Oshawa Second Marsh

Black Creek Watershed

BLACK/HARMONY/FAREWELL CREEK WATERSHED EXISTING CONDITIONS REPORT CHAPTER 18 - WETLANDS

April 2011

Central Lake Ontario Conservation

DURHAM REGION

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1.0 INTRODUCTION

Wetlands are at the transition between aquatic and upland ecosystems and have been defined as:

> Lands that are seasonally or permanently flooded by shallow water as well as lands where the water table is close to the surface; in either case the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic or water tolerant plants.
>
> (Ontario Ministry of Natural Resources, 2002)

Four major types of wetlands are found in Ontario: bogs, fens, marshes and swamps. These are distinguished on the basis of vegetation type and/or hydrology. For example, bogs are primarily fed by precipitation while fens are fed mainly by groundwater. Swamps are wooded wetlands with either trees or shrubs covering at least 25% of the area, while marshes are open wetlands dominated by emergent herbaceous species and have less than 25% shrub cover. (Ontario Ministry of Natural Resources, 2002).

American Germander

Wetland Functions and Values

In the past, wetlands were seen by many as wastelands with little value and were subsequently drained or filled in. More recently, however, the functions and values of wetlands have been recognized more widely. Wetland functions include biological, chemical and physical processes that occur naturally within a wetland. These functions can vary depending on the size of the wetland, its position in the watershed, its soils, plants and health.

Some common functions performed by wetlands are:

- nutrient cycling and reducing excess nutrients such as nitrogen and phosphorus;
- groundwater recharge;
- water filtration by slowing water down to allow settling out of sediments and contaminants; and
- habitat provision for invertebrates, fish, amphibians, birds, and mammals resulting in high biodiversity compared to other habitat types in Ontario.

"wetlands are…lands that are seasonally or permanently flooded by shallow water as well as lands where the water table is close to the surface…"

Ontario Ministry of Natural Resources

Values, on the other hand, are a reflection of the worth or importance of wetlands to humans. Values include:

- recreation such as canoeing, bird watching and photography;
- floodwater storage;
- water quality improvement for drinking water obtained from the Great Lakes or from groundwater; and
- shoreline stabilization and protection of properties from erosion.

Applicable Legislation and Policies

CLOCA has a "Generic Regulation" in place to deal with *Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (O.Reg. 42/06*). Please refer to Chapter 4 - Land Use and Policy for more information regarding this regulation.

Under Section 2.1 of the Provincial Policy Statement (PPS) (Ministry of Municipal Affairs and Housing, 2005), it states that "Natural features and areas shall be protected for the long term" and "*Development* and *site alteration* shall not be permitted in … *significant wetlands* in Ecoregions 5E, 6E and 7E1; and *significant coastal wetlands*." In addition, Section 2.1.6 of the PPS states that no development or site alteration is permitted on lands adjacent to significant wetlands "unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions". See section 3.2 of this report for a description of the determination of wetland significance.

'Development and *site alteration* shall not be permitted in *… significant wetlands* in Ecoregions 5E, 6E and 7E1; and *significant coastal wetlands.'*

2.0 STUDY AREA AND SCOPE

The Black/Harmony/Farewell Creek watershed is situated entirely within the Regional Municipality of Durham and covers an area of approximately 108km^2 (Figure 1). The watershed drains southerly towards Lake Ontario from its headwaters which originate in the south slope till plain of the Oak Ridges Moraine. The Black/Harmony/Farewell Creek watershed is divided into 3 primary subwatersheds: Black Creek, Harmony Creek and Farewell Creek. The Harmony Creek subwatershed is further divided into 5 subwatersheds: Ritson, Wilson, Grandview, Taunton and Mitchell. This chapter will focus on the types of wetlands found within the watershed and each subwatershed.

For the purposes of visual presentation, the mapped data layers (where available) have been shown as faded areas beyond the watershed and subwatershed boundaries. For areas outside of the Black/Harmony/Farewell Creek watershed boundary, these visual data layers may not have been analyzed for discussion purposes and therefore have not been included in the discussion of this chapter.

"Wetlands are some of the most ecologically diverse and productive ecosystems on Earth"

Environment Canada

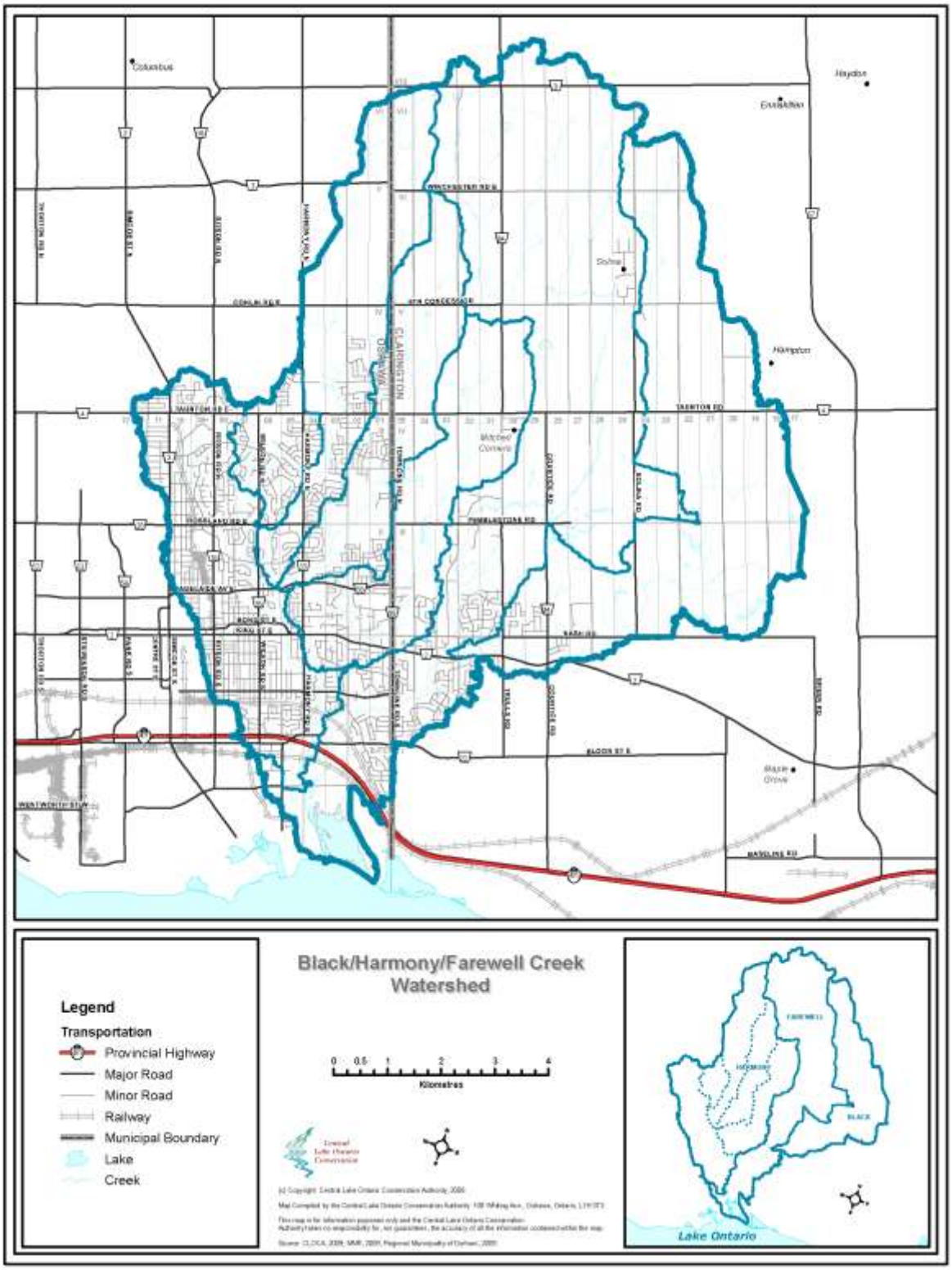


Figure 1: Black/Harmony/Farewell Creek watershed.

3.0 METHODOLOGY

3.1 Wetland Area and Types

The results reported here are based on digital aerial photo interpretation of land use and land cover from April 2008 photography in a Geographic Information System (GIS), in this case, ArcGIS (Environmental Systems Research Institute, Inc.). The photo interpretation involved drawing lines around the boundaries of various vegetation communities or land use types by viewing the aerial photography at a scale of 1:2000. This resulted in a layer of 'polygons', which are simply outlined areas, such that the entire Black/Harmony/Farewell Creek watershed was classified either according to its vegetation communities or land use types. The vegetation communities were classified according to the Ecological Land Classification (ELC) system for Southern Ontario (Lee et al., 1998). The reader is referred to Chapter 17 - Terrestrial Natural Heritage, Appendix A – Ecological Land Classification for more information.

"the vegetation communities were classified according to the Ecological Land Classification (ELC) system for southern Ontario"

From this vegetation cover/land use layer, all wetland community types were extracted and summarized by areal coverage for the entire watershed (i.e. percent wetland cover) and for each subwatershed by wetland type, by clipping the vegetation/land use layer to each watershed layer and recalculating the area of each vegetation community. From the different ELC communities that exist within the Black/Harmony/Farewell Creek watershed, the following were classified as wetlands for this analysis (Table 1).

Table 1: ELC community series – wetlands.

ELC Community Series	Code
Meadow Marsh	MAM
Shallow Marsh	MAS
Submerged Shallow Aquatic	SAS
Floating Shallow Aquatic	SAF
Coniferous Swamp	SWC
Deciduous Swamp	SWD
Mixed Swamp	SWM
Thicket Swamp	SWT
Treed Bog	BOT

Due to the difficulty in distinguishing some wetland types through aerial photo interpretation, there will be some wetlands within the watershed that have not been identified, while in other areas the wetland boundaries, as currently drawn, may actually encompass some upland areas. These boundaries would need to be refined during site visits as required.

There are other ELC Community Series types that are also wetlands (e.g. Treed Fen), but they were not found within this watershed. Including the Open Aquatic (OAO) wetland type in this analysis is somewhat problematic, due to the difficulty in distinguishing depth of water through aerial photographs. In the current ELC system, OAO is defined as open water greater than 2 metres in depth, however, there is no type for open water less than this depth, and with less than 25% aquatic vegetation. For the purpose of this exercise, the category (OAO) has been excluded from the wetland area calculations for the Black/Harmony/Farewell Creek watershed.

3.2 Significant Wetlands

The Ontario Ministry of Natural Resources is responsible for designating wetlands according to their level of significance; either local or provincial. This classification is done according to a scoring system based on points received for three different components: biological, social and hydrological (Ontario Ministry of Natural Resources, 2002). A number of provincially significant wetlands (PSWs) have been identified within the Black/Harmony/Farewell Creek watershed.

3.3 Data

While every effort has been made to accurately present the findings reported in this chapter, factors such as significant digits and rounding, and processes such as computer digitizing and data interpretation may influence results. For instance, in data tables no relationship between significant digits and level of accuracy is implied, and as a result values may not always sum to the expected total.

"During the past two centuries, over two-thirds of southern Ontario's original wetland area has been lost"

Environment Canada

Fragrant White Water-Lily

4.0 FINDINGS

4.1 Black/Harmony/Farewell Creek watershed

4.1.1 Wetland Area and Types

Wetland distribution within Black/Harmony/Farewell Creek watershed is fairly concentrated on the eastern portion of the watershed, which coincides with the location of the Lake Iroquois Beach (Figure 2). The sandy, poorly drained soils that were laid down by the glacial lake have created optimal conditions for the formation of wetlands (OMNR, 2004). By summing the areal coverage of wetland types for the entire Black/Harmony/Farewell Creek watershed and each of its seven subwatersheds, a percentage of wetland cover for each unit was calculated (Table 2). In total, wetlands encompass approximately 1,310 hectares of the 10,795-hectare watershed (12.13%). According to the current ELC mapping based on 2008 aerial photography, the entire Black/Harmony/Farewell Creek watershed has approximately 12% wetland cover, while each subwatershed varies from less than 1% to greater than 22%. Four of the seven subwatersheds meet if not surpass the guidelines set out by Environment Canada for maintaining healthy watersheds. These guidelines state that there should be a minimum of 10% wetland cover in each watershed and at least 6% in each subwatershed (Environment Canada, 2004). However, the remaining three subwatersheds, Ritson, Wilson and Grandview do not satisfy the criteria set in the guidelines, with wetland cover ranging from 0.13% to 3.65%.

Table 2: Percent of watershed or subwatershed containing wetlands (based on April 2008 photo interpretation).

Watershed/Subwatershed	% Wetland
Black/Harmony/Farewell Creek	12.13
Ritson	1.00
Wilson	0.13
Grandview	3.65
Taunton	8.72
Mitchell	11.03
Farewell Creek	13.94
Black Creek	22.64

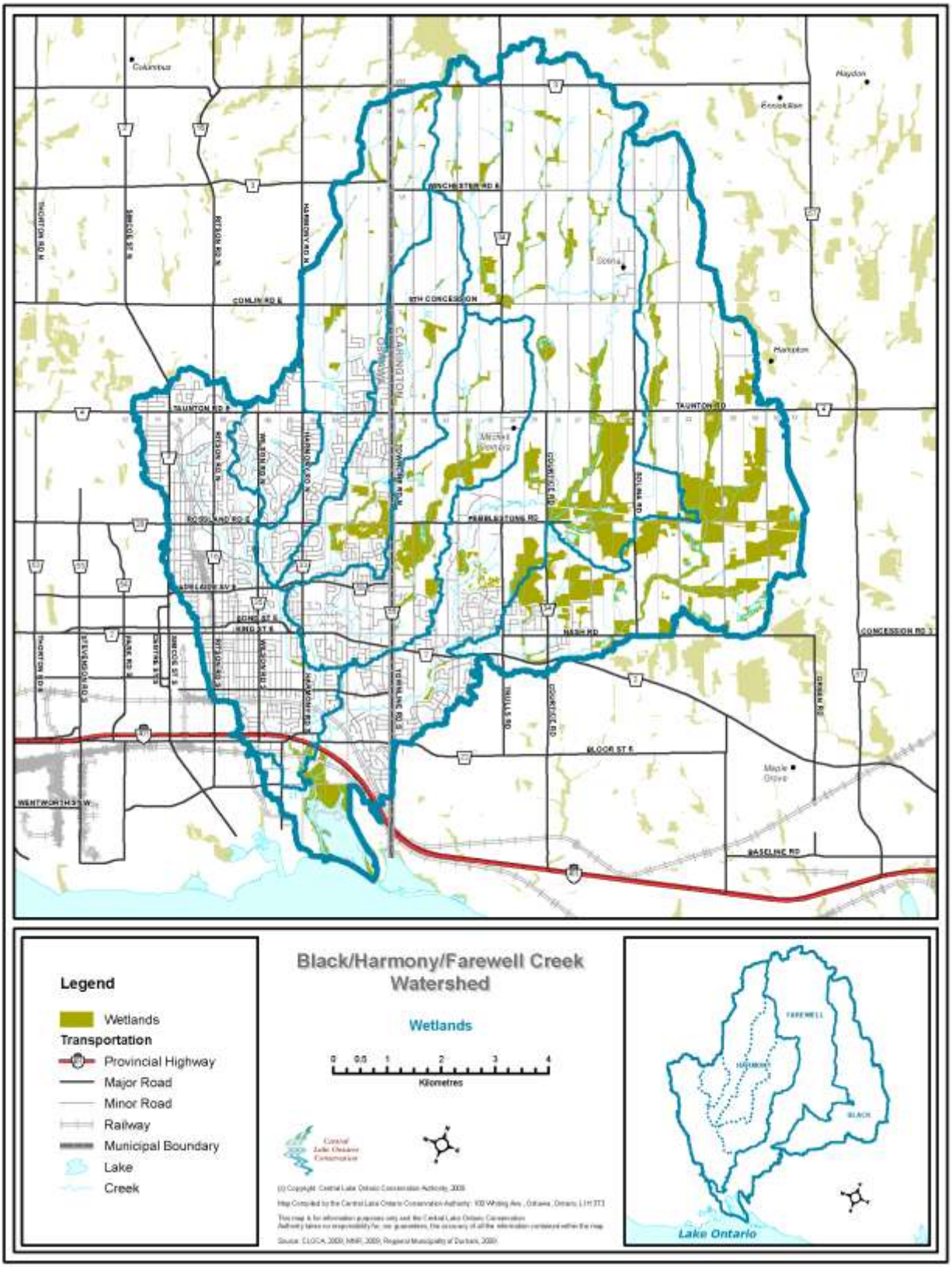


Figure 2: Wetlands within the Black/Harmony/Farewell Creek watershed.

4.1.2 Significant Wetlands

Five provincially significant wetlands are currently identified within the Black/Harmony/Farewell Creek watershed: Oshawa Second Marsh; Solina Wetland Complex; Harmony-Farewell Iroquois Beach Wetland Complex (in part); Enfield Wetland Complex (in part); and Maple Grove Wetland Complex (in part). The reader is referred to Chapter 17 - Terrestrial Natural Heritage mapping for provincially significant wetland delineations.

4.2 Subwatershed Findings

4.2.1 Harmony Creek Subwatershed

Harmony Creek subwatershed is approximately 46.65 km^2 and is made up of five subwatersheds: Ritson; Wilson; Grandview; Taunton; and Mitchell. In its entirety, Harmony Creek watershed contains 5% wetland cover and is the largest of the primary subwatersheds, yet it contains the least amount of wetland coverage. Of the five Harmony subwatersheds, Taunton and Mitchell have the most wetland cover (8.72 and 11.03% respectively), with both subwatersheds exceeding the Environment Canada recommended guideline. The remaining subwatersheds are located within highly urbanized areas, resulting in much less wetland coverage. The sections below describe in more detail the wetland cover within the Harmony Creek subwatershed boundaries.

'In its entirety, the Harmony Creek watershed contains 5.36% wetland cover and is the largest of the primary sub-watersheds, yet contains the least amount of wetland coverage.'

4.2.1.1 Ritson Subwatershed

4.2.1.1.1 Wetland Area and Types

The Ritson subwatershed contains only 1% wetland cover according to the current ELC mapping (Table 2) and has a very poor representation of wetland types (Table 3). The majority of wetlands lie within the southern portion of the Ritson subwatershed (Figure 3), and includes the most northern reach of Oshawa Second Marsh.

Very few wetlands remain within the urbanized sections of this subwatershed, suggesting that draining and/or filling has occurred in the past. The wetlands that do remain are concentrated in only a few areas (Figure 3).

Table 3: Wetland communities by number, area and percentage of the Ritson subwatershed.

ELC Wetland Communities	Number	Area (ha)	% of Watershed
Meadow Marsh	6	3.29	0.26
Shallow Marsh	1	1.46	0.11
Submerged Aquatic	0	0	0
Coniferous Swamp	0	0	0
Deciduous Swamp	2	8.09	0.63
Mixed Swamp	0	0	0
Thicket Swamp	0	0	0
Treed Bog	0	0	0
Total Wetlands	**9**	**12.85**	**1.00**

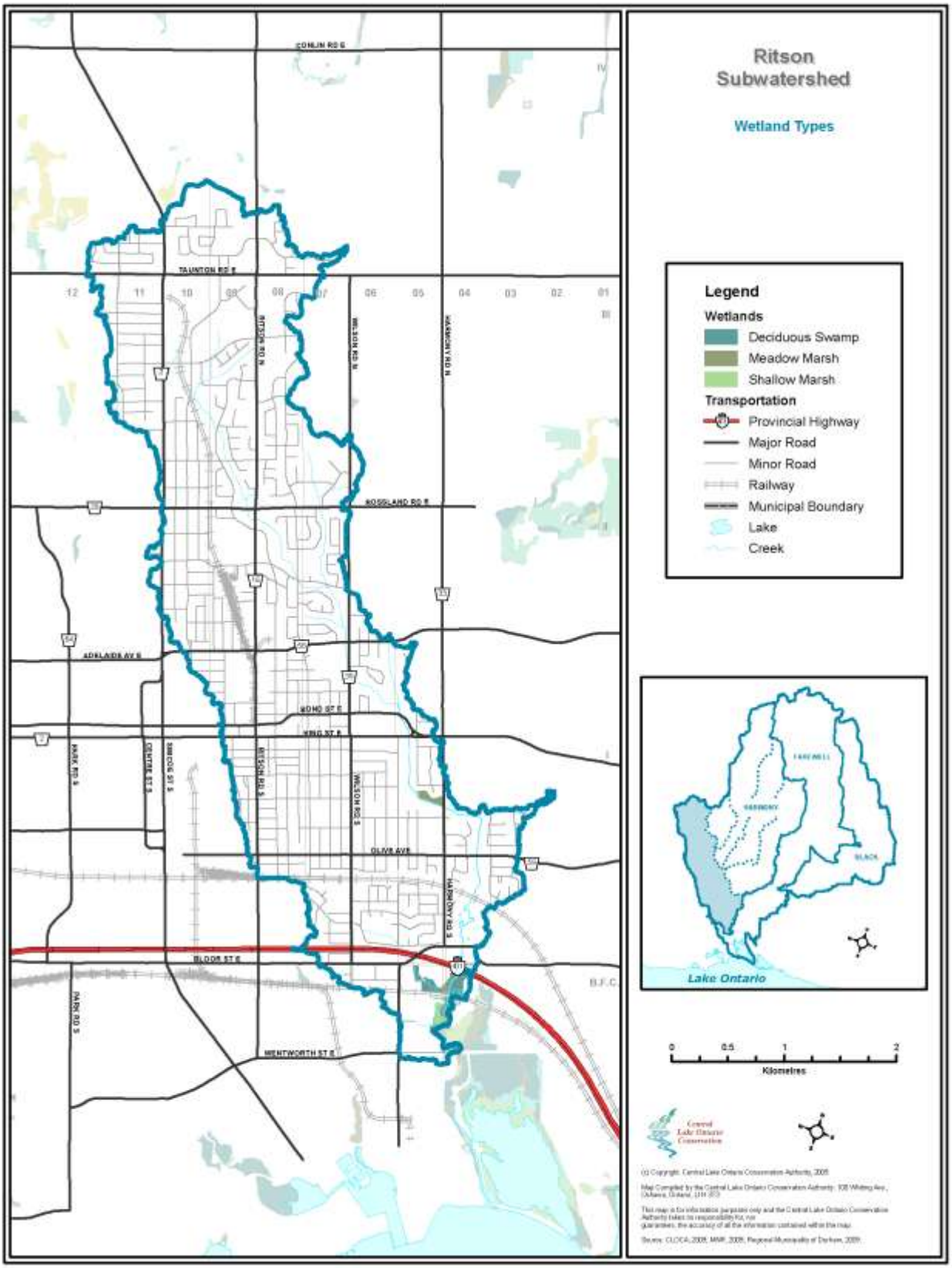


Figure 3: Wetland communities within the Ritson subwatershed.

4.2.1.1.2 Significant Wetlands

Oshawa Second Marsh

Oshawa Second Marsh was identified as a provincially significant wetland in 1983. This wetland is located in the southern portion of the City of Oshawa on the Lake Ontario shoreline. Its total area is 133 hectares and it is one continuous wetland (Ontario Ministry of Natural Resources, 1998). It is comprised of a mixture of Marsh (71%) and Swamp communities (29%).

Great Lakes coastal wetlands are influenced both by water coming down from their watersheds and by fluctuating Lake Ontario water levels. This coastal wetland, along with 17 others in Durham Region, has been intensively monitored through the Durham Region Coastal Wetland Monitoring Project (Environment Canada and Central Lake Ontario Conservation Authority, 2004; 2007). The monitoring assesses both biological and physical conditions at each wetland and has been conducted from 2002 until the present time.

The submerged aquatic vegetation community at Oshawa Second Marsh has been assessed to be in good condition (Table 4). Similarly, the bird, macroinvertebrate and fish communities were found to be in fair to very good condition (Table 4). While these rankings can vary from one year to the next, this may not signal an actual shift in the biological community condition. However, after five years of monitoring, the rankings do provide an indication of the actual condition as they are generally fairly stable by this time.

'rankings do provide an indication of actual conditions"

Table 4: Biological community condition rankings in Oshawa Second Marsh, as assessed through the Durham Region Coastal Wetland Monitoring Project*.

Oshawa Second Marsh			
	Years	Condition	Trend
Submerged Aquatic Vegetation	2002, 2003, 2005-2007	Good	Improving
Macroinvertebrates	2002-2007	Fair	Stable
Birds	2002-2007	Very Good	Stable
Fish	2005-2007	Fair	Unknown

* Rankings from Environment Canada (2009).

In the past, Oshawa Second Marsh was at the receiving end of many ongoing stresses that resulted in high turbidity. Due to the presence of Common Carp and increased sediment loads, much of the vegetation had little opportunity to establish itself (Environment Canada, 2004). Organizations tried many techniques to mitigate these problems, but they proved unsuccessful. In 2002, the main outlet of Farewell Creek was diverted from the marsh to flow directly into Lake Ontario. This has helped reduce watershed-related stresses on the marsh. The long-term goal of this project is to eventually re-connect the wetland with the lake, once the vegetation has re-established itself and is capable of dealing with these stresses again (Environment Canada, 2004).

4.2.1.2 Wilson Subwatershed

4.2.1.2.1 Wetland Area and Types

Only 0.13% of the Wilson subwatershed is identified as wetland, according to CLOCA's current ELC mapping. This wetland is a meadow marsh community (Table 5) found along a branch of Harmony Creek (Figure 4). Wilson subwatershed is the smallest of all the subwatersheds within the Black/Harmony/Farewell Creek watershed, and contains the least amount of wetland cover. Wilson is a highly urbanized subwatershed, thus resulting in very few natural areas.

Table 5: Wetland communities by number, area and percentage within the Wilson subwatershed.

ELC Wetland Communities	Number	Area (ha)	% of Watershed
Meadow Marsh	1	0.39	0.13
Shallow Marsh	0	0	0
Submerged Aquatic	0	0	0
Coniferous Swamp	0	0	0
Deciduous Swamp	0	0	0
Mixed Swamp	0	0	0
Thicket Swamp	0	0	0
Treed Bog	0	0	0
Total Wetlands	**1**	**0.39**	**0.13**

4.2.1.2.2 Significant Wetlands

No Provincially of Locally Significant Wetlands have been identified within the Wilson Subwatershed.

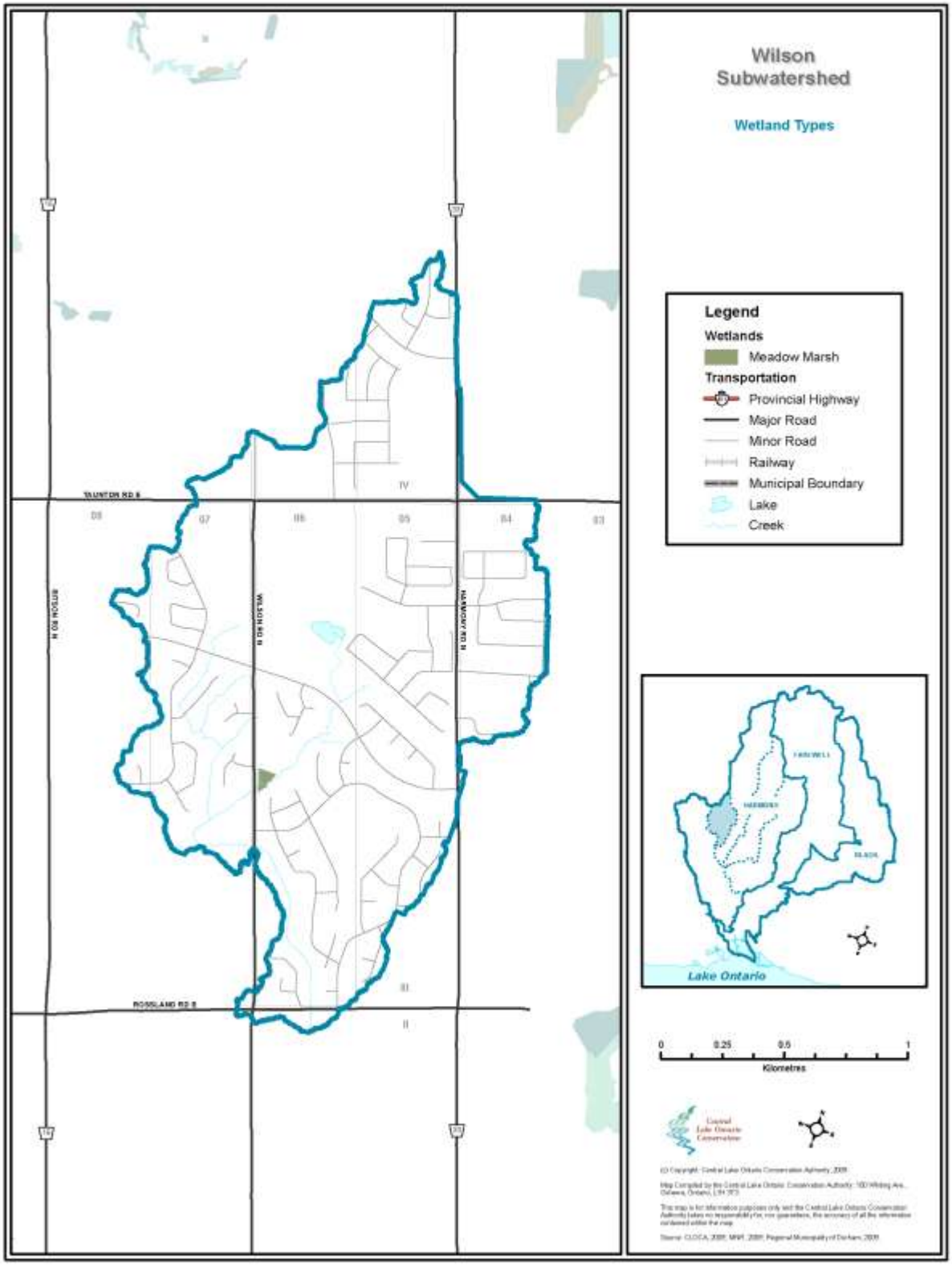


Figure 4: Wetland communities within the Wilson subwatershed.

4.2.1.3 Grandview Subwatershed

4.2.1.3.1 Wetland Area and Types

The Grandview subwatershed contains 3.65% wetland cover according to CLOCA's current ELC mapping (Table 2). This falls short of the Environment Canada AOC guidelines (2004) of 6% wetland cover in a subwatershed. The wetlands in this subwatershed are predominantly swamp communities, with deciduous and thicket swamps being the most common (Table 6). Most of the wetlands lie within the northern portion of the subwatershed (Figure 5), surrounded by agricultural land. The southern portion of Grandview subwatershed is highly urbanized, resulting in fewer natural areas.

Table 6: Wetland communities by number, area and percentage within the Grandview subwatershed.

ELC Wetland Communities	Number	Area (ha)	% of Watershed
Meadow Marsh	12	11.97	1.06
Shallow Marsh	0	0	0
Submerged Aquatic	0	0	0
Coniferous Swamp	0	0	0
Deciduous Swamp	11	14.20	1.26
Mixed Swamp	1	2.74	0.24
Thicket Swamp	6	12.10	1.08
Treed Bog	0	0	0
Total Wetlands	**30**	**41.02**	**3.65**

4.2.1.3.2 Significant Wetlands

No Provincially or Locally Significant Wetlands have been identified within the Grandview Subwatershed.

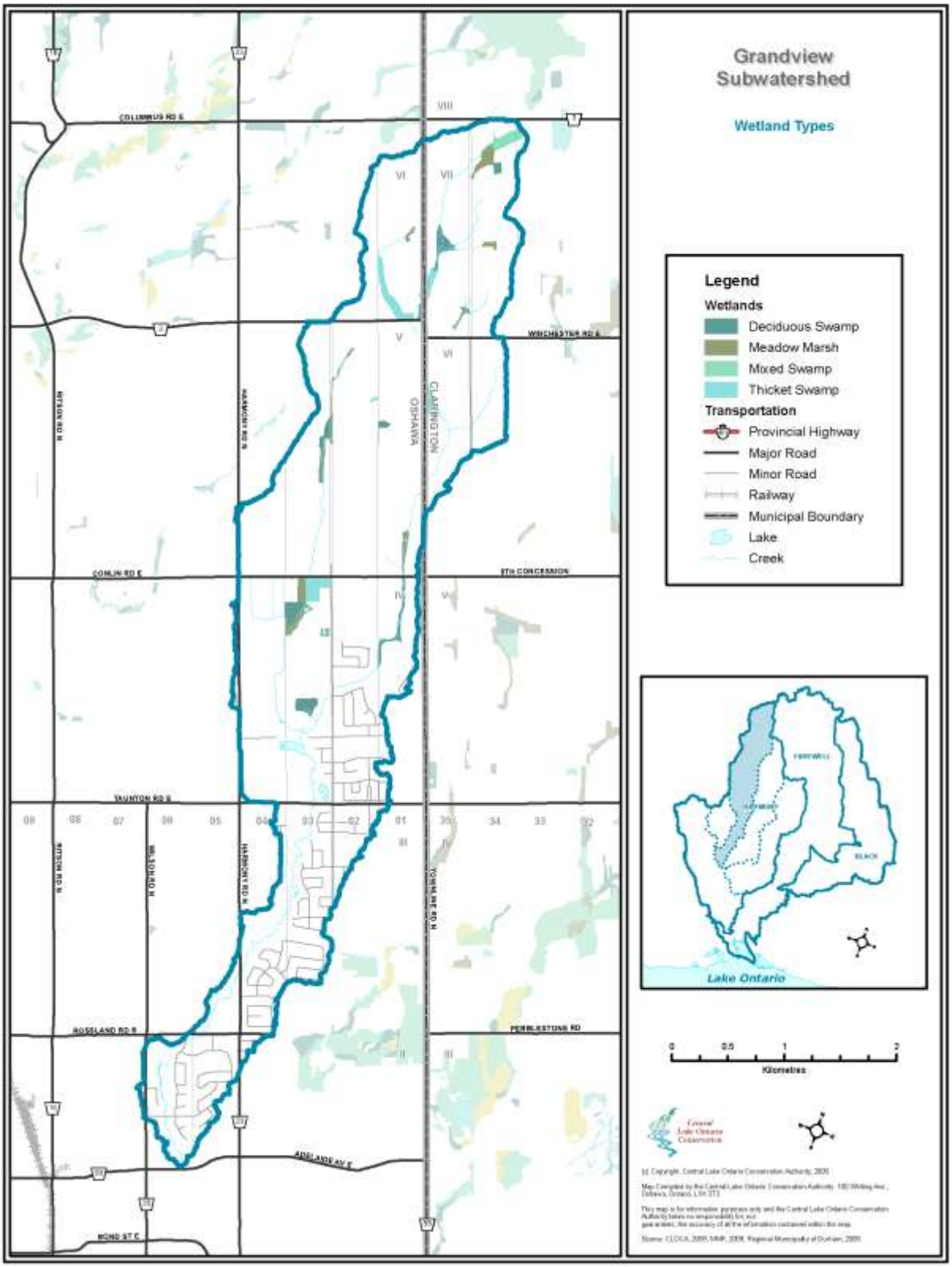


Figure 5: Wetland communities within the Grandview subwatershed.

4.2.1.4 Taunton Subwatershed

4.2.1.4.1 Wetland Area and Types

Taunton subwatershed wetlands are predominantly swamp communities with the majority being mixed swamps (i.e. a mixture of deciduous and coniferous trees) (Table 7). Wetlands account for 8.72% of the watershed. The Taunton subwatershed wetlands are well distributed (Figure 6), with a slightly higher concentration in the southern portion. The northern portion contains mostly marshes, while the south is mixed swamp. This southern wetland area is part of the Harmony-Farewell Iroquois Beach Wetland Complex and was identified as a Provincially Significant Wetland in 1999.

Table 7: Wetland communities by number, area and percentage within the Taunton subwatershed.

ELC Wetland Communities	Number	Area (ha)	% of Watershed
Meadow Marsh	13	14.73	1.69
Shallow Marsh	0	0	0
Submerged Aquatic	1	0.46	0.05
Coniferous Swamp	4	4.03	0.46
Deciduous Swamp	10	13.59	1.56
Mixed Swamp	11	41.01	4.71
Thicket Swamp	6	2.17	0.25
Treed Bog	0	0	0
Total Wetlands	**45**	**75.98**	**8.72**

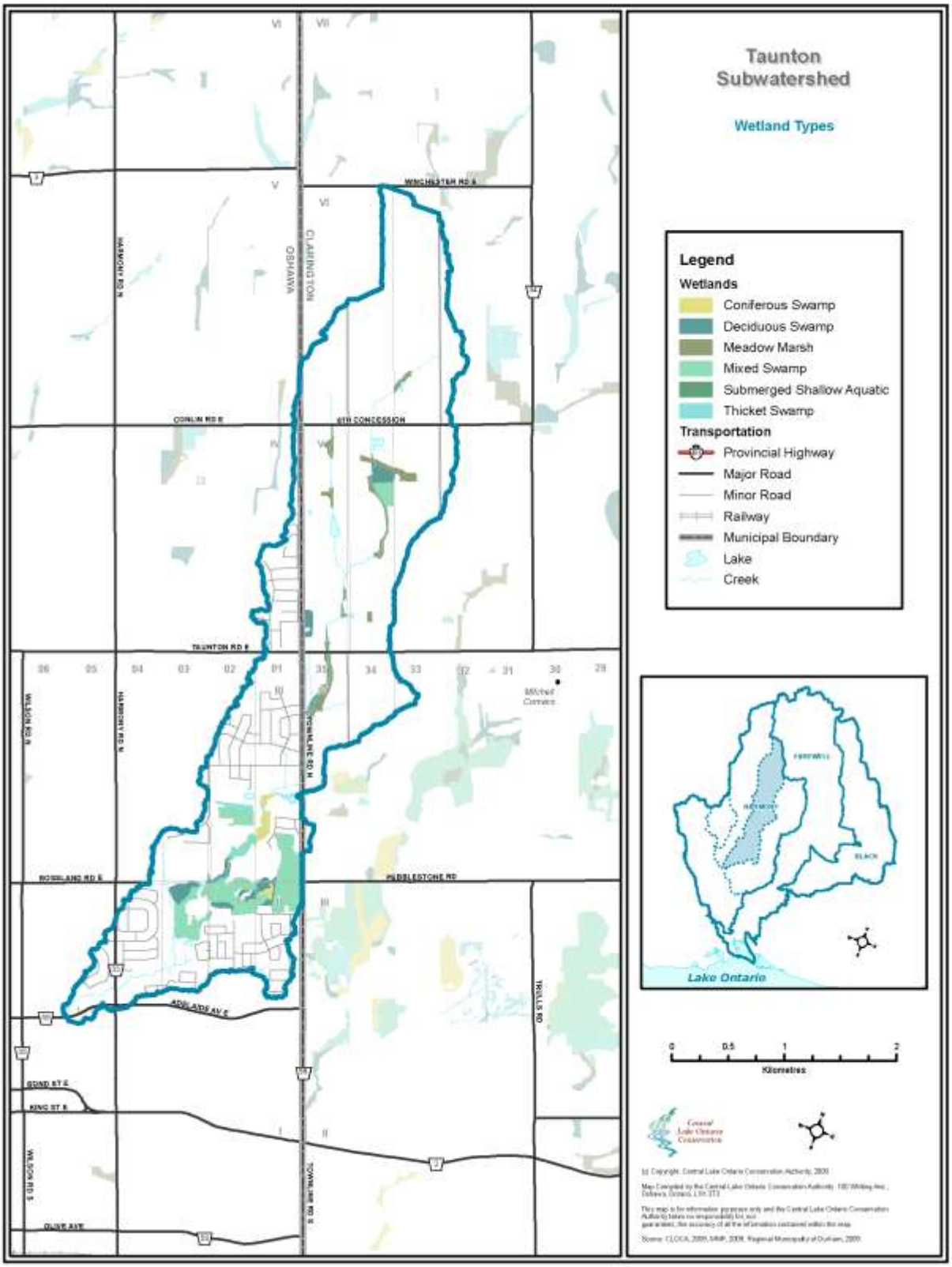


Figure 6: Wetland communities within the Taunton subwatershed.

4.2.1.4.2 Significant Wetlands

Harmony-Farewell Iroquois Beach Wetland Complex

In 2005, the MNR combined the Black/Farewell Wetland complex with the Harmony Valley Wetland, the Golf Course Wetland and several other previously unevaluated wetlands to form the provincially significant Harmony-Farewell Iroquois Beach Wetland Complex. This wetland complex is located within the Municipality of Clarington with the most western portion situated in the City of Oshawa (MNR, 2005), and spans across four subwatersheds: Taunton, Mitchell, Farewell and Black. This wetland complex is found in the former glacial Lake Iroquois beach that extends east-west across Durham Region.

Harmony-Farewell Iroquois Beach wetland complex is 685.7 ha in size, and consists of 70 wetlands. Ninety-two percent of this wetland complex is comprised of swamps, while the remaining 8% is marsh. These wetland communities provide habitat for a variety of significant plant species and wildlife, including Great Blue Heron rookeries and locally significant fish.

'These wetland communities provide habitat for a variety of significant plant species and wildlife, including Great Blue Heron rookeries and locally significant fish.'

4.2.1.5 Mitchell Subwatershed

4.2.1.5.1 Wetland Area and Types

The majority of wetlands within the Mitchell subwatershed are part of the Harmony-Farewell Iroquois Beach Wetland Complex and are primarily mixed swamp, comprising close to 6% of the wetlands (Table 8). Wetlands in the Mitchell subwatershed are well distributed and cover just over 11% of the subwatershed (Figure 7). All wetland community types are represented within the Mitchell subwatershed except for Treed Bog, which is exceptionally rare within CLOCA's jurisdiction. This watershed meets the recommended guidelines set out by Environment Canada for wetland cover within a subwatershed.

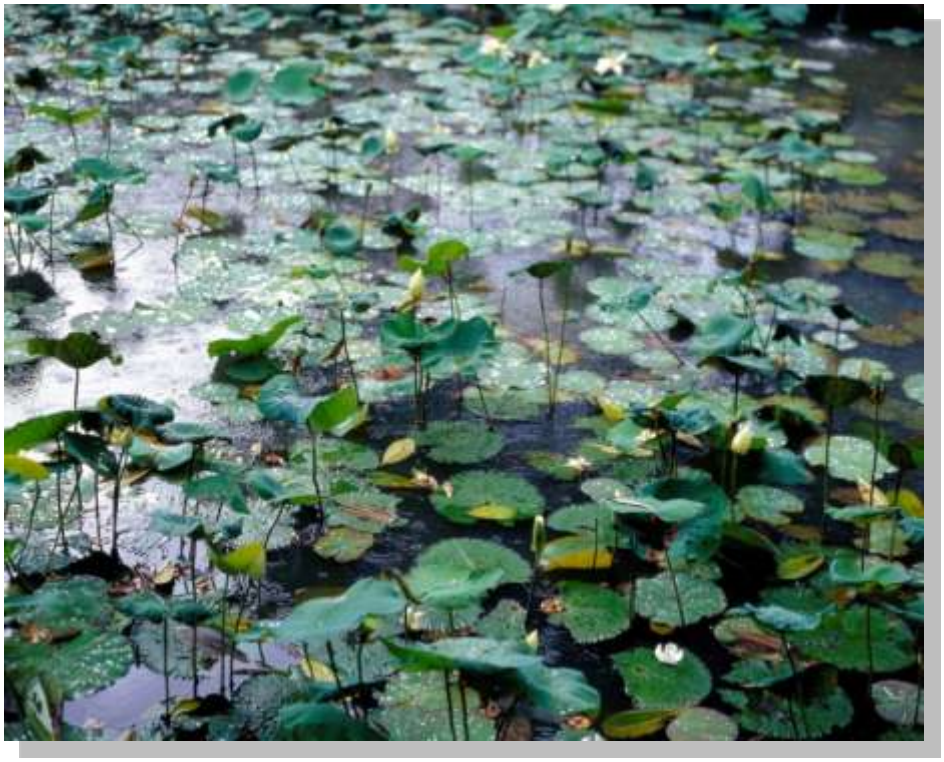
Table 8: Wetland communities by number, area and percentage within the Mitchell subwatershed.

ELC Wetland Communities	Number	Area (ha)	% of Watershed
Meadow Marsh	9	10.63	0.98
Shallow Marsh	3	4.74	0.44
Submerged Aquatic	3	0.80	0.07
Coniferous Swamp	12	20.13	1.85
Deciduous Swamp	10	10.95	1.01
Mixed Swamp	15	64.71	5.95
Thicket Swamp	10	7.87	0.72
Treed Bog	0	0	0
Total Wetlands	**62**	**119.82**	**11.03**

4.2.1.5.2 Significant Wetlands

Harmony-Farewell Iroquois Beach Wetland Complex

The Harmony-Farewell Iroquois Beach Wetland Complex is located, in part, in this subwatershed. The reader is referred to Section 4.2.1.4.2 for more information about this PSW.



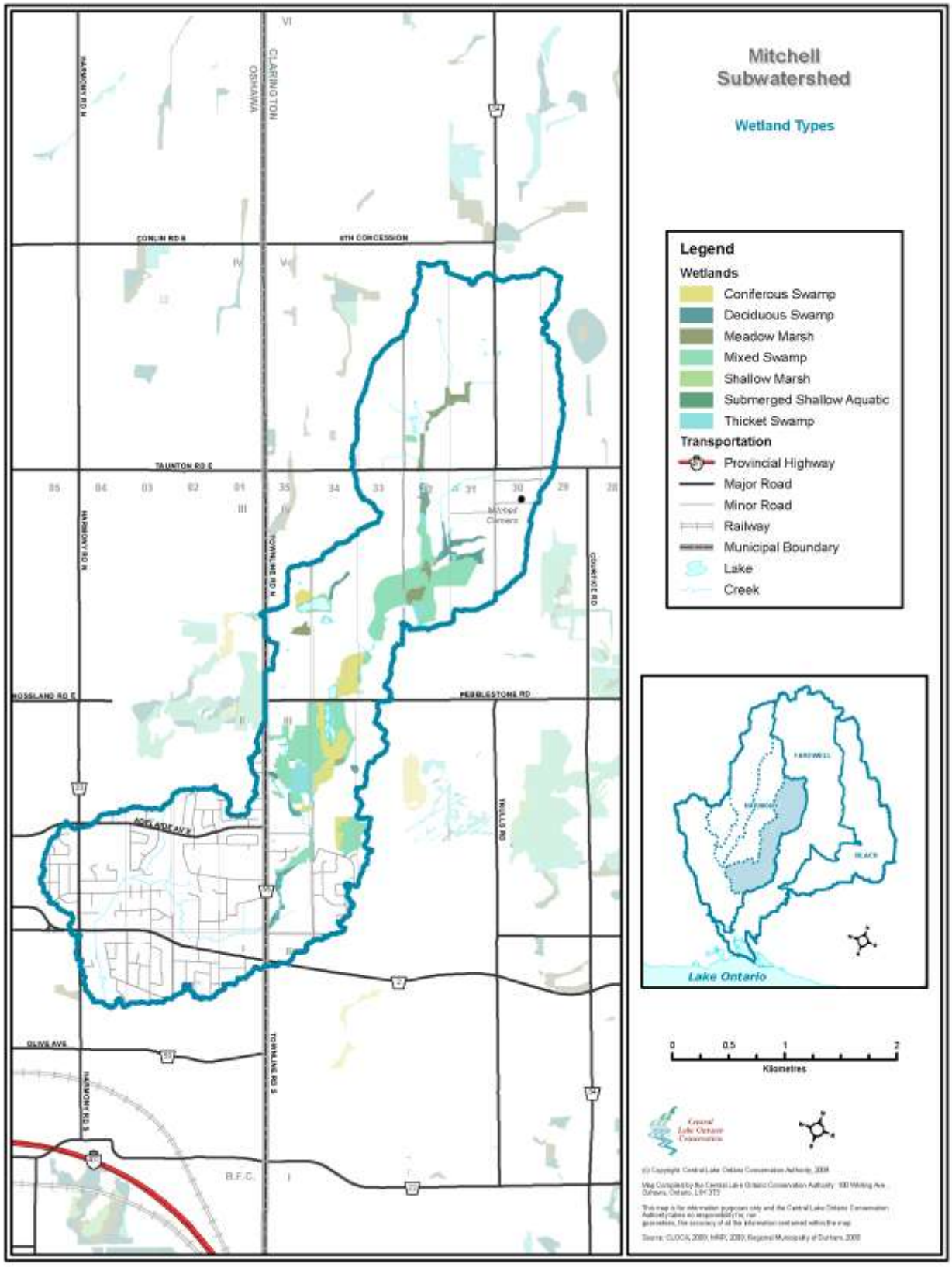


Figure 7: Wetland communities within the Mitchell subwatershed.

4.2.2 Farewell Creek Subwatershed

4.2.2.1 Wetland Area and Types

Farewell Creek subwatershed is approximately 37.73 km^2 and contains the second greatest amount of wetland cover within the Black-Harmony Farewell watershed, with just under 14%. Each of the wetland types are well represented within the Farewell subwatershed including a Treed Bog which is the only identified Bog within CLOCA's jurisdiction (Table 9). The Treed Bog is part of the Solina Wetland Complex, a Provincially Significant Wetland, one of four PSWs within the Farewell subwatershed. These PSWs are the Oshawa Second Marsh; Harmony-Farwell Iroquois Beach Wetland Complex; Solina Wetland Complex; and the Enfield Wetland Complex. Wetland coverage is well distributed across the Farewell subwatershed, except for in the highly urbanized areas of Clarington and Oshawa (Figure 8).

Table 9: Wetland communities by number, area, and percentage within the Farewell Creek subwatershed

ELC Wetland Communities	Number	Area (ha)	% of Watershed
Meadow Marsh	45	68.39	1.81
Shallow Marsh	23	64.80	1.72
Shallow Water	13	4.78	0.12
Coniferous Swamp	7	18.51	0.49
Deciduous Swamp	46	111.89	2.97
Mixed Swamp	29	187.95	4.98
Thicket Swamp	45	68.74	1.82
Treed Bog	1	1.02	0.03
Total Wetlands	**208**	**524.53**	**13.94**

'… the centre being a 1ha kettle peatland that has characteristics of both fens and bogs.'

4.2.2.2 Significant Wetlands

Oshawa Second Marsh

The Oshawa Second Marsh is found, in part, within the Farewell subwatershed. The Reader is referred to Section 4.2.1.1.2 for more information on this PSW.

Harmony-Farewell Iroquois Beach Complex

The Harmony-Farewell Iroquois Beach Complex is also found, in part, in this subwatershed. The reader is referred to Section 4.2.1.4.2 for more information about this PSW.

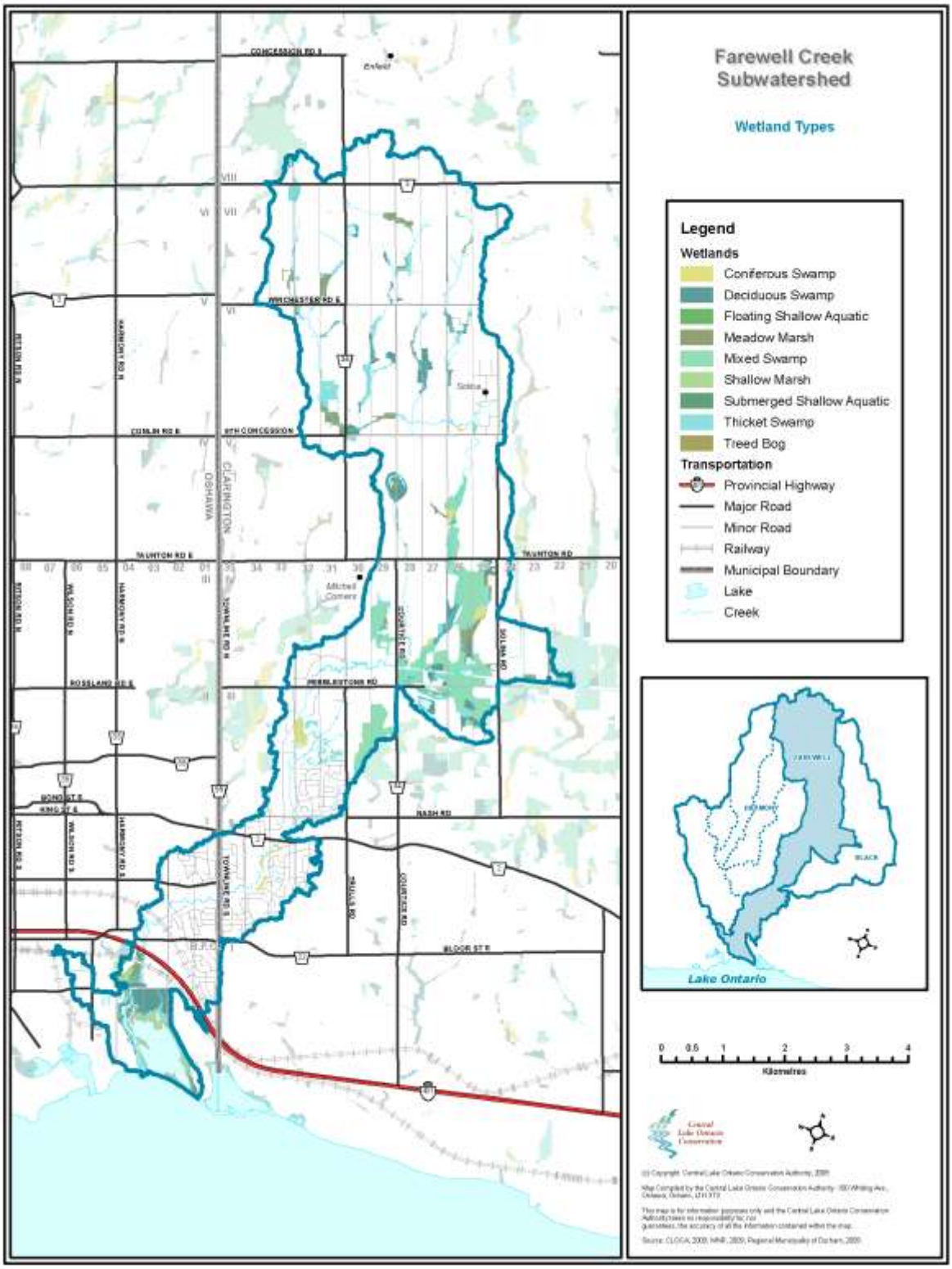


Figure 8: Wetland communities within the Farewell Creek subwatershed.

Solina Wetland Complex
The Solina Wetland Complex is situated entirely within the Municipality of Clarington, and was re-evaluated in 1999. It is an 11.3 ha headwater wetland, located at the terminus of a tributary of Farewell Creek (OMNR, 1999). Within the relatively small coverage of the wetland lie 11 different community types, the centre being a 1 ha kettle peatland that has characteristics of both fens and bogs (OMNR, 1999). This wetland has even greater significance as it is one of only 23 peatland communities occurring off the Oak Ridges Moraine (OMNR, 1999). Due to the rarity of this feature, it also contains many locally significant plants that are found only in bog and fen habitats, such as Bog Laurel, Labrador-tea and Velvet Blueberry (OMNR, 1999). For more details on the significance of this feature, the reader is referred to Chapter 17 - Natural Heritage.

Enfield Wetland Complex
The Enfield Wetland Complex received an updated evaluation in 2006, and has now gone from locally significant status to provincially significant. This wetland complex is incorporated in the Enfield Area of Natural and Scientific Interest (ANSI), as it contains kettle and headwater wetlands within the Oak Ridges Moraine (OMNR, 2006). There are a total of 24 wetlands within the Enfield Wetland complex, covering 102 ha. These wetlands contain 39 different wetland types, with 92% being swamps and the remaining 8% being marshes, rare to the Oak Ridges Moraine (OMNR, 2006).

'all existing wetland areas are valuable and their continued existence is critical in providing the functions for which wetlands are known'

4.2.3 Black Creek Subwatershed

4.2.3.1 Wetland Area and Types
The Black Creek subwatershed contains the highest coverage of wetlands within the entire Durham Region, with over 22% cover. This amount surpasses the minimum guidelines as recommended by Environment Canada of 10% wetland coverage. Many of these wetlands have been evaluated by the MNR as provincially significant which protects them under the PPS. These include Harmony-Farewell Iroquois Beach Wetland Complex and a portion of the Maple Grove Wetland Complex. A variety of wetland types are well represented within this watershed, with mixed swamps dominating at close to 14% coverage (Table 10). The wetlands are fairly well distributed throughout the watershed, with a concentration in the central portion (Figure 9). The northern part of the watershed still has a number of wetlands; however they are more dispersed due to the agricultural land uses in this area.

Table 10: Wetland communities by number, area, and percentage within the Black Creek subwatershed

ELC Wetland Communities	Number	Area (ha)	% of Watershed
Meadow Marsh	35	60.23	2.56
Shallow Marsh	8	6.05	0.26
Shallow Water	9	2.27	0.09
Coniferous Swamp	13	20.58	0.87
Deciduous Swamp	22	48.34	2.05
Mixed Swamp	59	325.59	13.82
Thicket Swamp	38	69.31	2.94
Treed Bog	0	0	0
Total Wetlands	**184**	**533.38**	**22.64**

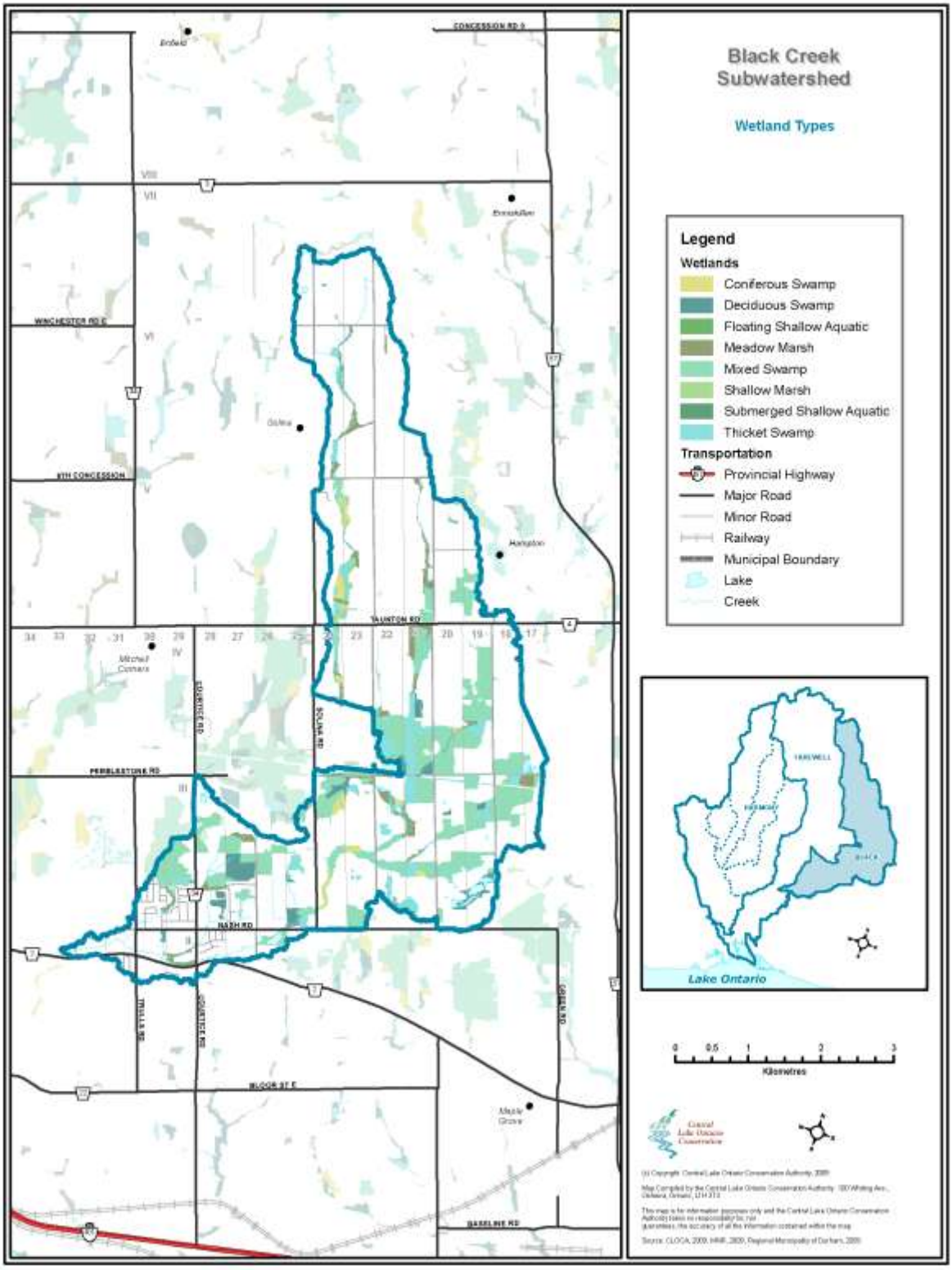


Figure 9: Wetland communities within the Black Creek subwatershed.

4.2.3.2 Significant Wetlands

Harmony-Farewell Iroquois Beach Wetland Complex
The Harmony-Farewell Iroquois Beach Complex is also found in part in this subwatershed. The reader is referred to Section 4.2.1.4.2 for more information about this PSW.

Maple Grove Wetland Complex
A portion of the Maple Grove Wetland Complex lies within the Black Creek watershed boundary. This wetland is approximately 149 ha, and contains 60% deciduous swamp and 30% coniferous swamp, while thicket swamps and marshes account for the remaining wetland cover. For more details on the significance of this feature, the reader is referred to Chapter 17 - Natural Heritage.

Together, the Maple Grove Wetland Complex and the Harmony-Farewell Iroquois Beach Wetland Complex support the largest wetland complexes on the Iroquois Plain within the GTA (OMNR, 2004).

'Maple Grove Wetland Complex and the Harmony-Farewell Iroquois Beach Wetland Complex support the largest wetland complexes on the Iroquois Plain within the GTA"

5.0 CONCLUSION

While the overall Black/Harmony/Farewell Creek watershed has enough wetland cover to meet the minimum Environment Canada guidelines for healthy watersheds, three of the subwatersheds are severely lacking in cover due to urban pressures. Within this watershed, wetlands tend to be concentrated in the eastern portion, particularly within the geological feature known as the glacial Lake Iroquois Beach. Wetlands cover 1,310 ha or 12.13% of the watershed. Five PSWs, including the Oshawa Second Marsh, the Harmony Farewell Iroquois Beach Wetland Complex, the Maple Grove Wetland Complex, Enfield Wetland Complex and the Solina Wetland Complex are found either completely, or in part, within this watershed.

The Solina Wetland Complex is especially significant, as it contains the only Treed Bog within CLOCA's jurisdiction. Within this wetland community, there are many locally significant plants and animals found due to the rarity of this habitat type. This 1 ha bog feature is a gem within CLOCA's jurisdiction.

This watershed may have had even greater percentages of wetland cover in the past (Environment Canada, 2004). However, due to the lack of historical information about the extent of wetland cover, it may not be possible to determine the exact area that has been lost since extensive human settlement began in this watershed. All existing wetland areas are valuable and their continued existence is critical in providing the functions for which wetlands are known.

This chapter has focused solely on wetland vegetation communities, however, all wetlands are dependent to a large extent on naturally-vegetated adjacent uplands for their successful functioning. As such, wetlands cannot be looked at in isolation. They require sufficient "buffer" zones surrounding them, and the land uses upstream in the watershed or adjacent to the wetlands can have a significant impact on wetland functions, depending on the type of wetland. Some wetland researchers have suggested that the wetlands we see now have been so altered by changes in hydrology and nutrient inputs (e.g. fertilizers) that we have already lost not only large areas of wetlands, but also the diversity of types that previously existed (Keddy, 2000).

The largest contiguous areas of wetland within the entire Black/Harmony/Farewell Creek watershed occur mostly on privately owned lands. This signifies the important role CLOCA must play to create and maintain partnerships with private land owners to help further establish a sense of stewardship to maintain the integrity of these wetlands. CLOCA is currently creating an outreach program for landowners that have provincially significant wetlands on their property. This program will promote stewards to maintain the high quality natural areas in the landscape, not only for recreational opportunities and as zones of high biodiversity, but also as functioning wetlands that contribute to human well-being through the values they provide.

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