chronic sources of contamination included management practices such as improper solid manure storage, faulty septic systems, and poor milkhouse waste containment. These are sources of bacteria that are present all the time and can be confirmed with routine monitoring. As rain events occur, they have the ability to move contaminants from these chronic sources and contribute to elevated *E. coli* concentrations noted following these events. For the most part, chronic issues can often be addressed with the implementation and maintenance of regular BMPs.

Not so obvious however, and not as easy to monitor, are the more “acute” sources of bacteria, such as the manure spill that occurred on July 10, 2006. In many cases, the source of the contamination is difficult to assess during routine site visits and may only be realized by evaluating potential contributions from artificial drainage and/or more intensive investigations. To combat these acute events all landowners storing and applying manure should have a spill contingency plan including the appropriate contact numbers (e.g., Ministry of Environment, ABCA, the municipality). All spills should be reported immediately to prevent as much of the contamination as possible. Tile drain outlets should also be monitored closely before, during and after manure application. The extent to which *E. coli* concentrations in the Pergel Gully result from the chronic or acute sources of bacteria is a debate that could potentially require many resources. Perhaps a more appropriate use of resources is to assist those chronic issues that landowners are acquiescing to identify and to remediate.

The effluent discharge data indicated that the Zurich lagoons are a potential source of *E. coli*, particularly in April and November. Concentrations of *E. coli* in the Zurich lagoon effluent between 2001 and 2005 were typically less than the concentrations normally found in watercourses in the surrounding area (Veliz et al. 2006), while *E. coli* concentrations from 2006 were elevated. *E. coli* concentrations decreased in 2007, which was likely a result of a chlorine disinfection program that was implemented during this year. There is no criteria for the concentration of *E. coli* in the effluent that is discharged from the lagoon, however the system operators are required to discharge outside of the recreational season (i.e., May to October) (C. Hutt, pers. comm.). Although these discharges occur outside of this recreational period, there is the issue of chronic loading effects, as well as the long-term survivability of *E. coli* in the sediment after it has been discharged in the effluent. Consequently, the effluent coming from the Zurich lagoon

still has the potential to contribute to the E. coli concentrations in the Pergel Gully. Several efforts have been put forth by the Municipality of Bluewater in order to secure funds to upgrade this lagoon system. Unfortunately the most recent Canada-Ontario Municipal Rural Infrastructure Fund (COMRIF) and Rural Infrastructure Investment Initiative applications have been denied.

The water quality results from 2006 indicate chronic and potentially acute sources of contamination. However, the local community has been committed to making improvements required to improve local water quality conditions. It is important that agencies and fellow landowners continue to provide support to those landowners who have taken, or are in the process of taking the initiative to improve water quality in this watershed. It is equally important to remember that just as it took time to degrade the water quality, it will take time to improve it, and this is only possible when everyone looks to improve upon their own actions.

Recommendations

As a result of the Zurich Drain Water Quality Enhancement Project (Adopt a Watershed), several recommendations can be made:

1. Continue to meet with landowners interested in stewardship visits.
2. Recognize some areas may have more engageable landowners, and that building trust between the landowners and the Conservation Authority takes time.
3. Find the necessary resources, strategies and low-tech solutions to help those landowners that are engaged in improving environmental conditions.
4. Continue to encourage the uptake of BMPs to address the chronic sources of pathogens.
5. Invite a wide array of stakeholders to join the working group so that it consists of the lakeshore and agricultural communities, industry, municipalities and agencies.

Solidify the goals of this community working group, which may include but are not limited to:

- Explore and encourage all possibilities for improvements of the Pergel Gully watershed.
- Promote dialogue and education about watershed processes among all stakeholders within the Pergel Gully watershed (residential, agricultural, etc.).
- Make stakeholders aware of existing or new programs and sources of funding that can improve the Pergel Gully watershed (e.g., Huron Clean Water Project, Environmental Farm Plan grants, Source Water Protection, etc.).

- Raise awareness of the needs of the Pergel Gully watershed and coordinate activities with stakeholders, government agencies and environmental groups.
6. Ensure working group members are able to work cooperatively with others, desire to seek solutions, listen and commit to mutual respect for others.
 7. Continue to work towards resolving the issues currently separating the community, while emphasizing the ultimate goal of working towards clean water and a healthy ecosystem within the Pergel Gully watershed and area.

Project Evaluation

A formal evaluation of the project was undertaken in January 2008, during which landowners and others involved in the project came together to discuss a) how the project went; and b) where they wanted to go from here (Appendix B). One recommendation from this meeting was to establish a steering committee to help guide future work in this watershed and others. There is currently a Municipality of Bluewater Environment Committee and a subcommittee from this may be available for this type of discussion.

In addition to this, several lessons have been learned from doing this community engagement project:

1. Things happen slowly. This includes the trust that needs to develop between landowners and the Conservation Authority, the pace of the actual BMP projects, and the improvements to water quality.
2. In order for a project to be a success, a genuine interest is needed from the watershed community. If people are not engaged, they are less likely to take action or perpetuate the project.
3. Dedicated volunteers are needed from the community to talk to their neighbours and friends about the project to get them engaged.
4. There has to be lots of open dialogue within the community between all stakeholders.
5. Grant money is not always the answer, and in some instances is not available for the necessary actions. Furthermore, the granting process has to be seen as easy for the landowner, and have a fairly quick turnaround time otherwise we run the risk of losing the interest of the landowner, which in some case took a lot of effort to get.
6. In some cases, low-tech strategies are all that is needed to make environmental improvements.

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Appendix A

February 28, 2006
File: W.7.10

John Smith
6 Smith Drive, RR 1
Ailsa Craig, ON
N0M 1A0

Dear John Smith:

Re: Zurich Drain Water Quality Study

The overall goal of the Zurich Drain Water Quality Study is to improve water quality in the Zurich Drain (please find a map on the back of this letter). To work towards this goal a number of approaches are going to be tried. These approaches include: stewardship, communication (e.g., Circle Meetings) and monitoring. The most important approach stewardship refers to actions taken "on the ground" that prevent contaminants from entering the water. There are a number of programs currently available to landowners to undertake stewardship programs. A key part of this proposed project is to use the monies available in the most effective manner to improve water quality.

As a landowner in the Zurich Drain sub-basin, you are being contacted for a couple of reasons. Primarily, we wish to let you know that the project is being undertaken in the Zurich area and that a couple of local landowners will be contacting you in the month of March to tell you more about the project.

Secondly we wish to inform you of an upcoming Environmental Farm Plan workshop being held at St. Joseph's Hall on **Monday, April 10, 2006**. To register, please contact Huron Soil and Crop Improvement Association representative Lois Sinclair at 357-3146 (huron@ontariosoilcrop.org). By completing an Environmental Farm Plan, farmers are eligible for funding to complete a comprehensive suite of on-farm projects. The Huron Clean Water Project and ABCA funding can top-up some categories of the EFP funding. Some landowners are currently receiving financial assistance to employ best management practices and improve water quality.

In the meantime, we encourage you to contact me for more information about the water quality study, or Kate Monk, the Stewardship Co-ordinator, for more information regarding financial incentives for the implementation of various projects. Thank you for taking the time to read this letter.

Yours truly,
AUSABLE BAYFIELD CONSERVATION AUTHORITY

Mari Veliz, Healthy Watersheds Coordinator

Appendix B

**Zurich Drain Water Quality Enhancement Project
Evaluation Circle**

Zurich Community Centre

January 9, 2008

10 am to 3 pm

Participants:

Don Geiger

Wayne Caldwell

Hope Brock

Paul Mennill

Mari Veliz

John Gillespie

Jennifer Ball

Jan Purvis

Paul Klopp

John Vander Burgt

Kay Pranis (Facilitator)

Introduction (Mari)

The Pergel Gully watershed is 25 km². The watershed starts at Zurich and enters Lake Huron at St. Josephs. Land use includes farm, non-farm rural acreages and cottages. The overall goal of the Pergel Gully Water Quality Enhancement Project was to enhance water quality in this basin. To meet this goal this project used a number of approaches:

- 1) *Outreach* (contacting residents with letter and peer to peer visits);
- 2) *Stewardship* (completing agricultural and rural, non-farm environmental Beneficial Management Practices); and
- 3) *Assessment* (water quality testing and drain walks).

Outreach

To date, 39 of 60 landowners have had a peer to peer visit, and of those, 16 have had a stewardship visit by Ausable Bayfield Conservation Authority (ABCA).

Stewardship

Twenty projects have been initiated or completed in this area.

Two goals for today's evaluation:

How effective has the process been in meeting its objectives?

How do participants wish to proceed?

Introduction Circle

Kay asked participants to introduce ourselves and provide an explanation of our role in the project to date and to use water as a metaphor to describe ourselves.

Some concepts from this introduction that help to inform future discussions included: this project underscored the importance of community development; change involves

individuals; and there are many sides of a story and it is important not to embellish certain truths for short-term political gain.

Circle Two: Kay acknowledged that there are different sides to the complicated issue around water quality in this area and asked participants to write down the values that are important to help guide the process for us to work together.

Values to Guide Current Circle and Future Dialogue:

- Humility – hear an opinion different than my own
- Trust
- Honesty – recognize that we each are a part of the problem and a part of the solution
- Work Ethic – we need to be able to work on more than one project
- Treat People Fairly
- Commitment to Ongoing Dialogue – do not abdicate role (Sticky-to-it-ness)
- Willingness to Discuss
- Openness
- Honesty
- Fairness – recognize that fair does not mean equal; Fair means ensuring that people get what they need
- Listen – try to understand the other person’s points of view but remain true to yourself
- Listen without accusing
- Diversity – accept differences
- Empathy
- Listen
- Try to understand other’s point of view
- Work together – the little things do add up

Circle Three: Kay suggested that these were the values we needed to respect in our discussion and that we need to remember that the person with the talking piece should be the only one speaking and they should not be interrupted. Were there any further guidelines? There were none.

Circle Four: What do people feel is their relationship with land and water? Some concepts from this Circle that help to inform future discussions included: sustainable agriculture requires land and water in the right amounts; celebrate good things and successes; water protection helps to guide some people’s purpose; cottage near lake important as a constant in changing urban lives; small, negligible wet areas in the landscape are really more significant than the land water interface that people more normally think about, which is the lake/shoreline interface; living off the land is a reality for some; some regulations are good and some are going to only encourage a more industrial form of agriculture in the long-run; land and water is very important in agriculture and really ought to be extremely significant to everyone. Kay asked

participants to keep in mind people's perspectives about land and water in this conversation.

Circle Five: Zurich Drain, what worked well?

- Financial assistance and help planning projects to improve water quality.
- Communications – ABCA staff; Community Ambassadors; sticky-to-it-tive-ness.
- Trust – members of the community invited staff to their homes and farms.
- It appears to be working – water quality trend improvement in 2007.
- Would like to use it as a model for other ravines.
- Learning experience – much farmland is rented, there are not as many owners operating their lands; agricultural community wanted to do things to improve water quality.
- Resources required to continue to do agricultural best management practices.
- Other issues are important for the drain such as: bait fishermen potentially over-harvesting, lagoon discharge and septic maintenance.

Circles Six and Seven: What were some of the challenges? Everyone spoke once and the talking piece went around a second time on the same question.

- Pace: too slow for ABCA; too fast for rural community
- Depth of interest in community – sometimes difficult to move issue beyond the interest of Community Ambassadors
- People can agree about generalities of the project i.e., the need to improve water quality and the community's role to facilitate this but specifics seem to lead to conflict
- some lakeshore residents thought that Conservation Authorities were aligned with agriculture, they have learned that some in agriculture feel the CA can be bureaucratic and imposing on some projects
- Enhancement projects focused on manure storage issue, not the unresolved issue of manure spreading. This issue has not been studied and could be studied.
- Challenges enormous some success is important
- Landowners need to protect privacy because they are unsure of the legality associated if or when issues are identified in stewardship visits and are not resolved due to financial or other considerations.
- Manure spreading is important for the land.
- (Rural) people care, they just have other things to do.
- It would have been nice to see more effort at lakeshore on the septic re-inspection program.
- Focus on other ravines – do not spend money studying get the money for the Environmental Farm Program
- Pine River Group – projects being done on both sides tied with their local Health Unit.
- Political shaking gets things done
- Use Huron Clean Water Protection Steering Committee as we move forward
- Make province aware to get more money

- Agriculture can work with Conservation Authorities if the Conservation Authorities do not change their intent.
- For some this project was not as much of a priority as it could be and it made some feel guilty
- Farmers do care about the water quality issue
- Research shows proper application of manure not a problem for water quality.
- Solutions from the government will result in more intensive agriculture.
- Some do not see the project ending – this is a good concept an example of community based approach.
- Would like to continue to focus on Zurich Drain and not just address least expensive issues.
- Components of project, such as the circle discussions have been successful but the project needs to grow in dialogue in the community.
- Manure spreading is an example of the type of specific issue that has conflicting concepts. A circle discussion would be useful to get at the issue.
- The least expensive issues were not singled out and addressed; in some instances a substantial amount of resources were spent. Also the project did not target expensive compared to inexpensive projects, rather attempted to identify and abate existing issues.
- The application of liquid manure on tile-drained fields is a complicated issue. Routine monitoring shows more chronic sources of bacteria are present all the time. For the most part, chronic issues can be addressed with the implementation and maintenance of regular BMPs. Not as easy to monitor, are the more “acute” sources of bacteria. To combat these acute events all landowners storing and applying manure should have a spill contingency plan including the appropriate contact numbers (e.g., Ministry of Environment, ABCA, the municipality). All spills should be reported immediately to prevent as much of the contamination as possible. Tile drain outlets should also be monitored closely before, during and after manure application. The extent to which E.coli concentrations in the Pergel Gully result from the chronic or acute sources of bacteria is a debate that could potentially require many resources. Perhaps a more appropriate use of resources is to assist those chronic issues that landowners are acquiescing to identify and to remediate.
- It would be nice to have a broader base of people to be actively involved with the project.

Circle Eight: Where do you want to go from here?

- Maintain the sustainability of the land and water resource
- Establish a committee similar to Pine River Group
- Get message out through Huron County initiatives
- Funding for Environmental Farm Plan
- Projects done with as little bureaucratic assistance as possible
- As a small project, this project was OK but we need a broader project
- Do not waste local Bluewater resources (time and money)
- At the broader (County or Provincial level), we will gain a different perspective

- Focus on a small watershed needs to come from immediate area
- How much is required for this type of project?
- Encourage all Farmers to have an Environmental Farm Plan
- Trial to measure the effects of manure spreading
- Bluewater has applied to be a Blue Flag Community – Requirements for Blue Flag Marina and Blue Flag for Public Beaches
- Water quality will be the main improvement required
- Working group comprised of Bayfield Ratepayers Association, Bluewater Shoreline Residents Association, Ontario Federation of Agriculture – Huron County, Ministry of the Environment, Ausable Bayfield Conservation Authority to facilitate a process that will lead to the Blue Flag.
- Bayfield River or another ravine without the septic or lagoon issue.
- The water quality issue has compelled some agencies (Fisheries and Oceans, Canada and the Ontario Ministry of the Environment) to suggest the response will be under existing legislation
- Community needs to want this
- Think Globally Act Locally
- The simplest solution is usually the best, if this type of project went to higher levels of government it would be difficult to have an impact – keep the project small and local
- This issue is longstanding and not going away the do nothing approach or the hope that EFP is going to solve all the issues is likely not enough of a response. Perhaps, we have collected the low hanging fruit in the Zurich Drain. Perhaps we need to take the results of the project up to the Municipal or County level to get direction about where next to focus efforts. Resources will be part local and part provincial
- Blue Flag has run for 20 years in France
- Some criteria include: sign, maps, promote five community environmental issues per year; water quality has to meet 100 cfu/100 mL 80 % of the time
- Because improvement projects need to go on individual properties, community has to want this and needs to be supportive. Support is demonstrated by all stakeholders doing their respective stewardship guide.
- There is a spectrum of response we could use 12 million dollars to buy the land and make all of the improvements or it could involve a few volunteers plugging away at the issue. Conservation Authority support is somewhere in between – likely closer to the volunteer end of the spectrum. We need to look at the lakeshore holistically, where do we put the little resources that we do have (CA time) to have the biggest impact to improve water quality?
- There is potential for this issue to be adversarial.
- People experienced with this process (i.e., discussion and citizen ambassador approach) should go to other watersheds and start new projects eventually innovative ideas will come back to Zurich Drain.
- Nutrients such as phosphorus may even come from woodlots.

Circle Eight: Kay directed the group to go around again because we were all over the place.

- The project should continue and there are three options:
 - Focus on the same watershed
 - Same idea in different watershed
 - General encouragement in lots of places
- With environmental issues, there is only so much that a small group like this can do and that is they will do what is in front of them. We need to link small pieces and check that the smaller projects are still aligned with the broader direction.
- Threatening with legislation is not helpful. Enforcement resources went to establishing community process because compliance visits in local watersheds were not deemed successful.
- Encouraging more and more regulation will result in more corporate farms with digesters and 1000's of hogs with no family farms and no rural community; this is a provincial issue.
- This process was a model and we have addressed a specific project and also discussed the broader issues around agriculture and economics. This is a discussion that could not have happened two years ago. There is a deeper understanding that agricultural economics are very much a part of the water quality discussion.
- There should be a commitment to ongoing dialogue.
- Key to this dialogue continuing is an advisory committee that can provide direction. Funding from the Municipality of Bluewater can help with discussions with watershed residents about the realities of the Zurich Drain project
- Who is going to knock on the doors?
- There needs to be mandatory septic inspection program.
- Some things are going to occur anyways in Zurich:
 - Septic reinspection
 - Clean water project funding
 - Environmental Farm Plan
- An advisory committee established by the Municipality of Bluewater will be helpful to keep the discussion going and if other funds come along than with assistance from local groups, the ABCA can start in a new area.
- If we use the Zurich Drain project as a model how do we convey the type of process that we followed? Who are the people that need to hear about the project?
- People need to want this process to ask for it? How does it go out? How are they going to know about it?
- Focus on the water quality issue, we are talking about small pieces of land. When we talk about the economics to address the issue we are talking about large agricultural issues.

Circle Nine: Who is going to help figure out the next steps? Who is willing to stay in dialogue to keep this process going? Who is willing to support the process? Some concepts from this conclusion circle that help to inform future discussions included:

Commitment to agriculture key to ongoing discussion; there was general commitment to process; some discussion that municipal committee can help to address issues around longevity of project.

Next steps: Mari to provide these evaluation notes to participants; we should all look forward to hearing from Municipality's working group.