

# Tay River e-Coli Testing Project July 2012

**Funders:** Perth and District Community Foundation (PDCF), Friends of the Tay Watershed Association (FoTW) and the Perth and District Canadian Federation of University Women (CFUW).

**Objectives** of this project were as follows:

1. to establish useful and reliable data as new baseline information re: e-Coli levels of the Tay River in Glen Tay and in Perth during traditionally high-use times in July, samples to be collected and analysed in accordance with Ontario Ministry of Health standards, and re-tested once at the same sites, for a total of 10 samples per site.
2. to help determine sources of e-Coli pollution of the River by comparing some samples taken near culverts entering the Tay in Perth before and after rainfall,
3. to provide testing outcome information to the public to enable people to make better informed decisions re swimming in the Tay, especially during the Stewart Park Festival weekend in mid-July.

**Expected endpoints** included:

1. increased public awareness of risks of swimming in the Tay especially in Perth re e-Coli levels;
2. increased understanding of the importance of preventative action to reduce e-Coli pollution; and
3. acceptance that some increased costs re: storm water treatment may have to be incurred if other efforts are inadequate.

Our ultimate goal is a healthier Tay River.

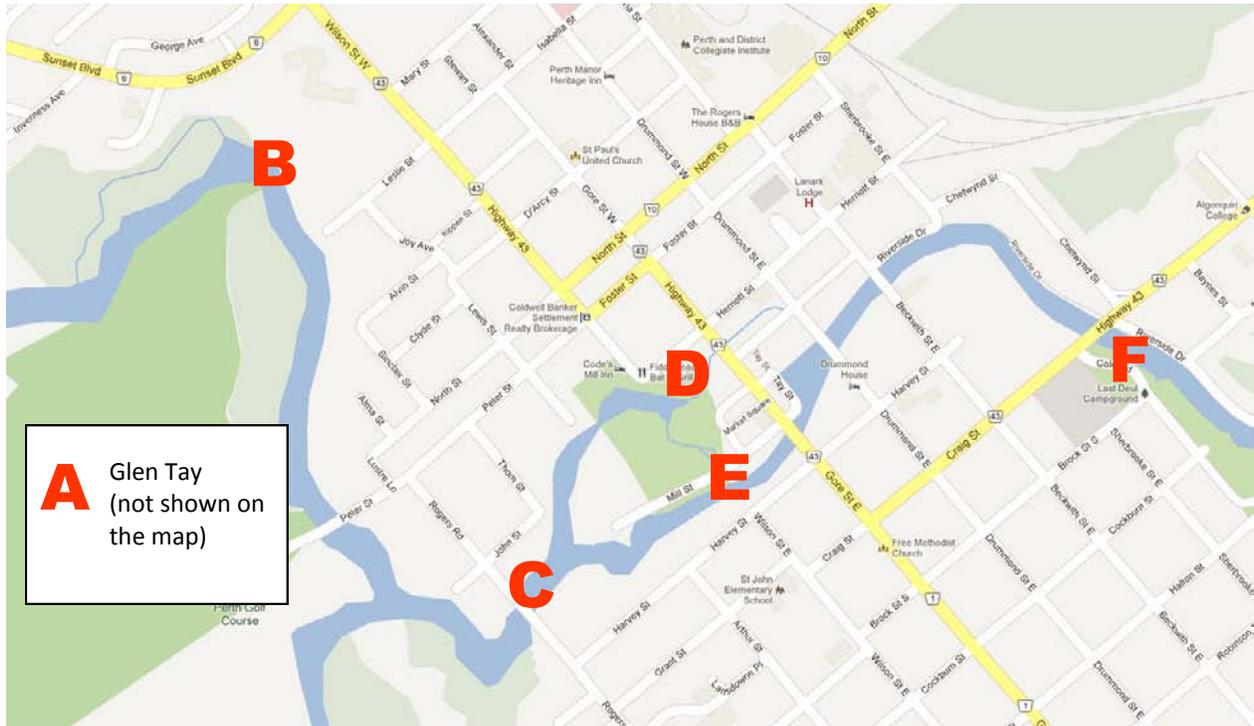
## **Sampling training and final Site Selection meeting**

Sampling volunteers met on July 4 at the Big Ben site with Sarah MacLeod, Resource Technician, Rideau Valley Conservation Authority, to practice proper sampling technique using a sampling rod. All agreed that the addition of sampling at two more sites would be helpful (at the Sunset Blvd outflow and at Last Duel Park) in order to broaden the scope of our project. Funding was then secured for these sites from the FoTW and the CFUW.



Photo: Frank Roy demonstrates use of a sampling pole, observed by sampling volunteers.

**July Sampling Program Notes**, -location of sites follows the flow of the Tay.



July 9 and 16 at Glen Tay Bridge (A): This site is at the public beach at Glen Tay, about five km upstream from Perth. The river is shallow here, so the sampler waded in until there was adequate testing depth (1 m) at mid-river. The site is upstream from the Glen Tay Bridge, off the upper point of the public beach, and about 20 m downstream of the stone house. Rudsdale Creek, which enters the River about 150 m above the site, is known to have a large beaver population. Both samples were taken during drought period. Sampler: David Taylor



July 9, 17 off Sunset Blvd: This site (B) is just off Sunset Blvd and downstream from the Perth drinking water treatment plant. Samples were taken from midstream just downstream of a culvert; the sampler waded in to maximum depth of about .5m. The second set of samples was taken following rain. Sampler: Chris Stone with Judy Buehler, second set with Peggy Land.



July 9,16 at Rogers Road Bridge: This site (C) is on the western border of the Town of Perth and is close to where Grants Creek and the Tay merge. Samples were taken from canoe just downstream of the bridge on the south side and in front of the culvert on that side. Current noted to be very slow, a flock of 6 tame geese were observed about 80 feet from the test site on July 16, riparian cover-rock and overhanging trees-buckthorn, pickerel weed were on opposite side of the River. Both samples were taken during a drought period. Sampler: Frank Roy with Judy Buehler



July 9, 17 at Big Ben Statue: This site is near the statue, about 10 m. downstream of the Wilson Street W. culvert entering Stewart Park from where the Tay branches off (left) into the "Little Tay". It continues on (right) towards the Green Bridge, a favorite swimming site for children. The maximum depth available for testing in this area was approximately .75 meters, and the sampler waded in. The second set of samples was taken just after a rain when there was visible outflow from the culvert, but on previous testing the culvert had been dry. Sampler: Chris Stone with Judy Buehler, second set with Peggy Land.



July 9, 16 at the Outdoor Pool adjacent to Stewart Park: Formerly a designated beach, e-Coli testing by the Health Unit at this site ceased 15 years ago but it is still a popular place for wading and where dogs can often be seen as well, enjoying the water. The Pool itself is only about .5 meters deep but becomes deeper immediately downstream. Samples were taken from the downstream side, both during drought. Sampler: Peggy Land with Murray Long.



July 9, 16 at Last Duel Park:

This park includes a campground, a boat launch and three docks, and is an area where people often swim and or waded in to launch their canoes, kayaks etc. Samples were taken from the dock closest to the Town centre, three from the downstream side and two from the upstream side, all from where depth was adequate, 1m. Both sampling dates were within a drought period. Sampler: Jim Graff with Peggy Land



Test results

**Tay River E-Coli Testing Results—July 2012**

Location	Date	E-Coli — cfu/100ml*	Air/water temp °C	Special observations
Glen Tay (A)	July 9	25	23/NA	
Glen Tay (A)	July 16	47	26/25	
Sunset Blvd (B)	July 11	52	22/23	
Sunset Blvd (B)	July 17	70	21/NA	After heavy rain
Rogers Road (C)	July 9	47	20/NA	
Rogers Road (C)	July 16	52	25/23	
Big Ben Statue (D)	July 11	45	22/23	
Big Ben Statue (D)	July 17	>400	21/28	After heavy rain
Outdoor pool (E)	July 9	36	29/26	
Outdoor pool (E)	July 16	41	23/27	
Last Duel Park (F)(	July 9	50	30/20	
Last Duel Park (F)	July 16	57	33/27	

\* Represents the geometric mean of five samples taken at each site on the same date.

Greater than 0 cfu/100 ml—unsafe for drinking

Greater than 100 cfu/100 ml—unsafe for swimming

**Summary** as posted at the FoTW info tent with the above table, July 21 and 22:

Levels of the bacteria e-Coli are important indicators of the health of any body of water. Unfortunately, the Tay in Perth has not been tested for swimming in Perth for many years and yet people continue to swim in it. The Outdoor Pool, once considered to be a “designated beach” is no longer designated as such and therefore it has not been tested by the Health Unit for at least 15 years.

Members of the Friends of the Tay Watershed recently tested for e-Coli in 60 samples taken from six sites along the Tay (see accompanying map for site locations). These tests have generally shown at least moderate levels of the bacteria e-Coli in the water. However, this is a common finding in natural bodies of water such as lake and rivers. Six sites were tested on Monday July 9 2012, and four of these were re-tested Monday July 16, 2012. These results showed a significant increase in the levels, coinciding with increased air and water temperatures.

On Tuesday July 17 – following the first real, but brief, downpour of rain in weeks, the remaining two test sites were re-tested. These two test sites are near culverts which release untreated storm water into the Tay. Results showed high levels of e-Coli in the water at the site nearest where people often swim in the Tay in Stewart Park. This is not an unexpected finding; it illustrates clearly that untreated storm water from run-off can downgrade the health of a river considerably.

Funding for this project has been provided by the Perth Community Foundation, the Friends of the Tay Watershed and the Perth and District Canadian Federation of University Women. A second phase of testing is planned for 2013.

See the FoTW website later this month for a more complete report at [www.tayriver.org](http://www.tayriver.org).

## **FoTW Survey Results, e-Coli testing project 2012**

During the 2012 Stewart Park Music Festival, members of Friends of the Tay Watershed Association (FoTW) conducted a survey, consisting of a short questionnaire which was filled out by 48 respondents (see Appendix 1). These survey respondents (all adults) either filled in the questionnaire at the FoTW information booth or were approached at random in the park by surveyors. All surveys were completed on July 21 or 22.

The survey period coincided with the release of data from recent water testing conducted by the FoTW on July 9, 16 and 17. The results of this water-testing, along with a map of the testing areas and a statement summarizing the findings, were posted at the FoTW information booth, with the result that some survey respondents had seen these results before taking the survey.

### **Residency in the Perth area**

Of the 48 survey respondents, 34 (71%) stated that they lived in the Perth area, while 14 (29%) stated that they did not.

### **Swimming or wading in the Tay River**

When asked "Do you swim in the Tay or ever considered it?" only one of the 14 non-Perth area respondents answered YES, while 24 of the 34 Perth area respondents (71%) answered YES.

Thus, a high percentage of Perth area respondents who attended the Stewart Park festival had at some time waded or swum in the Tay River. Understandably, a much smaller percentage of non-area residents answered YES to this question.

### **Factors influencing a decision to swim or wade in the Tay**

Respondents were asked to rate the importance of four factors in considering whether to swim or wade anywhere along the Tay River. These factors were the presence of a lifeguard; bottom conditions that made the bottom possibly unsafe or difficult to see; the speed of the current; and regular monitoring and reporting of e-Coli levels. The rating choices for each factor were: not important at all; not very important; no opinion; somewhat important; and very important.

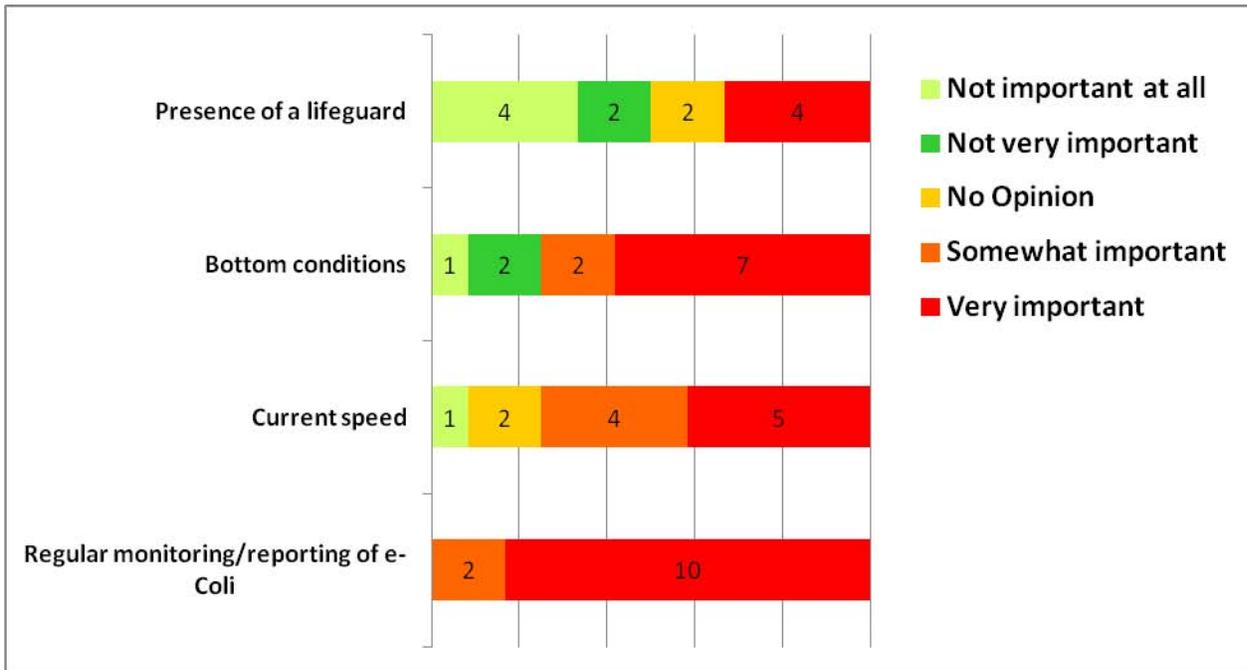
All survey respondents answered this question. See the next page for charts summarizing the responses.

As can be seen from the two charts below, the presence of a lifeguard ranks somewhat higher in importance with non-Perth residents who may be less familiar with the Tay River as a place to wade or swim. Bottom conditions also rank as somewhat more important to non-area residents, although they rank as a significant concern among both Perth and non-Perth respondents.

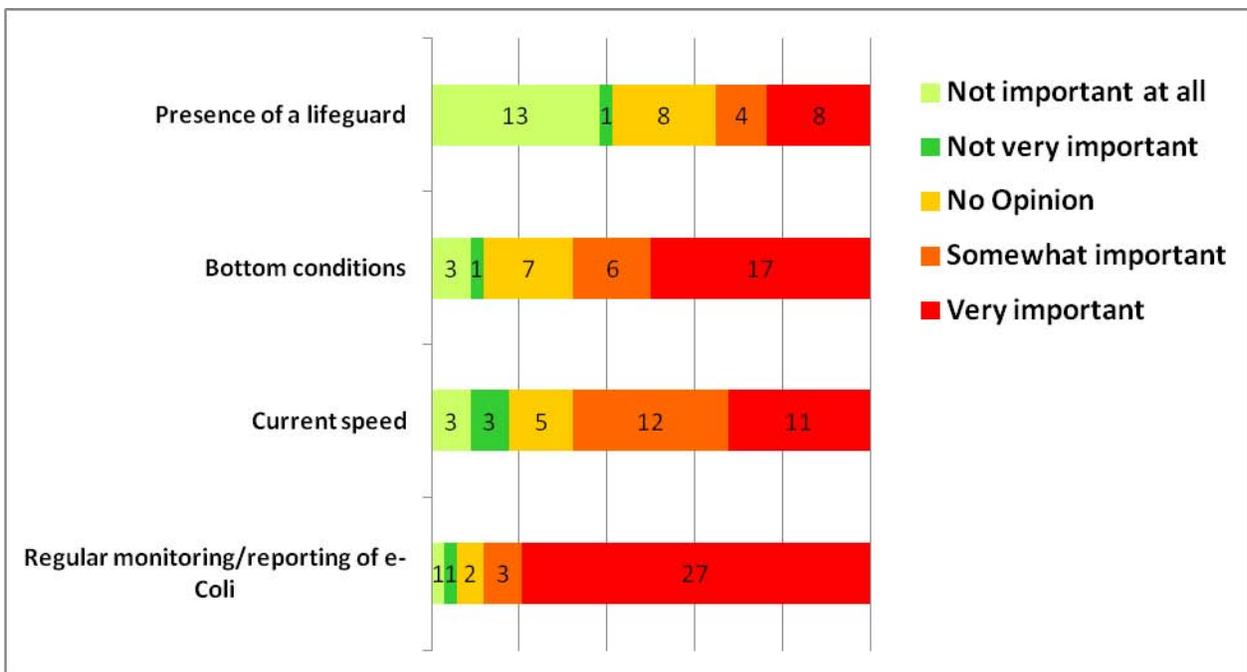
Current speed is also a consistently important factor among both groups of respondents, with 75% of non-Perth respondents ranking this as somewhat important or very important. Among Perth area respondents, 62% rated this factor as somewhat important or very important.

The factor with the highest ratings for somewhat important or very important was regular monitoring and reporting of e-Coli levels in the water. In fact, 100% of non-Perth respondents who answered this question considered this factor somewhat or very important, while 88% of Perth area respondents considered this a somewhat or very important factor.

**Non Perth residents rating of the four factors**



**Perth area residents rating of the four factors**



### **Decision to wade or swim in the Tay based on recent e-Coli testing results**

When told that recent water testing had shown “generally moderate levels of e-Coli in the Tay at Perth and at Glen Tay” and had shown “high levels in Stewart Park after the rain on Tuesday (July 17) likely due to untreated storm water run-off entering through the culverts” respondents were asked, based on knowing this information, if they would consider swimming or wading in the Tay River in Perth that weekend (during the Stewart Park Festival).

Only 1 non-Perth area respondent said YES to this question while 11 (92%) said NO. These percentages are entirely consistent with the percentages of non-Perth area respondents who stated they had swum or waded in the Tay or had considered doing so

Among Perth area respondents, 11 (32%) said YES, they would consider doing so, with 23 (68%) saying NO, they would not. These percentages represent an almost complete reversal from the percentage of Perth area respondents who had stated they had previously swam or waded in the Tay or had considered doing so at some point in time (71% YES and 29% NO), and suggests that knowledge that recent e-Coli samples measured in a “moderate” or “high” range was a strong influence on Perth residents’ decisions against swimming or wading in the Tay River in Perth that weekend.

### **Providing information about health risks of swimming in the Tay**

Respondents were asked if the Town of Perth should notify people of the potential health risks of swimming in the Tay. These risks were not specifically enumerated in the question; however the previous question about presence (or lack) of a lifeguard, possibly unsafe bottom conditions, current speed and presence of e-Coli in the water provided respondents with a framework with which to address this question.

Among all 48 respondents, 44 (92%) stated YES to this question. When asked to suggest means of notifying people of risks, the following suggestions were made, listed by order of mention:

Posting notices or signage	33
Radio announcements	24
Newspaper notices	9
Website/social media announcements	7
Warning flags (these could be colour coded)	2
Police monitoring of swimmers/waders	2
General media (no specific mention of radio/print or social media)	2
Letters to residents	1
Monitoring and reporting (which might fit into general media above)	1

As clearly shown from the above chart, signage (69% of respondents identified this as their first choice) and radio announcements (50%) seem the most popular means of informing people of risks of swimming/wading in the Tay River, with newspaper and social media announcements also considered an effective means of doing so.

### Taking action to improve the Tay River's water quality

The final question for respondents was whether the Town of Perth should take action to improve the Tay's water quality.

Among non-Perth residents, 100% responded YES to this question. Among Perth residents, 94% responded YES. The percentage stating YES across both groups of respondents was 95%.

From the YES groups, when asked to provide or choose from suggestions of how the Town could take action, see listed below by order of mention:

Naturalization of shorelines or bio-remediation	21
Holding tanks or catch basins	16
Creation of a dog park	4
Monitoring of the water quality	3
More public education on water quality issues	3
(Non-specific) control and prevention of run-off	2
Enforcement of stoop & scoop bylaw	1
Provision of doggie bag stations	1
Measures to keep pets from the park and the pool	1
Good greywater/sewage/septic systems at source	1
Alternative cattle watering systems for farmers	1
Compostable storm water filters	1
Bio-remediating islands	1

In addition to the above, were individual suggestions for treatment of the water in the Tay, community action or working costs of water quality improvement into taxes and the Town budget, two general suggestions to "keep the river clean" and "clean the swimming hole", and suggestions to promote the use of human waste composting/non-flush toilets, and the need for "political action." One respondent added "Don't forget Walkerton."

It is clear from the above chart that naturalization of the Tay to permit bio-remediation to take place is the number one recommendation of all respondents (43%), with strong support as well for the use of some kind of holding tank/basin or pond (33%). While much further down on the action list, desire for a dog park and for the Town to monitor water quality on a regular basis as well as provide more public education around water quality issues also rated higher than other suggestions.

## **Summary**

Although this survey had a relatively small number of respondents, the results are very revealing, both about the current use of the Tay by Perth residents and others (at least those who attend the Stewart park Festival) for swimming and wading and the concerns about e-Coli presence in the water. Specifically:

- More than 70 percent of respondents from the Perth area have swum or waded in the Tay or would consider doing so.
- An extremely high percentage of Perth respondents (88%) and 100% of non-Perth respondents consider it somewhat or very important that there be regular monitoring or reporting of e-Coli in the water.
- There is a strong correlation between knowledge of e-Coli levels (especially if the levels are “moderate or “high” (high being over 100 colony-forming units of e-Coli per 100 ml of water) and a decision not to wade or swim in the Tay.
- More than 90% of all survey respondents believe the Town of Perth should notify people of the potential health risks of swimming in the river. Close to 70% of respondents believed signage was the preferred method of doing so, backed up by radio announcements (50%) and use of other media.
- Collectively, 95% of all respondents, including 94% of Perth respondents, believe the Town of Perth should take action to improve the Tay’s water quality. The number one suggestion for action is naturalization (43% of respondents) followed by the use of holding tanks/basins or ponds (33%).

It is clear from the above survey results that citizens of Perth value information about water quality in the form of regular e-Coli testing, and believe the Town should post those results in some form, including specifically the use of signage.

Equally clear is the view of citizens that the Town of Perth should be taking more action to improve water quality, with naturalization and the used of holding tanks for storm water run-off high on the list of possibilities.

## **Conclusions**

This testing program has achieved its objectives and expected outcomes as shown in the above testing and survey results. Our ultimate goal of a healthier Tay River with lower levels of e-Coli especially from untreated storm water run-off is yet to be achieved however.

### **Next Steps**

At time of writing of this report, we await receipt of payment for the invoices from Caduceon Labs, both payments sent by mail on July 26'12 and will provide these to our funders as soon as they arrive. See invoices in Appendix 2.

The FoTW and the Environment Committee of the CFUW are scheduled to present our testing project results and recommendations to Perth Council on Sept. 11.

We plan to repeat this testing project in the summer of 2013 and hopefully by then some actions will have been taken by the Town of Perth to post warning signage which include the risks of contracting bacterial infection by swimming or wading in the Tay, and to improve the health of the river by reducing the entry of e-Coli into the Tay, especially via untreated storm water. Another round of tests will help show any changes and add to the data base of e-Coli levels in the Tay from Glen Tay to Last Duel Park.

Respectfully submitted,

Carol Dillon  
Executive Board Member  
Friends of the Tay Watershed Association

Peggy Land  
Environment Committee Chair  
Perth and District Canadian  
Federation of University Women

## Appendix 1: FoTW Survey for Stewart Park Festival 2012

You may have noticed in this year's Stewart Park Festival program that Friends of the Tay Watershed is encouraging those interested to check in at our booth to find out the results of recent testing for e-Coli levels, important indicators of the health of the River. Would you be willing to answer a few questions for us to help us with our on-going testing project?

1. Do you live in the Perth area?

Yes No

2. Do you swim or wade in the Tay or ever considered it?

Yes No

3. How important do you consider the following factors to be if considering swimming or wading anywhere along the Tay? Please choose from not important at all(1), not very important (2), no opinion (3), somewhat important (4) ) very important (5) :

Presence of a lifeguard	1	2	3	4	5
Bottom conditions possibly unsafe and difficult to see	1	2	3	4	5
Current speed	1	2	3	4	5
Regular monitoring and reporting of e-Coli levels	1	2	3	4	5

4. Recent testing by us has shown generally moderate levels of e-Coli in the Tay in Perth and at Glen Tay, and high levels in Stewart Park after the rain on Tuesday, likely due to untreated storm water run-off entering through the culverts. Knowing this would you consider swimming or wading in the Tay in Perth this week-end?

Yes No

If yes, how? \_\_\_\_\_

\_\_\_\_\_

5. Should the Town of Perth take action to improve the Tay's water quality?

Yes No

If yes, how? \_\_\_\_\_

\_\_\_\_\_

## Appendix 2: Caduceon Invoices



### Invoice

Date	Invoice #
25-Jul-12	12-8898

<b>Bill To:</b> Friends Of Tay Watershed 58 Cockburn St Perth Ontario K7H 2B6 Canada
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Quote Number	PO Number	GST Number
P120606_PL		898699194

Currency	Project Number	Terms
CAD		NET 30 2%/month

Line	Item	Ref	Description	Qty	Rate	Amount	
1	Analysis	B12-17893	EC	10	8.00	80.00	
2	Environmental		Environmental Surcharge :	1	1.50	1.50	
						Sub Total	81.50
						HST 13%	10.60
						<b>Total</b>	<b>92.10</b>



### Invoice

Date	Invoice #
23-Jul-12	12-8731

<b>Bill To:</b> Friends Of Tay Watershed 58 Cockburn St Perth Ontario K7H 2B6 Canada
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Quote Number	PO Number	GST Number
P120606_PL		898699194

Currency	Project Number	Terms
CAD		NET 30 2%/month

Line	Item	Ref	Description	Qty	Rate	Amount	
1	Analysis	B12-17040	EC	20	8.00	160.00	
2	Analysis	B12-17324	EC	10	8.00	80.00	
3	Analysis	B12-17636	EC	20	8.00	160.00	
4	Pick-Up Fee		Pick-Up Fee :	3	10.00	30.00	
5	Environmental		Environmental Surcharge :	3	1.50	4.50	
						Sub Total	434.50
						HST 13%	56.49
						<b>Total</b>	<b>490.99</b>