

Harrington Dam and Conservation Area

Existing Environmental Conditions

Updated March 8, 2017



UPPER THAMES RIVER
CONSERVATION AUTHORITY

Contents

Introduction	1
Project Study Area	2
Trout Creek Watershed Action Plan	6
Flow Characteristics	6
Hydrogeology	7
Topography, Geology, and Soils.....	7
Private Well Survey	11
Surface Water Quality.....	12
Aquatic Ecology.....	15
Fisheries Resources	15
Benthic Resources.....	16
Vegetation and Wildlife Inventory.....	18
Cultural.....	20
History of Study Area	20
Current Uses	21
Other Uses	21
Bibliography and reference documents.....	21
Appendices.....	22
Appendix A: Flow Characteristics of Harrington Creek at Harrington Dam and Youngsville Drain at Embro Dam	22
Appendix B: Harrington Pond Water Quality Assessment.....	22
Appendix C: Harrington Dam area Fish and Benthic Records.....	22
Appendix D: Harrington Conservation Area Vegetation and Bird Inventory 2015.....	22
Appendix E: Historic Harrington Dam and Conservation Area News Articles	22

List of Figures

Figure 1: Trout Creek watershed with Harrington CA highlighted (Source: UTRCA)	2
Figure 2: Trout Creek watershed in relation to the Upper Thames watershed (Source: UTRCA)	3
Figure 3: Harrington Conservation Area (Source: UTRCA).....	4
Figure 4: Location of dams upstream and downstream of Harrington Dam (Source: UTRCA)	5
Figure 5: Catchment area and elevation of Harrington CA (Source: UTRCA)	8
Figure 6: Surficial geology of the area around Harrington CA (Source: UTRCA).....	9
Figure 7: Groundwater recharge (mm/y) of the area around Harrington CA	10
Figure 8: Known wells in the area of Harrington CA (Data Source: MOECC).....	11
Figure 9: Harrington Pond Water Quality Survey Sites 2015 (Source: UTRCA)	12
Figure 10: Harrington Pond Continuous Temperature Upstream and Downstream, Summer 2015 (Source: UTRCA).....	13
Figure 11: Harrington Dam area Benthic and Fish Sampling Sites (Source: UTRCA)	15

List of Tables

Table 1: Water quality ranges for FBI values	17
Table 2: Comparison of FBI values for Harrington CA, Trout Creek and UTRCA watersheds (Source: UTRCA)	17

Introduction

The Upper Thames River Conservation Authority in partnership with Zorra Township is undertaking an environmental assessment of the Harrington Dam under the Conservation Ontario Class Environmental Assessment process. This report describes much of the existing natural environment conditions for the Harrington Dam and Conservation Area. This report includes measurement, inventory, analysis, and observations undertaken by Upper Thames River Conservation Authority (UTRCA) resources during 2015 of streamflow, water quality, aquatic environment, natural heritage, cultural setting, and limited hydrogeological background information. Similar information is gathered and interpreted routinely by the Authority in support of watershed focused environmental efforts. Contributing local watershed context and historical information where available is brought forward for comparisons. Community contributions have been considered to date.

The information in this report will be considered in the presentation and analysis of alternatives for the Harrington Dam by the consultant. The consultant as contracted through the Terms of Reference for the overall Assessment has augmented the environmental information with further study of the physical environment and will interpret all the resources information collected.

The report is a draft which will be finalized with additional information as required before final publication with the Assessments documentation.

Project Study Area

Harrington Dam and Conservation Area is on Harrington Creek which flows into the nearby Wildwood Reservoir. Harrington Creek is a tributary of Trout Creek, located in the Trout Creek watershed.

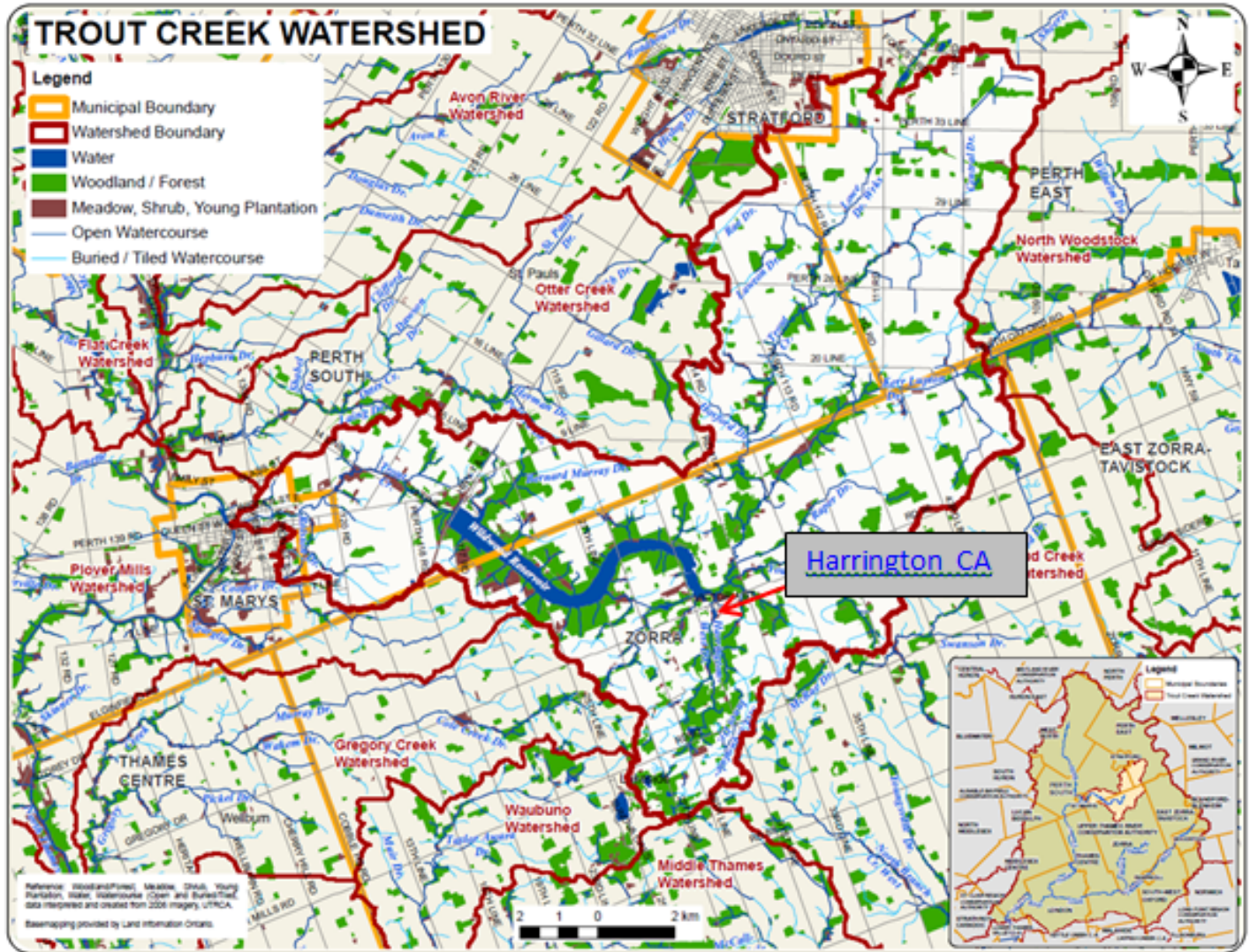


Figure 1: Trout Creek watershed with Harrington CA highlighted (Source: UTRCA)

The Trout Creek watershed drains an area of approximately 161 km² and is located in the centre of the Upper Thames River Conservation Authority watershed. Trout Creek outlets into the North Branch of the Thames River in the town of St. Marys. The watershed includes portions of the Townships of Zorra (44%), Perth South (32%), Perth East (22%), the Town of St. Marys (3%) and the City of Stratford (1%). Land use within the Trout Creek watershed is primarily agriculture (75%) with other land uses including natural vegetation (20%), urban (2%), water (2%), and aggregates (<1%).

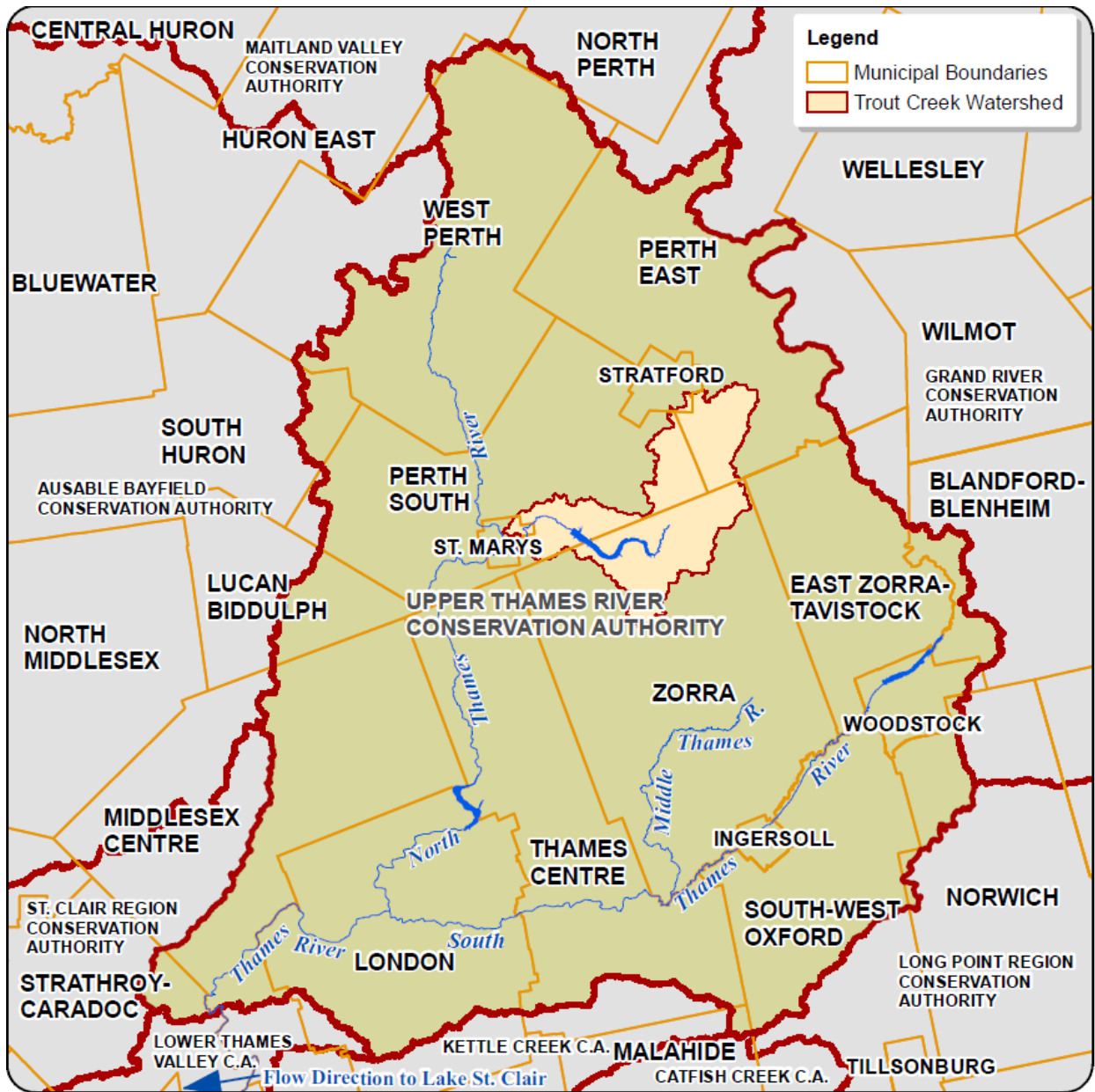


Figure 2: Trout Creek watershed in relation to the Upper Thames watershed (Source: UTRCA)

The study area for the Harrington Dam will include the lands within the Harrington Conservation Area (Harrington CA) and adjacent lands as necessary. Harrington CA is located on Oxford County Road 96 in Oxford County, Township of Zorra, Lot 30, Concession 2, as can be seen outlined on the map in Figure 3 below.

Harrington Conservation Area is a small conservation area (~ 4.9 hectares) and includes manicured grassland with a scattering of shade trees, a small conifer planting on the southeastern boundary, and a meadow/marsh community at the south end of the reservoir/pond. The reservoir/pond and Harrington Creek encompass about 0.8 – 1.2 hectares. A wildflower/prairie plot was planted in 2005 by the Upper Thames River Conservation Area (UTRCA) through the Communities for Nature Program.

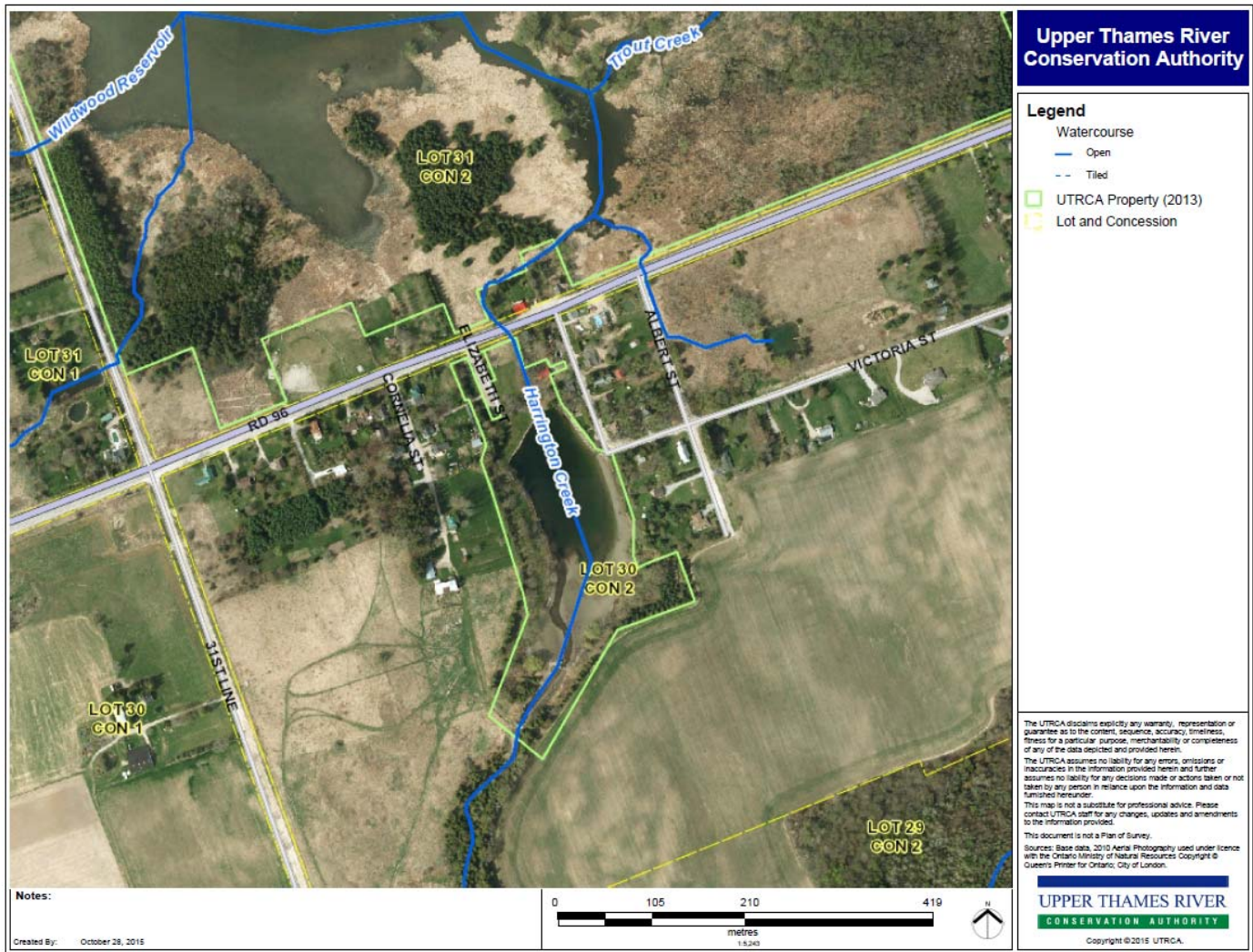


Figure 3: Harrington Conservation Area (Source: UTRCA)

Figure 4 shows the dams that exist upstream of Harrington CA. Dams labeled with a “POT” (potential) number have not been verified as to existence, whereas dams labeled with a “UT21” number are believed to have been surveyed at some point in the past. A Ducks Unlimited (DU)/UTRCA Dam exists downstream of the Harrington CA Dam within the Wildwood Reservoir and is currently under review by DU and UTRCA.

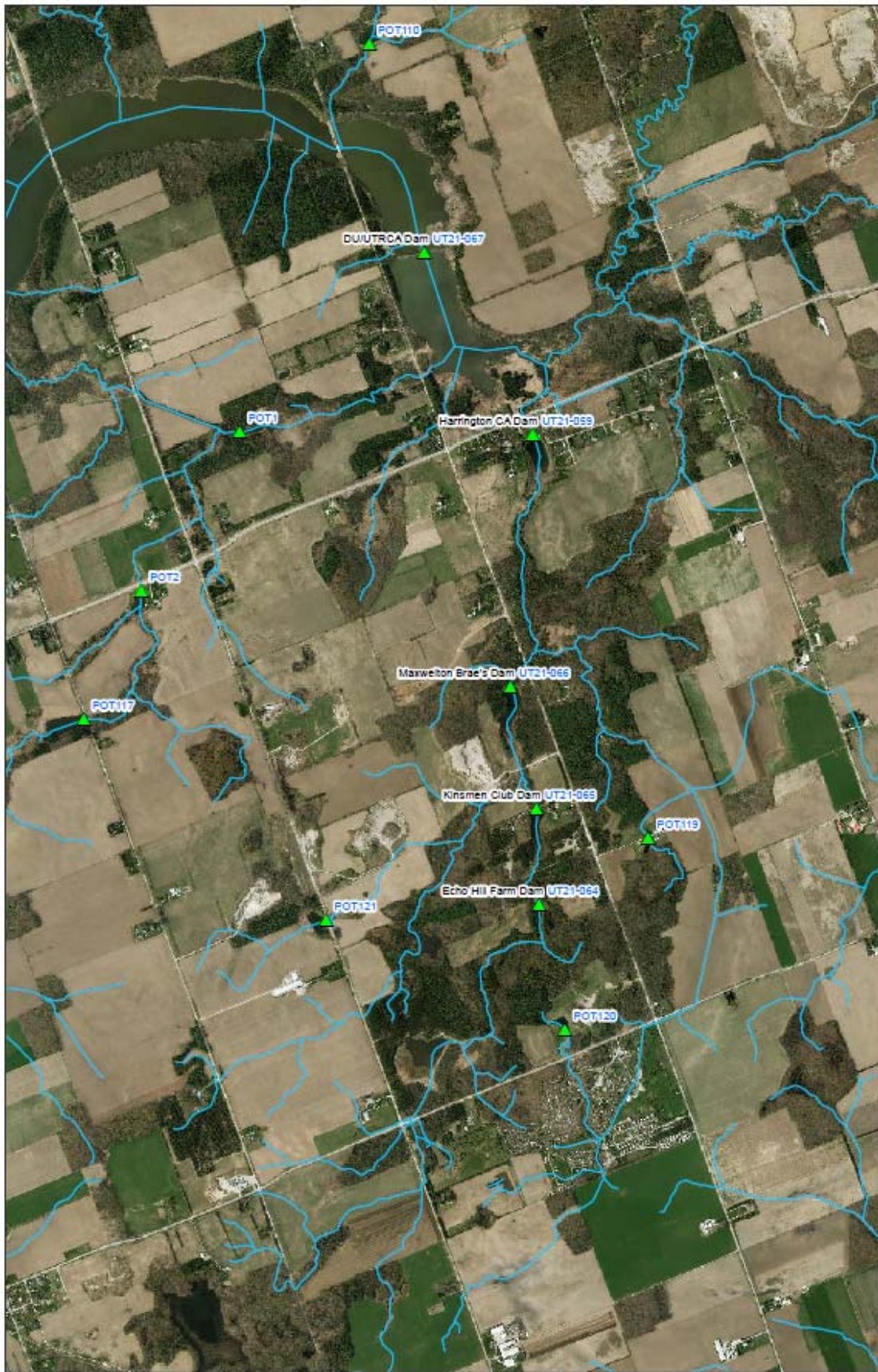


Figure 4: Location of dams upstream and downstream of Harrington Dam (Source: UTRCA)

Detailed information about various physical and biological features of the Harrington Dam and Conservation Area study is discussed below.

Trout Creek Watershed Action Plan

In late 2008, through funding from the Ontario Trillium Foundation, a Trout Creek Community-based Watershed Strategy was started. Residents of the Trout Creek watershed were involved in developing and implementing the watershed strategy. The strategy includes an action plan in which recommendations were made for restoration work to improve environmental health of the watershed. The Class Environmental Assessment for Harrington Dam may help to address some of the following recommendations that were made:

- Target priority areas identified in the Trout Creek watershed for rehabilitation
- Rehabilitate cold water streams to increase the number of streams able to support a cold water fishery and improve water quality downstream
- Approach landowners in the priority areas regarding participation in rehabilitation projects
- Continue to work with local municipalities, agencies, landowners, and community groups on existing rehabilitation projects in the Trout Creek watershed
- Involve secondary school students in the Trout Creek Watershed Report Card Program which examines forest conditions and surface water quality conditions

Flow Characteristics

To properly assess and design the different options that exist in regards to Harrington Dam it is necessary to understand the streamflow characteristics of Harrington Creek. These flow characteristics were studied and the details of this study are located in Appendix A: Flow Characteristics of Harrington Creek at Harrington Dam and Youngsville Drain at Embro Dam. The study determined that the 1248 hectare catchment area of Harrington Creek contributed greater unit area flow rates to the North Branch of the Thames River than other nearby tributaries such as at those monitored at the following stream gauge stations:

- i) Trout Creek near Fairview
- ii) Avon River above Stratford
- iii) Fish Creek
- iv) Trout Creek near St. Mary's

From May 24, 2008 – April 9, 2011, March 26, 2012 – September 12, 2012, and April 23, 2015 – August 28, 2015, the contribution of the flow measured downstream of Harrington Dam to the total flow out of the Trout Creek Subwatershed was 10.2%, 12.4%, and 10.5%, respectively. It was determined that Harrington Creek has a high resiliency to drought/low water as evidenced by a significantly smaller percent decrease in flow than that experienced at other watercourses in the watershed. Flow measurements during base flow conditions indicated that the flow upstream of the backwater effects of Harrington Dam was approximately 93% of the flow measured at the location downstream of Harrington Dam. Due to the low magnitude of the flows, the accuracy limitations of the flow velocity meter, and

inflow to Harrington Creek in between the upstream and the downstream measurement locations, it is recommended that monitoring be continued to increase the confidence in assessing the flow characteristics Harrington Creek.

Hydrogeology

The UTRCA collected physical geography map information and well record information to describe general information on the hydrogeological setting of Harrington Conservation Area and the local area around the dam. Ministry of Environment and Climate Change (MOECC) well records were obtained. All information collected was transferred to the consultant Ecosystem Recovery Inc. for their analysis.

Topography, Geology, and Soils

The Harrington Pond catchment area includes Lakeside/Wildwood Complex (a provincially significant wetland), as well as Happy Hills and Lost Concession, two significant natural areas. Upstream of Harrington Pond is Harrington Creek, McCorquodale-Innes Drain, and Young Drain. Groundwater flow gradient is from the south to the north towards Wildwood Reservoir.

The following maps illustrate the physical surface and subsurface conditions and contribute to the understanding of surface and groundwater resources in the Harrington Creek catchment.

The general topographic setting of Harrington Conservation Area in the downstream reaches of the Harrington Creek catchment is shown on the map in Figure 5. Elevations on the Young and McCorquodale-Innes drains range between 375-380 m above mean sea level on the western reach of the drains, and are approximately 360 m on the eastern reach (boundary of the Mud Creek subwatershed), with a low elevation of 330 m at Harrington Pond.

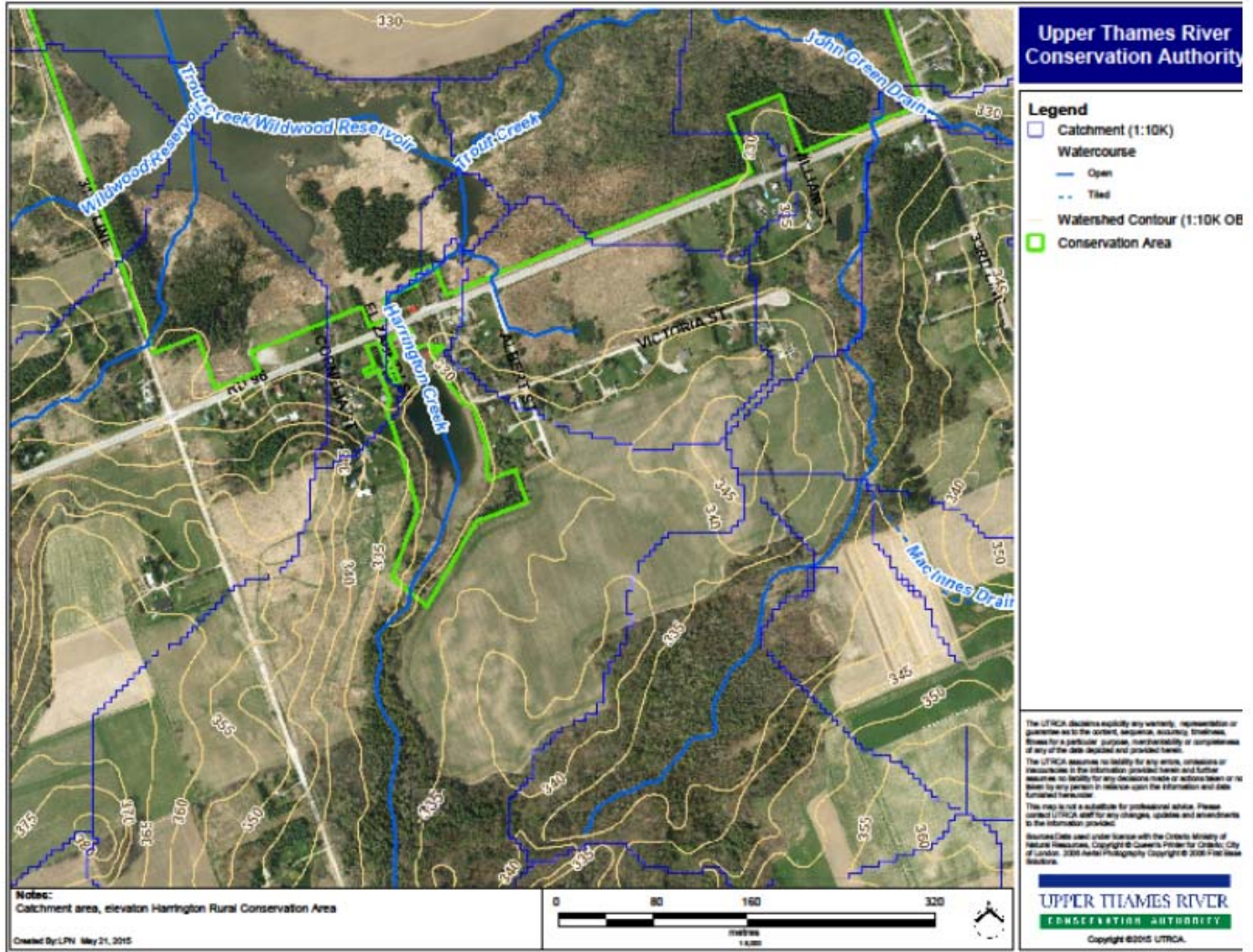


Figure 5: Catchment area and elevation of Harrington CA (Source: UTRCA)

The catchment area is characterized by sandy soils that extend from the southern to northern end of the area, with gravel in the northwestern edge. The sandy soils that dominate the catchment area suggest high infiltration and high groundwater recharge.

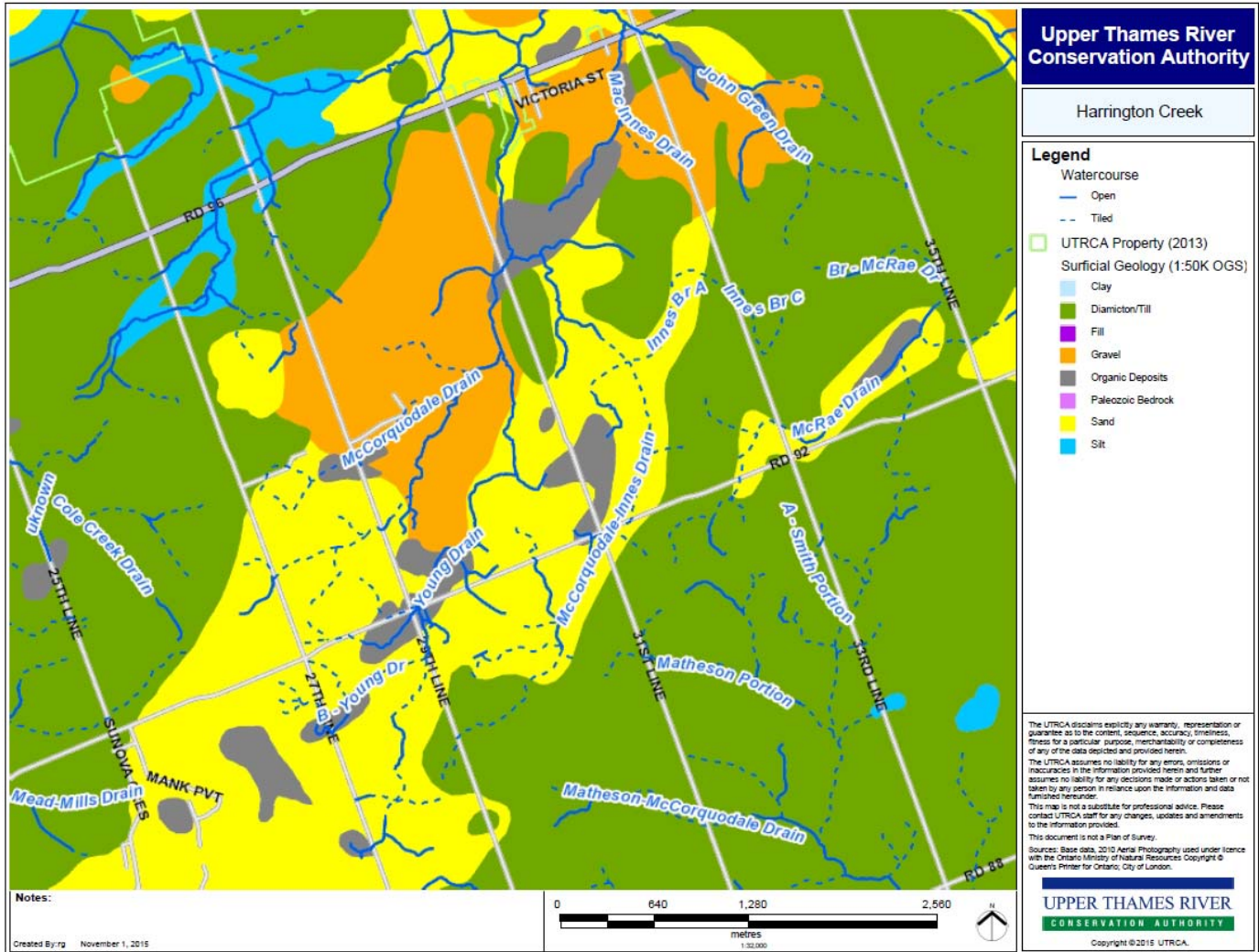


Figure 6: Surficial geology of the area around Harrington CA (Source: UTRCA)

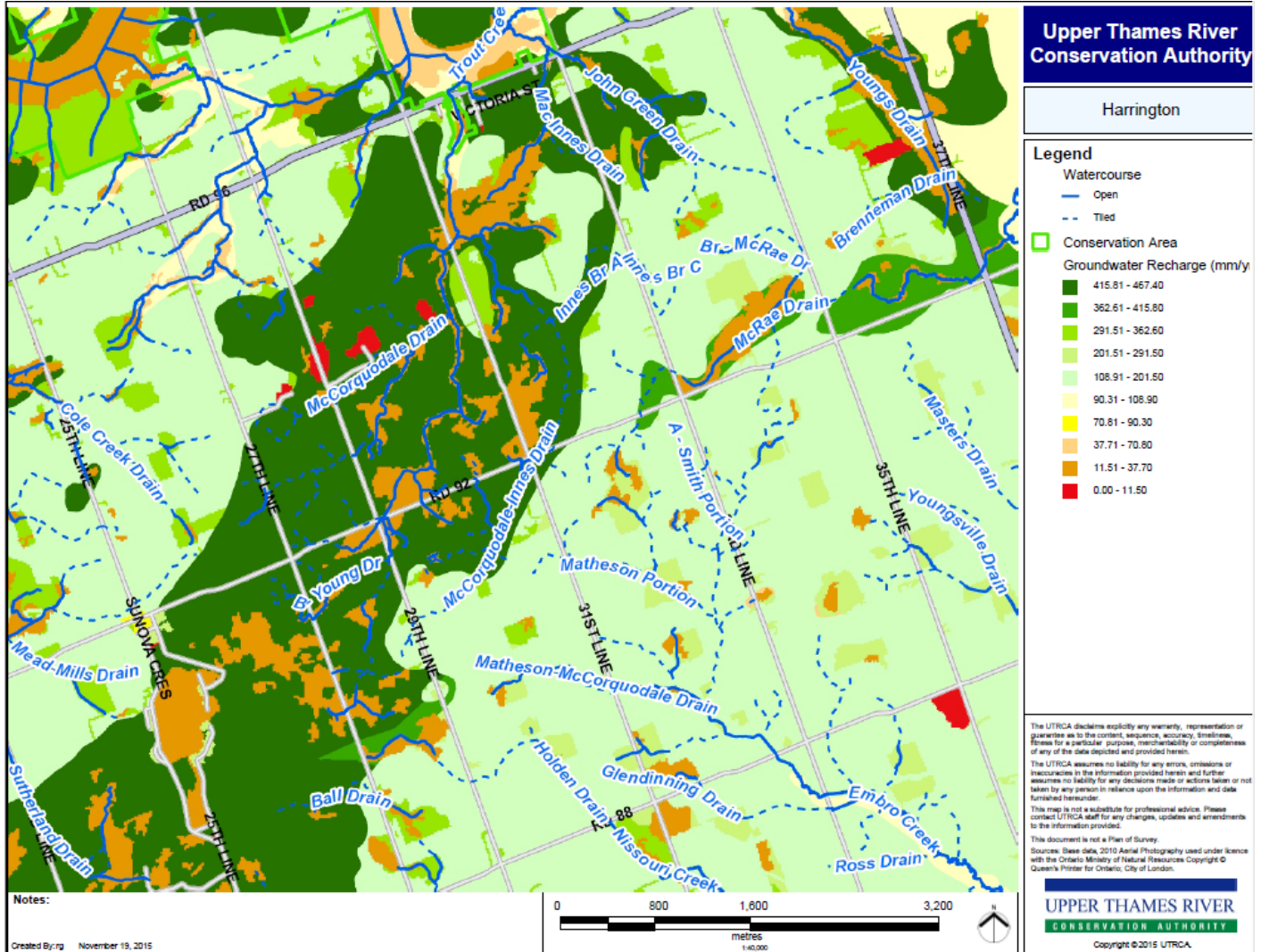


Figure 7: Groundwater recharge (mm/y) of the area around Harrington CA

Private Well Survey

All background information and individual well records were retrieved from the Ministry of the Environment and Climate Change (MOECC) and provided to Ecosystem Recovery Inc. for analysis by their sub-consultant Englobe (formerly LVM). Figure 8 shows the locations of the known wells in the area. The well location information suggests that some residences may share or do not have documented wells. The wells shown on the Harrington Dam are Bore Holes for the past Dam Safety investigations.



Figure 8: Known wells in the area of Harrington CA (Data Source: MOECC)

Surface Water Quality

A series of five water samples were collected at four locations in the area of Harrington CA: one upstream of the pond, two in the pond, and one downstream of the dam (see map in Figure 9). This monitoring provides a snapshot of water quality, and is limited to the conditions of April to October 2015. Harrington Pond also had one year of historical data from 1989, which has been included in the evaluation of the results, which can be found in Appendix B: Harrington Pond Water Quality Assessment.



Figure 9: Harrington Pond Water Quality Survey Sites 2015 (Source: UTRCA)

Most samples were taken during low flow conditions. The dry conditions in the summer and fall of 2015 resulted in minimal opportunity to monitor runoff conditions. There was some variation in flow based on minimal rain but only one date had rain with full runoff conditions (June 1) and one date had rain with partial runoff conditions (October 9).

Samples were analysed at ALS Laboratories in London. Samples were analyzed for Nitrate, Nitrite, Total Kjeldahl Nitrogen, Total Phosphorus, Orthophosphate, *E. coli*, Chloride, and Suspended Solids. Field measurements were taken with a YSI multi-parameter meter for Dissolved Oxygen, pH, Conductivity, and Temperature. Continuous temperature measurements were taken from June 1 to September 23 using dataloggers recording in half hour intervals.

In general, the water quality in the Harrington-West Drain, where it was sampled upstream, downstream and in Harrington Pond, showed general low levels for the parameters measured in 2015 with numbers typically better than the average seen in the Upper Thames watershed streams. The headwaters of this area which includes a significant wetland complex and natural areas would likely contribute to the good quality of this stream.

The results for 1989 and 2015 were very similar for all parameters with the exception of nitrate which is slightly higher in 2015 compared to the 1989 data.

Temperature differences are apparent between upstream and downstream of the pond based on continuous measurements and show a greater difference as the summer progressed, likely as a result of the warming effect of the pond.

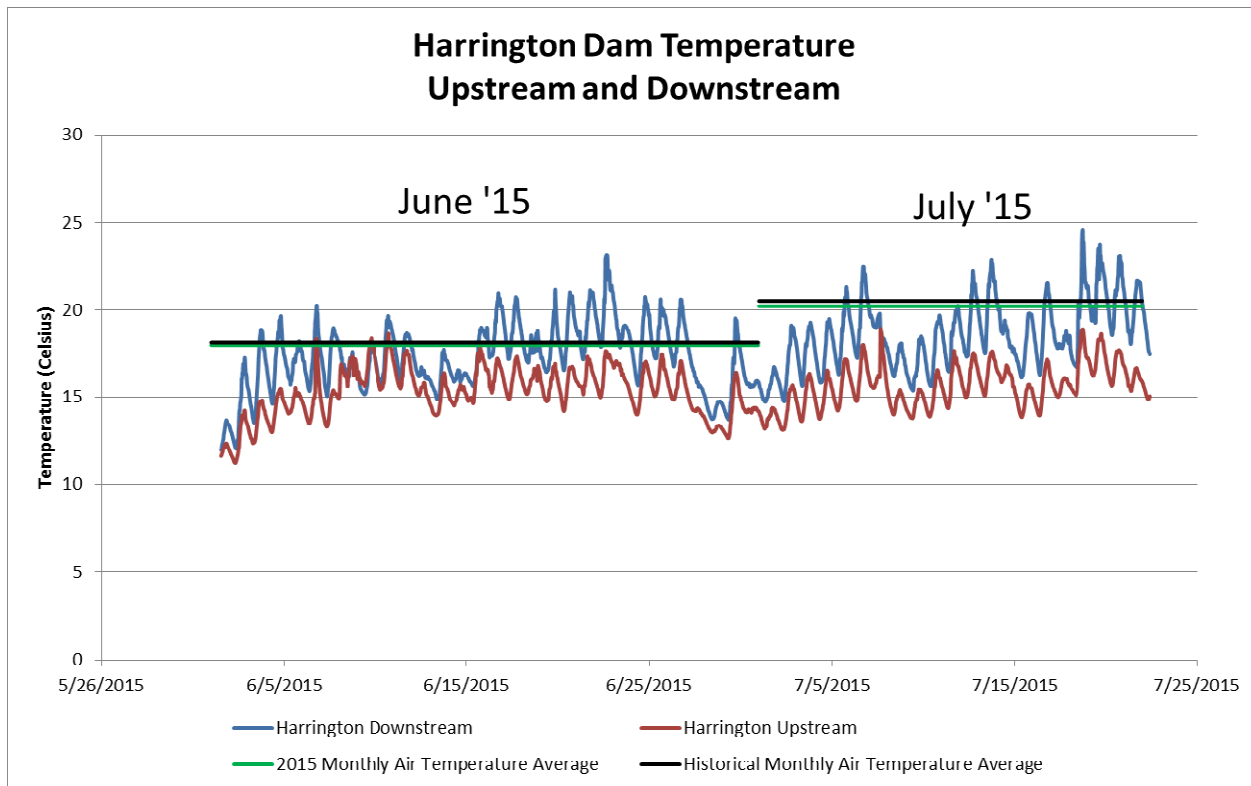


Figure 10: Harrington Pond Continuous Temperature Upstream and Downstream, Summer 2015 (Source: UTRCA)

Stream temperature data for June and July 2015 were taken during periods in which the monthly air temperature averages (ref. Environment Canada – London Airport) were similar to historical monthly air temperature averages.

Ponds can act as a settling basin for sediment and associated contaminants such as phosphorus, and these can accumulate in the bottom sediments. These contaminants can be re-suspended when disturbed such as during more extreme flow conditions. Sampling of the bottom sediments would give an indication of any accumulation.

Aquatic Ecology

Electrofishing and benthic surveys were carried out during the spring, summer, and fall of 2015. The map in Figure 11 shows the different sampling sites. A list of recorded fish and benthic species, separated by sampling location, is provided in Appendix C: Harrington Dam area Fish and Benthic Records.

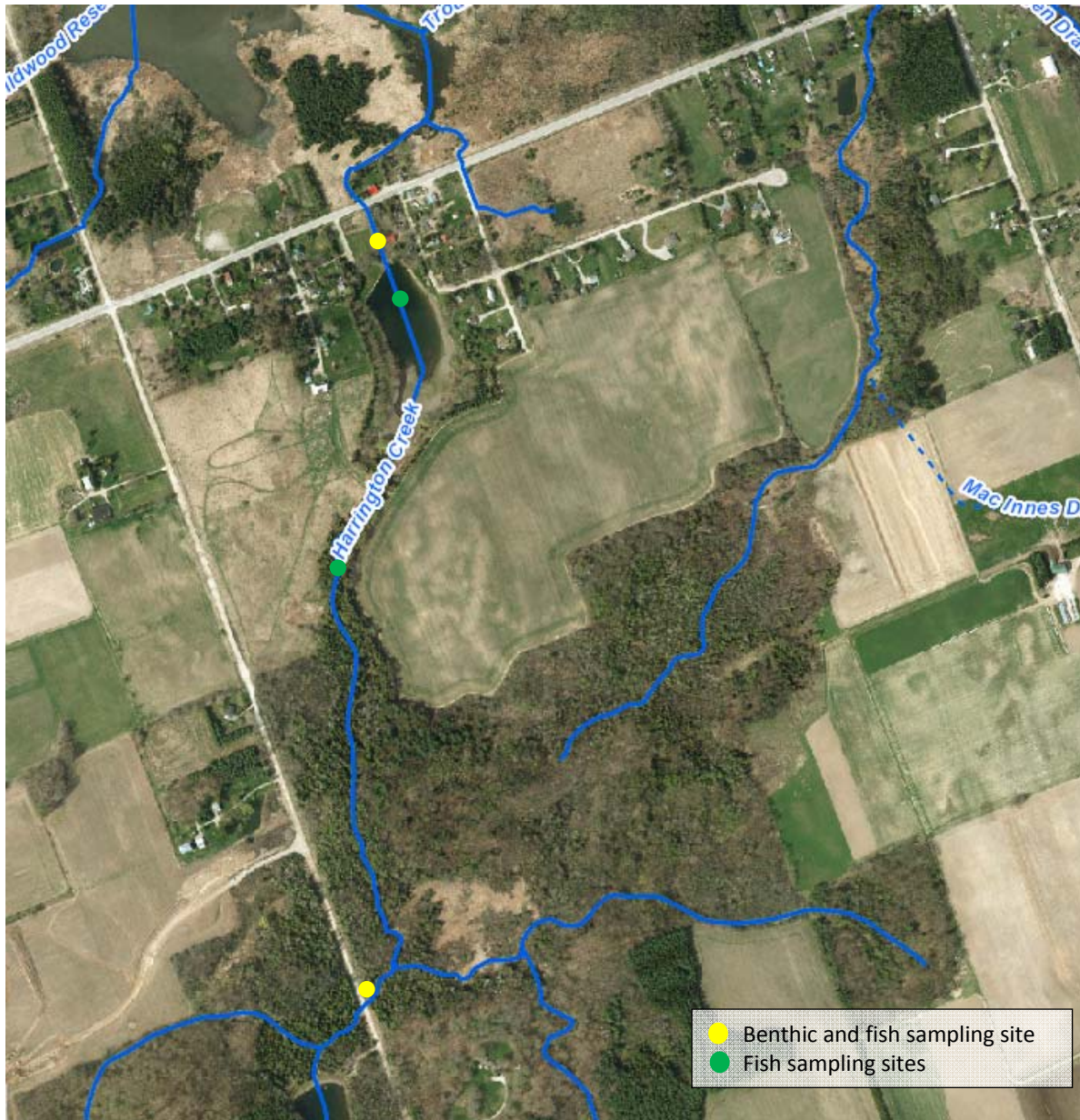


Figure 11: Harrington Dam area Benthic and Fish Sampling Sites (Source: UTRCA)

Fisheries Resources

An electrofishing survey of the Harrington Pond as well as upstream of the pond and downstream of the dam was conducted on April 15, 2015. The area downstream of the dam was surveyed again July 22, August 16, and October 19, 2015, while two upstream sites were sampled again November 11, 2015. All

specimens were identified to species, recorded, and released. Sample records, including historic records, are tracked in an MS Access database and provided in Appendix C: Harrington CA Fish and Benthic Records.

Brook Trout and Mottled Sculpin were recorded upstream of the dam in 2015 as well as in previous years, indicating that Harrington Creek does offer suitable habitat for cold water species. Rainbow Trout (remnant from fish derby stocking), Brook Trout, and sculpin found below the dam indicate that the numerous seeps counteract the warming effect of the pond creating pockets of cool water habitat.

The stream reach below Harrington Dam appears to provide both permanent and seasonal habitat for warm water species. Most of the minnow and darter species are likely year-round residents while game fish such as Large and Smallmouth Bass, Northern Pike, and Yellow Perch appear to be seasonal residents. The presence of many young-of-the-year of these species in summer samples indicates this is valuable spawning and nursery habitat and an important source of recruitment for Wildwood Lake game fish. Absence of young-of-the-year of Rainbow Trout, Brook Trout, and Sculpin below the dam indicates cold water species are unable to successfully reproduce in this stream reach, and those present likely passed over the dam and became trapped below the dam. Other species likely to be spring and summer residents only include Common Carp and sucker and bullhead species.

Based on 2015 and historic fish surveys, a large discrepancy in species diversity exists between up and downstream of the pond with seven species recorded upstream and 30 species downstream. This species list can be found in Appendix C. The low species diversity upstream is fairly typical of trout dominated systems but also likely reflects the impact of the barrier to fish movement presented by Harrington Dam. This is supported by 2015 sampling where all seven species historically occurring upstream of the dam were recorded and 25 of the 30 species listed downstream were recorded. The recorded 2015 species represent the most commonly occurring species historically.

During a mid-May (5/14/2015) visit to Harrington CA, extensive carp spawning activity was observed in the shallow upper parts of the pond, indicating that the pond supports a large population of this invasive species. A lack of aquatic macrophyte growth and high turbidity levels also likely can be attributed to the carp population.

Benthic Resources

Benthic invertebrates are organisms that live on the bottom or in the sediment of a water body. Because they are diverse, generally sedentary, and responsive to environmental alterations, benthic invertebrates are often sampled to study water quality (Jones, N.E. 2011).

To determine water quality, a value from 0 to 10, called a biotic index, is assigned to benthic invertebrate taxa. This value indicates their sensitivity and tolerance to pollution. Lower numbers indicate pollution sensitivity and high numbers indicate tolerance. A weighted average of the biotic index and the number of invertebrates in each taxa in the sample gives a value called a Family Biotic Index (FBI). The water quality ranges for the FBI values can be found in Table 1.

FBI Value	Water Quality
< 4.25	Excellent
4.25 – 5.00	Good
5.00 – 5.75	Fair
5.75 – 6.50	Fairly Poor
6.50 – 7.25	Poor
> 7.25	Very Poor

Table 1: Water quality ranges for FBI values

Benthic invertebrate sampling was conducted in the spring (May 8) and fall (September 23), 2015, at a site upstream of Harrington Pond and at a site downstream of the dam. Sampling was conducted using a traveling kick and sweep method, and samples handled and analyzed using methods consistent with Provincial (OBBN) and Federal (CABIN) protocols. Samples were preserved in the field, randomly subsampled in the lab, and identified to the Family taxonomic level. Resulting data was entered into and analyzed using an MS Access database. Sample records (including historic records) with calculated Family Biotic Index (FBI) are provided in Appendix C: Harrington CA Fish and Benthic Records.

For the two 2015 samples, the average FBI upstream of the pond was calculated to be 5.11, indicating “fair” water quality, and 6.22 downstream of the dam, indicating “fairly poor” water quality. The pollution sensitive taxa (caddisflies and stoneflies) found above the pond are replaced by very pollution tolerant taxa, primarily aquatic worms, below the dam, indicating a dramatic pond impact on water quality.

Only one historic downstream sample exists, with an FBI = 5.40, indicating “fair” water quality, but sampling has occurred extensively at the site upstream of the pond since 1997, with an average FBI = 5.37. This value is considerably better than the long term UTRCA average of FBI = 5.99, as well as the average of UTRCA 2015 sites evaluated to date of FBI = 5.68. A value of FBI = 6.17 was calculated for the 2012 Trout Creek Watershed Report Card (the catchment in which Harrington Creek is located).

Harrington Dam, therefore, lowers Trout Creek water quality rather than improving it as unencumbered flows would do.

Benthic Sample Location	Spring 2015 FBI	Fall 2015 FBI	Average FBI	Water Quality
Harrington Creek upstream of Harrington Pond	4.68	5.53	5.11	Fair
Harrington creek downstream of Harrington Dam	6.73	5.71	6.22	Fairly poor
Trout Creek watershed 2012	N/A	N/A	6.17	Fairly poor
UTRCA watershed 2015	N/A	N/A	5.68	Fair
Provincial Guideline (target only)	N/A	N/A	< 5.00	Good

Table 2: Comparison of FBI values for Harrington CA, Trout Creek and UTRCA watersheds (Source: UTRCA)

Vegetation and Wildlife Inventory

This study examined the vegetation and bird and other wildlife at Harrington CA to determine the habitat quality and to flag any rare or sensitive species or communities that might be impacted if the Harrington Dam and reservoir area were changed.

A three-season botanical inventory was completed in 2015 of this 5 ha site. Of the 219 plant species found, 40% are non-native, which is average or moderate for similar sites in the Upper Thames watershed. While the diversity of plants is quite large for a small site, the overall quality of the vegetation communities is moderately poor to average. No species-at-risk or rare or uncommon species were found that would be a limiting factor to future site works or conservation area changes. Overall, the quality of the vegetation, which is a diverse mix of small habitat types, is rated as moderately poor to average.

The Harrington Pond/Reservoir itself does not support any native rooted aquatic plants, though there is sparse cover of a non-native pondweed. The reservoir has only a narrow fringe of wetland emergent plants along the southern edges. The large population of Common Carp in the reservoir is likely a cause as these fish muddy the water and uproot plants. The wetland emergent plant species found along the pond's shores are common along flowing waterbodies and in wetlands in the area. Many of these plant species would likely naturally re-establish along Harrington Creek and would not be a limiting factor to future site changes.

Harrington CA is within 100 m of a Provincially Significant Wetland known as the Lakeside Wildwood Complex. Thus, construction activities need to consider impacts on the wetland. It is likely that many wildlife species travel between the wetland and Harrington CA due to the close proximity. Only the treed edge (southeast edge) of Harrington CA is part of a larger significant natural heritage feature as defined by the Oxford Natural Heritage System (ONHS 2006). The remainder of the CA (pond/day use area) is not part of that feature. Neither the Provincially Significant Wetland nor natural heritage feature designations would be limiting factors to future site changes.

A three season bird survey was undertaken in 2015 as well. The 42 species of birds recorded in the CA are mostly common breeding or permanent residents of the area. One species-at-risk, the Barn Swallow (Threatened), was seen in Harrington CA, but there was no evidence of breeding within the CA. The reservoir or other parts of Harrington CA do not provide critical habitat for any sensitive bird species. Use of the pond by native waterfowl seemed to be on an occasional basis for feeding and resting versus nesting and rearing young. The fish biomass in the pond is largely unavailable to fish-eating birds such as kingfishers and herons due to the size of the fish (i.e., large, mature carp dominate).

While no sensitive wildlife species were recorded by the biologists, there have been reports from the public that Snapping Turtles use the reservoir. The Snapping Turtle is a species of Special Concern. Should the dam be removed, a slow, summer-time drawdown of the reservoir should safeguard any individuals by allowing them to move into nearby stream habitats, and ultimately, back into the restored creek within Conservation Area.

Other species noted by the public were Milksnake and Eastern Bluebird. Neither are Species at Risk and do not rely on ponds, instead preferring fields and forest edges. Concern was also noted by the public regarding the impact of dam removal on other wildlife such as Mute Swan (non-native), beaver or muskrat, and eagles. Many of these species are not exclusive to ponds and can carry out their functions in stream habitats. During planning for any projects these species can be further investigated as to existence, location, use of the Conservation Area, and avoidance, habitat protection or creation during the time before in field works are undertaken. Specific periods of construction during nesting or rearing could be avoided.

In conclusion, there are no sensitive plants, plant communities, birds or wildlife that would be threatened from changes to the environment in Harrington Conservation Area.

A detailed report of the vegetation, bird, and other wildlife inventory can be found in Appendix D: Harrington Conservation Area Vegetation and Bird Inventory 2015.

Cultural

History of Study Area

In a document that speaks to the history of the Harrington area, titled “Class of 1840”, a story is told about two young men that arrived in Zorra Township in 1802, which at that time was “almost a solid wilderness”, to search out a home. The men rested a night on a “...spring creek of clear water (that) flowed northward through the spot and it is known today as the village of Harrington”. The men also interacted with residents of an “Indian camp that was twenty rods down the valley by the creek” (Rounds, 1990).

The village of Harrington was created in 1855, though the original grist mill was established years before, in 1846. According to the “Gazeteer and Directory of the Counties of Oxford and Norfolk and Woodstock, 1867”, Harrington contained a handful of shops and a church, along with the mill (Rounds, 1990).

The area that comprises the current Harrington Conservation Area was historically privately owned by a few different landowners prior to being purchased by the Upper Thames River Conservation Authority. A summary of the chronology of the conservation area, which includes the mill and dam, is as follows (Upper Thames River Conservation Authority, 1973 and 2010):

- The original mill was built in 1846 by a man named Demerest
- The mill was purchased by Mr. Robert Duncan in 1920. The mill was destroyed by fire in 1923 and was replaced that same year.
- In 1948, Milton Betteridge suggested that the Harrington dam site be acquired as a conservation area. Inspection of the property by UTRCA representatives revealed the 10.7 meter spillway had been undermined and washed away. Works to repair the dam plus enlarge the pond from 1.6 to 3.2 hectares were estimated to cost approximately \$10,000.
- In 1952, almost 5 hectares of property was purchased by the UTRCA, including the dam and pond (owned by Mr. Duncan) and adjoining property owned by Mrs. Levi Nimock and George Robinson. Work started in July of 1952 to repair the spillway and enlarge the pond. Work was completed by the end of that same year.
- Provincial operating funding support for recreation dams was cut in 1995. The Township of Zorra now contributes 100% of the dam operating costs.
- In 1966, the Authority purchased the mill from Mr. Duncan.
- The mill was in continuous operation from 1846 to 1966, except for a brief period of time in 1923 when it succumbed to fire, and two other times when the mill dam broke (1903 and 1949). A diesel engine was used in the latter years of the mill’s operation when the water supply was too low to operate the turbine.
- In 1999, the UTRCA entered into a lease agreement with the Harrington and Area Community Association (HACA) for the long-term restoration of the mill and the maintenance of Harrington Conservation Area grounds.
- The Harrington Dam was overtopped twice in the summer of 2000 with subsequent repair work performed on the downstream embankment slopes adjacent to the spillway.

Current Uses

Harrington Conservation Area is a “Day-Use Only” area, with current uses including hiking, birding, fishing, and picnicking. In early 2015, a 1.5 km hiking trail was created around the pond. Harrington CA has been a fishing and picnic area for generations; a yearly fishing derby for children is presented by the Tavistock District Rod and Gun Club (the pond being stocked with various sizes of rainbow trout for the occasion), and HACA holds an annual BBQ as a fundraiser for the restoration of the mill.

Since 1999, HACA has worked to restore the grist mill from 1923, and currently offers tours upon request. Over \$100,000 has been raised by the Harrington Community for these restoration efforts. The community association is interested in having the mill function using water power as it did in the past.

In July 2015, a “Memorial Tree Sign” was unveiled within the Harrington CA. Through a new program run by the Township of Zorra, in the future, memorial trees purchased through UTRCA may be planted within the CA.

Other Uses

The Township of Zorra has investigated potential uses of water sources in Harrington Conservation Area for firefighting purposes in the area to establish a year-round source. While use of the existing well was examined it was not preferred due to costs and a more likely source would be a reservoir or holding tank. The Township Fire Chief has indicated that the Township would await the outcomes of the EA (Pers. Comm. Zorra – UTRCA, 2013-15).

Bibliography and reference documents

Jones, N.E. 2011. *Benthic Sampling in Natural and Regulated Rivers. Sampling Methodologies for Ontario's Flowing Waters*. Ontario Ministry of Natural Resources, Aquatic Research and Development Section, River and Stream Ecology Lab, Aquatic Research Series 2011-05. Retrieved from <https://dr6j45jk9xcmk.cloudfront.net/documents/2668/stdprod-103416.pdf>.

Pers. Comm. Zorra – UTRCA, 2013-15

Rounds, Sharon F. 1990. *Class of 1840*.

Upper Thames River Conservation Authority. July 2010. *Trout Creek Community-based Watershed Strategy, Watershed Action Plan*. Retrieved from <http://thamesriver.on.ca/wp-content/uploads//TroutCreek/TroutCreek-WatershedActionPlan.pdf>

Upper Thames River Conservation Authority. 1973. *Twenty Five years of Conservation on the Upper Thames Watershed 1947-1973*.

See the following reference documents:

Harrington Dam Safety Review HATCH, 2007

Trout Creek Watershed Report Card, 2012. Retrieve from http://thamesriver.on.ca/wp-content/uploads//WatershedReportCards/RC_Trout.pdf

Appendices

Appendix A: Flow Characteristics of Harrington Creek at Harrington Dam and Youngsville Drain at Embro Dam

Appendix B: Harrington Pond Water Quality Assessment

Appendix C: Harrington Dam area Fish and Benthic Records

Appendix D: Harrington Conservation Area Vegetation and Bird Inventory 2015

Appendix E: Historic Harrington Dam and Conservation Area News Articles