

## Appendix D

# Harrington Conservation Area Vegetation and Bird Inventory 2015

Updated March 8, 2017



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**Cover Photos**

*Left:* Brenda Gallagher surveying the vegetation at the edge of Harrington Reservoir, summer 2015. Photo by Cathy Quinlan.

*Right:* Red-winged Blackbird. Photo by Brenda Gallagher.

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## Executive Summary

This study examined the vegetation and bird and wildlife of Harrington CA to determine the habitat quality and to flag any rare or sensitive species that might be impacted if the Harrington Dam and reservoir were changed. It is part of the Harrington Dam Class Environmental Assessment report.

A three-season botanical inventory was completed in 2015 of this 5 ha site. Of the 219 plant species found, 40% are non-native. No Species at Risk or rare or uncommon species were found that require special consideration prior to possible restoration work and dam de-commissioning. 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 and has only a narrow fringe of wetland emergent plants along the southern edges and a sparse cover of rooted aquatic plants (a non-native pondweed). 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 plants 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 if the dam were retired.

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). Neither the Provincially Significant Wetland nor natural heritage feature designations would prevent the restoration of a reservoir to a natural creek system.

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 it was not nesting here and so there are no actions that need to be taken to protect its breeding habitat. 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. 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 the Conservation Area.

Other species noted by the public were Milksnake and Eastern Bluebird. Neither is a Species at Risk, and they 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 by the decommissioning of Harrington Dam.

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## 1.0 Purpose of the Vegetation and Bird Study

This study is a component of a larger Environmental Assessment study on the Harrington Dam and Reservoir. The purposes of this study are to:

- document the vegetation communities within Harrington Conservation Area (CA) to establish baseline conditions and to flag any unique or rare species that need protection or consideration prior to any potential changes to the CA (i.e., the dam and reservoir), and
- document the bird species that use the aquatic and terrestrial habitats of Harrington CA, either year round, seasonally or infrequently, to establish baseline conditions and to flag any unique or rare species that need protection or consideration prior to any potential changes to the CA (i.e., the dam and reservoir).

## 2.0 Vegetation Inventory

### 2.1 Methodology

A three-season vegetation inventory was carried out in Harrington CA in 2015 by Brenda Gallagher, Vegetation Specialist and Forestry Technician with the Upper Thames River Conservation Authority (UTRCA). The entire CA was inventoried in May, again in July and lastly in August. Each season's inventory spanned two field days. [Table 1](#) summarizes the survey effort.

**Table 1. Vegetation Survey Dates in 2015**

Dates Inventoried	No. Days
May 25, 26	2
July 7, 13	2
August 25, 27	2
<b>Total days</b>	<b>6</b>

After walking the entire site once, the ELC (Ecological Land Classification) vegetation communities were mapped onto 2010 colour orthoimagery. Vascular plant species in each vegetation community were recorded on field sheets. At the end of the study, the plant lists were entered into the UTRCA plant database to produce a full checklist of vascular plants by community. Statistics were generated also.

Aquatic plants in the pond/reservoir were collected and identified by John Schwindt, Aquatic Biologist, when undertaking the fish inventory. Brenda Gallagher also recorded incidental wildlife sightings, especially of birds, amphibians, reptiles and mammals, while undertaking the vegetation inventories.

## 2.2 Results and Discussion

Figure 1 shows the three ELC vegetation communities plus the pond/reservoir (Shallow Aquatic) for Harrington CA. Table 2 shows the area of each community. ELC communities less than 0.5 ha in size are usually merged with neighbouring vegetation communities, as per Lee *et al.* 1998, but Community 3 FOD (Deciduous Forest) was left as a stand-alone community even though it is only 0.2 ha as it is quite unique and did not fit well with the surrounding communities. A full annotated checklist of vascular plants found in all three terrestrial communities is provided in Appendix A.

**Table 2. Area of ELC Vegetation Communities**

ELC Code	Community Description	Area	Terrestrial vs. Aquatic
1 -CUW	Cultural Woodland (Com 1)	1.6 ha	3.1 ha (terrestrial)
2 - CUS	Cultural Savanna (Com 2)	1.3 ha	
3 -FOD	Deciduous Forest (Com 3)	0.2 ha	
4 - SA	Shallow Aquatic (Com 4)	2.3 ha	2.3 ha (aquatic)
<b>Total</b>		<b>5.4 ha</b>	

Table 3 summarizes the number of species, both native and non-native, as well as MCC (Mean Coefficient of Conservatism) and Average Wetness for each plant community and overall. Descriptions of these parameters are provided in Appendix B. While the number of species found is high for such a small site, the overall quality of the vegetation is moderately poor to average. The sections that follow describe the conditions in greater detail for each of the communities.

**Table 3. Summary of Plant Statistics**

Community Number and ELC		# Species	# Native Species	# Non-native Species	% Non-native Species	MCC	# Species with CC 8-10	Avg Wetness	Overall Quality Assessment
1	CUW	185	116	69	37	3.5	1	-1.2	Moderately Poor to Average
2	CUS	147	94	53	36	3.5	2	-1.0	Moderately Poor to Average
3	FOD	120	70	50	42	3.4	0	-0.6	Moderately Poor
<b>Overall</b>		<b>219</b>	<b>132</b>	<b>87</b>	<b>40</b>	<b>3.6</b>	<b>2</b>	<b>-1.0</b>	<b>Moderately Poor to Average</b>



Figure 1. Harrington Conservation Area ELC Vegetation Communities



### 2.2.1 Community 1, Cultural Woodland (CUW)

The Cultural Woodland of Community 1 is 1.6 ha in size and encompasses the southern part of the CA on both sides of the pond/reservoir. Cultural woodlands are treed areas characterized by canopy coverage between 35 - 60%. These communities often represent the stage of natural succession between cultural thicket and forest. Cultural communities result from, or are maintained by, cultural or anthropogenic-based disturbances.

In Community 1 there is a wide mix of native and non-native plant species that have been either planted or that have self-naturalized over the years. A total of 185 plant species were recorded: 116 native and 69 non-native or adventive species. The number of plant species is relatively large for such a small area, owing to the diversity of micro-habitats within it: pond edge (wetland emergent plants), planted prairie plot, naturally succeeding thickets and woods and planted conifers. The percentage of non-native plants is 37%, which is about average or moderate for the Upper Thames watershed. The site is disturbed by a foot trail and past land use change (i.e., was formerly mowed lawn).

The MCC (Mean Coefficient of Conservatism) is 3.5, a moderately poor score. There is a predominance of wetland plants in this community (average Wetness is -1.2).

Mature trees include White Cedar, willows, pine, spruce, ash, and maples (Manitoba, Norway, Red, Silver, and Sugar). There are a variety of shrubs including dogwoods, Staghorn Sumac, raspberries, ninebark with some cranberries and Nannyberry.

Community 1 contained a wide range of wildflowers, both native and non-native, that prefer mostly sunny ground in moist to wet habitats. The most abundant native species found include asters, goldenrods, avens, Spotted Joe Pye-Weed, touch-me-nots, Field Mint and a variety of grasses. An interesting plant to note was the Yellow Lady's Slipper, an orchid, though not rare.



Photo 1. Community 1 — View looking south from the east side of the pond. Joe Pye-weed flowers in bloom and cedar trees on far side.



Photo 2. Community 1 – View looking south from trail on east side of the pond.

### **2.2.2 Community 2, Cultural Savanna (CUS)**

The Cultural Savanna of Community 2 is located on the west side of Harrington Pond and is 1.3 ha in size. Cultural Savannas have a canopy cover of 23 - 35%, slightly lower than Cultural Woodlands. Cultural communities result from, or are maintained by, cultural or anthropogenic-based disturbances.

Community 2 has a variety of very small but different habitats within it. The understory is mostly manicured lawn grass with plantings of older trees such as Black Cherry, willow, White Birch, maples and spruce. It also includes a narrow fringe of wetland plants along the pond's shore as well as two planted tallgrass prairie plots and a meadow marsh near Road 96.

A total of 147 species were recorded, 94 native and 53 non-native. The percentage of non-native species (36%) is average and reflects the human disturbance and manicured nature of the site. The MCC is 3.5, a moderately poor score.

Common shrubs and trees include Nannyberry, Staghorn Sumac, Highbush Cranberry and dogwoods. Pond shore plants include Joe Pye-Weed, beggarticks, and jewelweeds. The diversity of pond edge/wetland plants is not as large and diverse as in Community 1 because the fringe of plants is very narrow as the pond is steeper edged here.



Photo 3. Community 2 — Cultural savanna of lawn with open grown trees and naturalized edges



Photo 4. Community 2 — Prairie plot planted in 2005 by the UTRCA and local community.

### 2.2.3 Community 3, Deciduous Forest (FOD)

The deciduous forest of Community 3 is small (0.2 ha) and includes the area immediately adjacent to Harrington Creek downstream of the dam as well as the area around Harrington Mill. Though smaller than the 0.5 ha minimum vegetation community size recommended by the ELC (Lee et al 1998), it was maintained as a stand-alone community because of its uniqueness.

This small forest community is dominated by mature trees with a dense understory of shrubs and herbaceous plants. Under the ELC, deciduous forests are characterized by a canopy of >60% cover consisting of >75% deciduous trees.

A total of 120 species were recorded from the community, 70 native species and 50 non-native species. The higher percent of non-native plants (42%) reflects the disturbances the area experiences (e.g., flooding, structures, and human foot traffic). The MCC score of 3.4 indicates the habitat is of moderately poor quality.

Dominant tree species included Silver Maple, ash (in decline), elms and Black Walnut with some cedar and spruce. Common shrubs include dogwoods, young ash, elderberry, currants and raspberries. The herbaceous layer consists of avens and goldenrod, with non-native goutweed and coltsfoot on the banks adjacent to the mill.

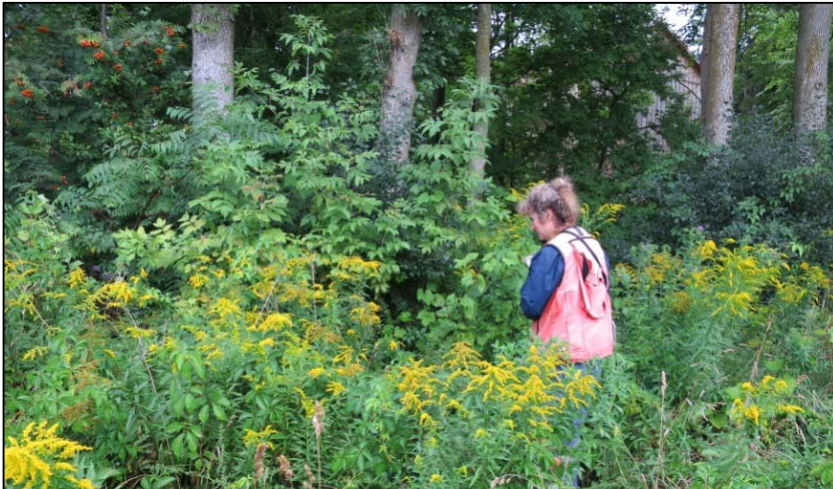


Photo 5. Community 3 — Brenda Gallagher inventories the west side of Harrington Creek.

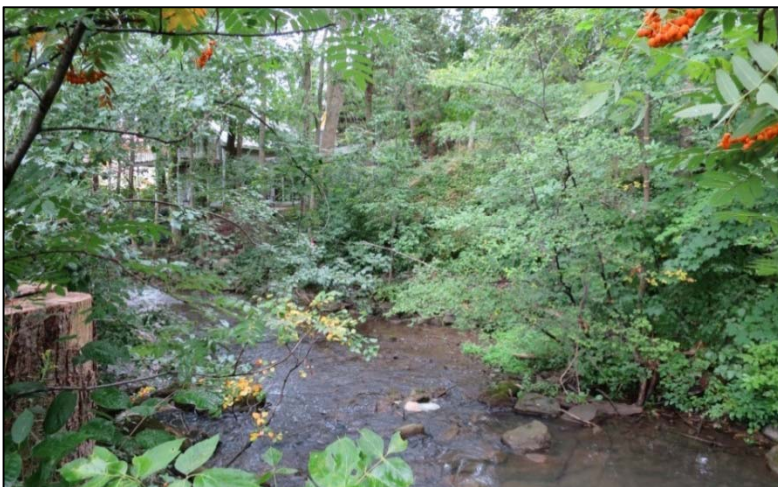


Photo 6. Community 3 — Forest community abutting Harrington Creek

#### 2.2.4 Community 4, Shallow Aquatic (SA)

The Harrington Pond/Reservoir is classified as Shallow Aquatic with standing water <2 m depth and a low percentage of any vegetation. While the spring 2010 air photo shown in [Figure 1](#) shows mud flats at the south end of the pond, the mud flats are only visible during reservoir drawdowns in the fall to early spring period. However, the mud flats demonstrate that the pond is very shallow and silting in and the bottom substrate is very soft.

Any rooted shoreline vegetation is included in Communities 1 and 2. Algae and a small amount of Duckweed float on the surface of this shallow aquatic community. There is a sparse cover of a submerged rooted plant called Curly-leaved Pondweed, a non-native species.

The lack of a diversity of submergent and emergent aquatic plants may be due, in part, to the large population of mature Common Carp. This non-native fish disturbs the bottom sediments, uproot plants and cause the water to be very murky which, in turn, limits sunlight penetration through the water.



Photo 7. Community 4 — Shallow Aquatic (Harrington Pond/Reservoir) looking south from the dam.



Photo 8. Community 4 — Floating algae is visible on the pond/reservoir surface and on the submerged rocks (Sept 2015)

## 2.2.5 Pond Edge Plants

The fringe of wetland emergent plants growing at the pond shore is not large enough to be its own ELC community because it is less than 0.5 ha in size. The southeast side of the pond/reservoir has the most wetland emergent plants as it is shallowest, as seen on the air photo. The north part of the pond has fairly steep banks, so there are fewer pond edge plants there.

A separate list of plants found on the pond edge was generated ([Appendix C](#)) as this is the community that will most likely be affected by any proposed changes to the dam and reservoir. Most of these plants have a wetness coefficient of -5, the wettest score. None are rare or uncommon. Most of these wetland plants can also be found growing along the flowing sections of Harrington Creek and other slow moving streams and wetlands in the region.

The large population of Common Carp in the reservoir likely limits the population of emergent plants as these large fish root around in the sediments and uproot plants and muddy the water so that light does not penetrate.



Photo 9. Wetland emergent plants growing along the reservoir edge: cattails, joe pye-weed, turtle head, and dogwoods.



Photo 10. Peppermint blooms in August along the upstream edge of Harrington Pond.

### 2.2.6 Plants with High Coefficient of Conservatism (CC) Scores

Plants with a CC score of 8, 9 or 10 are considered more specialized in habitat or condition and conserve themselves to very specific environments, usually unaltered communities. Plants with low CC scores are considered generalist species that are found in a wide variety of habitats, including disturbed sites.

**Table 4** summarizes the two plant species that had a CC score of 8: Butterfly-weed (or Butterfly Milkweed) and Indian Grass. Butterfly-weed and Indian Grass are not rare in our area, but they are faithful to their habitat type and, in this case, were planted in the prairie plots in Communities 1 and 2. No plants with a CC score of 9 or 10 were found.

**Table 4. Plant Species with high CC Scores**

Common Name	Scientific Name	CC Score	Community	Comments
Butterfly-weed	<i>Asclepias tuberosa</i>	8	1, 2	Part of prairie plot, planted
Indian Grass	<i>Sorghastrum nutans</i>	8	2	Part of prairie plot, planted

### 2.2.7 Plants with Species At Risk (SAR) Designations

No plant species with at-risk designations were found in the study area. **Appendix B** lists the various species-at-risk categories.

### 2.2.8 Plants with Provincial Ranking (SRANK) of S1, S2 or S3

No plant species had a SRank of S1, S2 or S3 (very rare to rare to uncommon).



### 3.0 Bird Survey and Incidental Wildlife

#### 3.1 Methodology

A three-season bird survey was undertaken in 2015 by John Schwindt, Aquatic Biologist with the UTRCA who has years of birding experience with the Breeding Bird Atlas and Christmas Bird Count. Incidental bird observations were made by Brenda Gallagher while she was undertaking the botanical inventories. Brenda is also an experienced birder.

**Table 5** summarizes the dates of each of their visits. John Schwindt focused three of his five days to the spring breeding and migration period, and a day in summer and one in late summer. Approximately four hours were spent each time, with particular effort around the pond. Brenda Gallagher also spent six days at Harrington CA in roughly the same time period.

**Table 5. Bird Survey Dates in 2015**

Season	John Schwindt	Brenda Gallagher
Early Spring	15 Apr & 22 Apr	
Spring	14 May	25 May & 26 May
Early Summer	24 June	7 July & 13 July
Late Summer	26 Aug	25 Aug & 27 Aug
	<b>5 days total</b>	<b>6 days total</b>

#### 3.2 Results

A total of 42 bird species from 24 different orders were seen by John Schwindt and Brenda Gallagher on their separate visits to Harrington CA from April to August, 2015. **Appendix D** provides a list of the bird species recorded. Two species are exotic or introduced (European Starling, Mute Swan). Of the 40 native species:

- 36 are common breeding, permanent residents or winter residents in Oxford County,
- 1 is a common migrant in Oxford (Double-crested Cormorant),
- 1 is an uncommon breeding species in Oxford (Osprey) ,
- 1 is an uncommon permanent resident in Oxford (Pileated Woodpecker), and
- 1 is a common breeding species in Oxford but Threatened in Ontario (Barn Swallow).

The Barn Swallow is a common breeding species found throughout southern Ontario but there was no breeding evidence at Harrington CA. Barn Swallow is listed as Threatened by SARO (Species at Risk in Ontario), meaning the species lives in the wild in Ontario, is not endangered, but is likely to become endangered if steps are not taken to address factors threatening it.

According to the Ministry of Natural Resources and Forestry (<http://www.ontario.ca/page/barn-swallow>), Barn Swallows often live in close association with humans, building their cup-shaped mud nests almost exclusively on human-made structures such as open barns, under bridges and in culverts. Barn Swallows have experienced a significant population decline since the mid-1980s. While there have been losses in the number of available nest sites, such as open barns, and in the amount of foraging habitat in open agricultural areas, the causes of the recent population decline are not well understood. This bird's nests are often destroyed when old buildings in rural areas are demolished or fall down. Massive pesticide spraying of fields can also reduce the insect population Barn Swallows need for food.

Of the uncommon species, Osprey and Pileated Woodpecker, there was no breeding evidence in Harrington CA.

None of the 42 bird species seen are exclusively pond dwellers. Species such as Canada Goose, Mallard, Belted Kingfisher, Osprey, and Spotted Sandpiper feed in or by standing water but these species utilize rivers and streams as well. Use of the pond/reservoir by native waterfowl seemed to be on an occasional basis for feeding and resting versus nesting and rearing young. Much of the fish biomass in the pond is unavailable to fish-eating birds such as Osprey due to the size of the fish (e.g., there is a dominance of large carp in Harrington Reservoir).

Most of the songbirds seen at Harrington CA use the terrestrial habitats and nearby backyards and gardens.



Photo 11. Mute Swans, a non-native species, were present most of the 2015 season on Harrington Reservoir.



Photo 12. Song Sparrow. Photo by Brenda Gallagher

### 3.3 Other Wildlife Sightings

Brenda Gallagher recorded incidental wildlife seen while undertaking the botanical inventories. [Appendix E](#) lists the five mammals and two amphibians seen, all of which are common to our area. No species-at-risk wildlife was recorded. The Green Frog is the only animal seen with strong affiliation to permanent water bodies. The Green Frog overwinters in permanent water bodies thus the population within this CA may decline if the dam is removed.

#### Public Sightings of Wildlife and Concerns

There have been reports from the public that Snapping Turtles use the reservoir, although they were not seen by UTRCA staff on this study. There are records of this species within 1 km of the study area as well. The Snapping Turtle is a species of Special Concern. Special Concern means the species lives in the wild in Ontario, is not endangered or threatened, but may become threatened or endangered due to a combination of biological characteristics and identified threats. Special concern species do NOT receive species or habitat protection, however.

While there is no official habitat protection afforded to species of Special Concern, the Snapping Turtle would not be harmed by the removal of the reservoir and the restoration of the creek as they do live in creek systems. A slow, summer-time drawdown of the reservoir should safeguard any individuals in the pond 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 (via the Public Information Centres), but not seen by UTRCA staff in this study, are listed and described below. The public is concerned about the potential impact of dam removal on these species. None of these species is a species at risk and none are reliant on ponds for their life cycle or will use flowing watercourses just as well.

- *Milksnake*. Milksnakes are a species of Special Concern, but do not rely on ponds, preferring field and forest edges and old barns to hunt for mice.
- *Eastern Bluebird*. The Eastern Bluebird is a common species whose population is considered stable. It lives in areas of grassland and open country, and is not reliant on ponds.
- *Beaver*. Beavers are a common and widespread species and utilize river systems, creating their own ponds through dam building. They abandon ponds that are too shallow due to sediment accumulation. Some beavers do not build dams but instead live along rivers where they burrow into banks.
- *Muskrat*. Muskrats are a common species, living in marshes, lakes and streams, where they dig burrows into the banks. They feed on wetland plants such as cattails.
- *Bald Eagle*. Bald Eagles are a species of Special Concern. Breeding population in southern Ontario small, but expanding and are not uncommon along the Thames River. They nest in a variety of habitats and forest types, almost always near a major lake or river where they do most of their hunting. Fish are their main source of food, but they also catch ducks and feed on dead animals. The dominance of large Carp in Harrington Pond likely limits any fishing the eagles could do here.

### 3.4 Other Species at Risk Records within 2 km of the Study Area

Other records of Snapping Turtle are present within 1 km of the study area. No other Species At Risk records exist within 2 km of the study area.

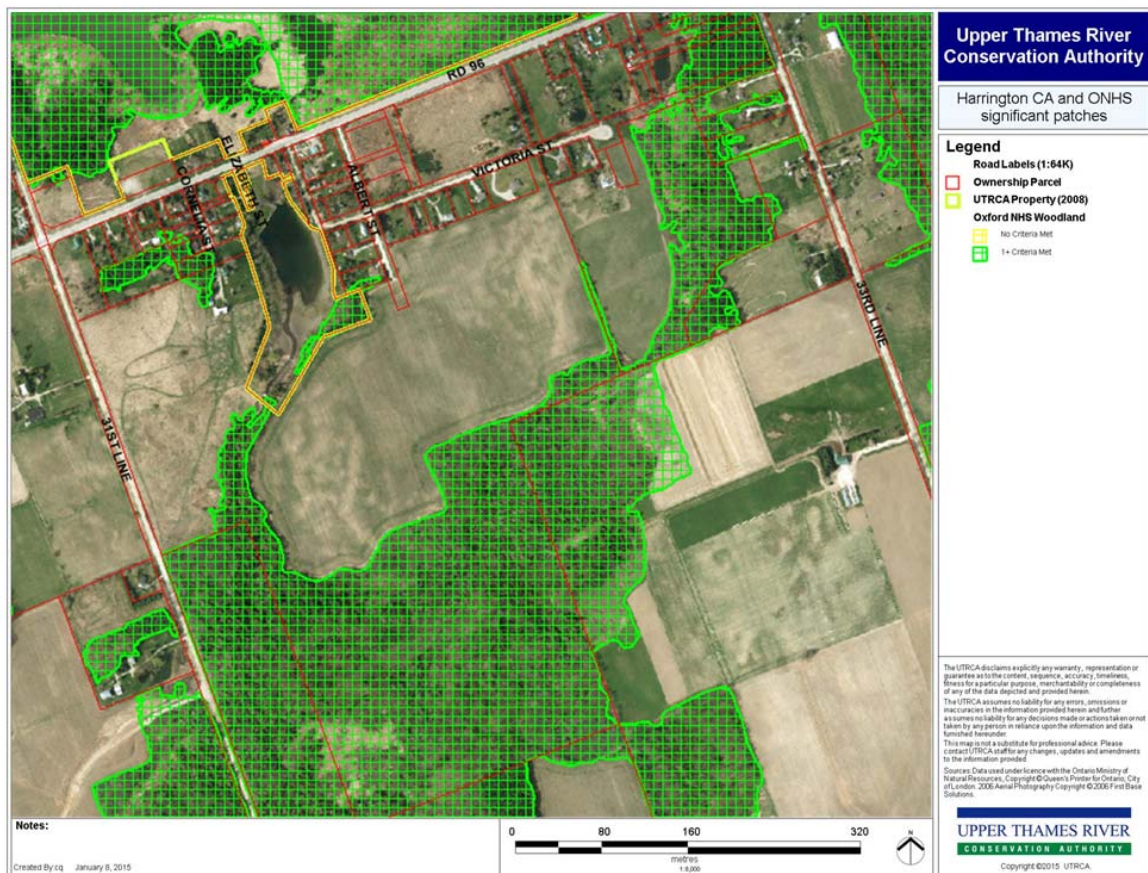
## 4.0 Significant Natural Heritage Features

### 4.1 Oxford Natural Heritage Study (ONHS)

The Oxford Natural Heritage Study (Oxford County 2006) identified significant woodland features in the county based on a set of ecological criteria. **Figure 2** shows the significant features identified in and around Harrington CA. Harrington CA contains terrestrial habitats that are part of larger surrounding and connected woodland features that are considered significant on the county landscape.

The ONHS did not include meadows, marshes, ponds or manicured parkland (e.g., mowed lawn areas). Thus the pond/reservoir and open shoreline habitats around Harrington Pond were excluded from the significant natural heritage features. The next iteration of the ONHS study planned for 2016 will include meadows, marshes and ponds as part of the natural features so more of the CA may be identified as significant if it meets the size criteria.

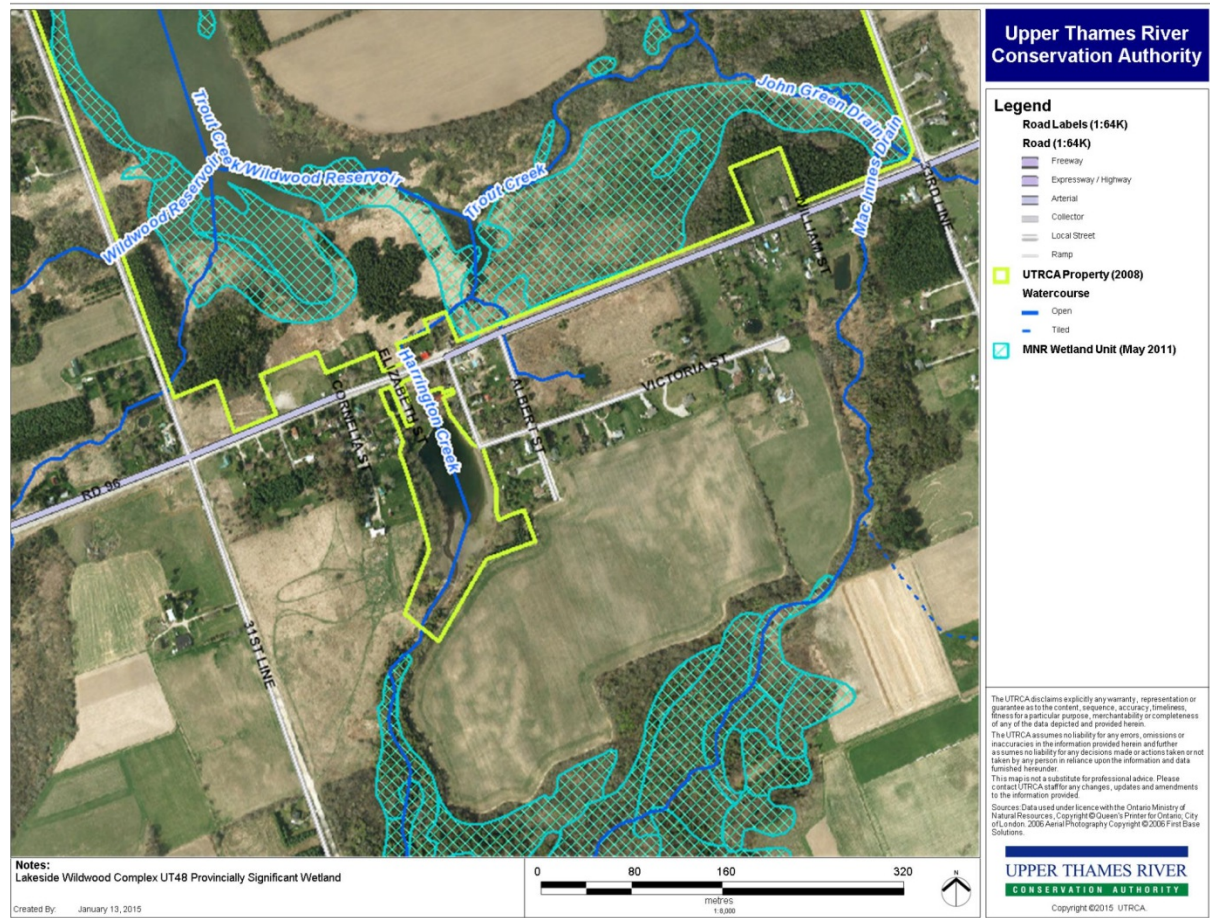
**Figure 2. Significant Natural Heritage Patches Mapping from ONHS 2006**



## 4.2 Wetlands

Figure 3 shows the evaluated wetlands near Harrington CA. The conservation area is surrounded by several large components of the Lakeside Wildwood Wetland Complex, a large Provincially Significant Wetland. The wetland extends both upstream along the Harrington Creek and downstream along Wildwood Reservoir but does not include the CA itself. The MNRF has indicated it would like to re-evaluate this large wetland complex in the near future to update the file.

**Figure 3. Harrington Area Wetlands (Lakeside Wildwood Wetland Complex)**



## **5.0 Discussion and Conclusions**

### **5.1 Vegetation**

The vegetation within Harrington Conservation Area is quite diverse owing to the mix of habitats including manicured parkland, pond edge, naturalized plots and mature forest along the downstream end of Harrington Creek. Efforts by the local community and UTRCA to plant more native plants in Harrington CA have added to the diversity of the plant life in the CA.

While the diversity of plants is quite large for a small site, the overall quality of the three vegetation communities is moderately poor to average. The overall percentage of non-native species is 40%, which is about average and expected for a small, disturbed area.

The Harrington Pond/Reservoir supports only a few aquatic species including Duckweed (native), Curly-leaved Pondweed (non-native) and algae.

The shoreline and shallow edges of the pond support some typical wetland emergent plants such as Common Cattail, Common Arrowhead, willows, Turtlehead, Spotted Joe-Pye-weed and dogwoods. However, the area is quite narrow and so there is not a large population of any of these plants. The large carp population in the reservoir may be a factor in the lack of vegetation as these fish uproot plants and stir up sediments making conditions very poor for plants. By comparison, natural shallow ponds often succeed into marsh/thicket habitat over time. Most of the plants that grow along the edge of Harrington pond/reservoir also grow along the shores of Harrington Creek and nearby creeks and rivers and wetlands and are not uncommon in our area.

No plant species at-risk were found nor were any rare or uncommon species. Two plants with a high Conservatism of Conservation score were found, but both are tallgrass prairie species that were planted in the plots at the edge of the CA.

### **5.2 Birds and Wildlife**

Birding surveys over the spring, summer and fall of 2015 recorded 42 species. Two non-native species were found and 39 native species. Of the 40 native species, the majority are common birds in the county. Two birds uncommon in Oxford (Osprey and Pileated Woodpecker) were seen visiting Harrington CA, but not nesting.

One Threatened bird species, Barn Swallow, was seen. While Barn Swallows are common breeders in Oxford County, their overall population in Ontario has been declining and may be attributed to loss of barns and human structures, pesticide spraying of fields that reduce insect populations. Since they were not seen breeding in Harrington CA and are habitat generalists, there is no action that needs to be taken to protect them if any changes are made to the Harrington dam/reservoir.

Most of the songbirds seen at Harrington CA were feeding or nesting in the terrestrial areas, not the pond and are unlikely to be affected by any changes to the reservoir.

Of the native birds that use the pond (e.g., Canada Goose, Mallard, Osprey, Belted Kingfisher), none are exclusively pond dwellers and they make use of rivers and creeks as well. There are few small fish in the reservoir for fish-eaters such as herons and kingfishers since large carp dominate. These birds likely are attracted to the nearby Wildwood Reservoir and Conservation Area and, as a result, are in the area.

No rare or uncommon wildlife species were seen. The Green Frog overwinters in permanent water bodies, thus its population within Harrington CA may decline if the dam is removed.

Other species noted by the public but not seen by UTRCA staff in this study include Milksnake, Eastern Bluebird, Bald Eagle, Beaver and Muskrat. None of the species is a species at risk and none are reliant on ponds for their life cycle or will use flowing watercourses just as well.

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.

### 5.3 Conclusions

This report examined the vegetation and bird and wildlife of Harrington CA to flag any rare or sensitive species that might be impacted if the Harrington Dam is decommissioned and the land and Harrington Creek restored.

No rare or uncommon plant species were found. No rare or uncommon breeding birds were found that need protection. The visiting Barn Swallow is Threatened in Ontario but there was no evidence of breeding within Harrington CA. No rare to uncommon wildlife species were found either.

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 Lakeside Wildwood Wetland complex 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.

In conclusion, there are no sensitive plants, plant communities, birds or wildlife that would be threatened from the decommissioning of Harrington Dam.



Photo 13. Harrington Creek downstream of the dam

## References

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## Appendices

- A. Annotated Checklist of Vascular Plant
- B. Descriptive Indices for Vegetation Communities
- C. Native Wetland Emergent Plants Growing Along the Reservoir Edge
- D. Bird Sightings at Harrington CA (April 22 – Aug 26th, 2015)
- E. Animal Sightings



## Appendix A. Annotated Checklist of Vascular Plants for Harrington CA

Scientific Name	Common Name	Native or Adventive	WEED	CC	CWet	S-RANK	SARO	Com 1	Com 2	Com 3
<i>Acer negundo</i>	Manitoba Maple	N		0	-2	S5		x	x	x
<i>Acer platanoides</i>	Norway Maple	A	-3					x		
<i>Acer rubrum</i>	Red Maple	N		4	0	S5		x	x	x
<i>Acer saccharinum</i>	Silver Maple	N		5	-3	S5		x	x	x
<i>Acer saccharum</i>	Sugar Maple	N		4	3	S5		x	x	x
<i>Achillea millefolium</i>	Yarrow	A	-1						x	
<i>Aegopodium podagraria</i>	Goutweed	A	-3						x	x
<i>Agrimonia gryposepala</i>	Agrimony	N		2	2	S5		x		x
<i>Alisma subcordatum</i>	Water-plantain	N		3	-5	S4?		x	x	
<i>Alliaria petiolata</i>	Garlic Mustard	A	-3					x	x	x
<i>Ambrosia artemisiifolia</i>	Common Ragweed	N		0	3	S5		x	x	x
<i>Amphicarpaea bracteata</i>	Hog-peanut	N		4	0	S5		x		
<i>Andropogon gerardii</i>	Big Bluestem	N		7	1	S4		x	x	
<i>Anemone canadensis</i>	Canada Anemone	N		3	-3	S5		x		x
<i>Angelica atropurpurea</i>	Angelica	N		6	-5	S5		x	x	x
<i>Arctium minus</i>	Common Burdock	A	-2					x	x	x
<i>Asclepias syriaca</i>	Common Milkweed	N		0	5	S5		x	x	x
<i>Asclepias tuberosa</i>	Butterfly-weed	N		8	5	S4		x	x	
<i>Barbarea vulgaris</i>	Winter Cress	A	-1					x	x	x
<i>Betula papyrifera</i>	Paper Birch	N		2	2	S5			x	
<i>Bidens cernua</i>	Nodding Beggarticks	N		2	-5	S5		x	x	x
<i>Bidens frondosa</i>	Devil's Beggarticks	N		3	-3	S5		x	x	
<i>Bromus inermis</i>	Smooth Brome	A	-3					x	x	x
<i>Caltha palustris</i>	Marsh-marigold	N		5	-5	S5		x		
<i>Campanula rapunculoides</i>	Creeping Bellflower	A	-2						x	
<i>Carex lacustris</i>	Lake Sedge	N		5	-5	S5		x		
<i>Carex stricta</i>	Tussock Sedge	N		4	-5	S5			x	
<i>Carex vulpinoidea</i>	Fox Sedge	N		3	-5	S5		x		
<i>Carpinus caroliniana</i>	Blue-beech	N		6	0	S5			x	x
<i>Carya cordiformis</i>	Bitternut Hickory	N		6	0	S5			x	x
<i>Cerastium fontanum</i>	Mouse-eared Chickweed	A	-1					x	x	x
<i>Chelone glabra</i>	Turtlehead	N		7	-5	S5		x	x	x

Scientific Name	Common Name	Native or Adventive	WEED	CC	CWet	S-RANK	SARO	Com 1	Com 2	Com 3
<i>Chenopodium album</i>	Lamb's-quarters	A	-1					x		x
<i>Cicuta maculata</i> var. <i>maculata</i>	Spotted Water-hemlock	N		6	-5	S5			x	
<i>Circaea canadensis</i>	Enchanter's-nightshade	N		3	3	S5		x	x	x
<i>Cirsium arvense</i>	Canada Thistle	A	-1					x	x	x
<i>Cirsium vulgare</i>	Bull Thistle	A	-1					x	x	x
<i>Cornus alternifolia</i>	Alternate-leaved Dogwood	N		6	5	S5		x	x	x
<i>Cornus amomum</i>	Silky Dogwood	N		5	-4	S5		x	x	x
<i>Cornus stolonifera</i>	Red-osier Dogwood	N		2	-3	S5		x	x	x
<i>Crataegus</i> sp.	Hawthorn species	N		4	5			x		x
<i>Cypripedium parviflorum</i> var. <i>pubescens</i>	Large Yellow Lady's-slipper	N		5	-1	S5		x		
<i>Dactylis glomerata</i>	Orchard Grass	A	-1					x	x	x
<i>Daucus carota</i>	Wild Carrot	A	-2					x	x	x
<i>Dipsacus fullonum</i>	Teasel	A	-1					x	x	x
<i>Echinochloa muricata</i> var. <i>microstachya</i>	Barnyard Grass	N		4	-5	S5		x		
<i>Echinocystis lobata</i>	Wild Cucumber	N		3	-2	S5		x	x	x
<i>Elymus repens</i>	Quack Grass	A	-3					x	A	
<i>Epilobium ciliatum</i>	Willow-herb	N		3	3	S5		x		
<i>Epilobium hirsutum</i>	Great Hairy Willow-herb	A	-2					x	x	x
<i>Equisetum arvense</i>	Field Horsetail	N		0	0	S5		x	x	x
<i>Equisetum fluviatile</i>	Water Horsetail	N		7	-5	S5		x		
<i>Erigeron annuus</i>	Daisy Fleabane	N		0	1	S5		x	x	x
<i>Erigeron canadensis</i>	Horseweed	N		0	1	S5		x	x	
<i>Erigeron philadelphicus</i>	Philadelphia Fleabane	N		1	-3	S5		x	x	x
<i>Erigeron strigosus</i>	Narrow-leaved Fleabane	N		0	1	S5		x		
<i>Eupatorium perfoliatum</i>	Boneset	N		2	-4	S5		x	x	
<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod	N		2	-2	S5		x	x	
<i>Eutrochium maculatum</i> var. <i>maculatum</i>	Spotted Joe-Pye-weed	N		3	-5	S5		x	x	
<i>Fragaria virginiana</i>	Wild Strawberry	N		2	1	S5		x	x	x
<i>Frangula alnus</i>	Glossy Buckthorn	A	-3					x	x	x

Scientific Name	Common Name	Native or Adventive	WEED	CC	CWet	S-RANK	SARO	Com 1	Com 2	Com 3
<i>Fraxinus americana</i>	White Ash	N		4	3	S4		x	x	x
<i>Fraxinus pennsylvanica</i>	Red/Green Ash	N		3	-3	S4		x	x	x
<i>Galium mollugo</i>	Wild Madder	A	-2					x	x	x
<i>Galium odoratum</i>	Sweet Woodruff	A	-1							x
<i>Galium palustre</i>	Marsh Bedstraw	N		5	-5	S5		x	x	x
<i>Geranium robertianum</i>	Herb Robert	A	-2					x	x	x
<i>Geum aleppicum</i>	Yellow Avens	N		2	-1	S5		x	x	x
<i>Geum canadense</i>	White Avens	N		3	0	S5		x	x	x
<i>Geum laciniatum</i>	Cut-leaved Avens	N		4	-3	S4		x	x	x
<i>Geum vernum</i>	Spring Avens	N		7	1	S4		x	x	
<i>Glechoma hederacea</i>	Gill-over-the-ground	A	-2					x	x	x
<i>Helianthus annuus</i>	Common Sunflower	A	-1					x		
<i>Heliopsis helianthoides</i>	Ox-eye	N		3	5	S5			x	
<i>Hemerocallis fulva</i>	Orange Day Lily	A	-3					x		x
<i>Hesperis matronalis</i>	Dame's Rocket	A	-3					x		
<i>Humulus lupulus</i>	Common Hop	A	-1					x		
<i>Hypericum perforatum</i>	Common St. John's-wort	A	-3						x	
<i>Impatiens capensis</i>	Spotted Touch-me-not	N		4	-3	S5		x	x	x
<i>Iris pseudacorus</i>	Yellow-flag	A	-2						x	
<i>Juglans nigra</i>	Black Walnut	N		5	3	S4		x	x	x
<i>Juncus effusus</i>	Soft Rush	N		4	-5	S5		x		
<i>Lamium maculatum</i>	Spotted Henbit	A	-1					A		
<i>Laportea canadensis</i>	Wood Nettle	N		6	-3	S5		x		x
<i>Lapsana communis</i>	Nipplewort	A	-2							x
<i>Leersia oryzoides</i>	Rice Cut Grass	N		3	-5	S5		x		
<i>Lemna minor</i>	Common Duckweed	N		2	-5	S5		x		
<i>Leontodon autumnalis</i>	Fall Hawkbit	A	-1						x	
<i>Leonurus cardiaca</i>	Motherwort	A	-2					x	x	x
<i>Leucanthemum vulgare</i>	Ox-eye Daisy	A	-1					x	x	
<i>Lilium michiganense</i>	Michigan Lily	N		7	-1	S5				x
<i>Linaria vulgaris</i>	Butter-and-eggs	A	-1					x	x	
<i>Lobelia siphilitica</i>	Great Lobelia	N		6	-4	S5		x		
<i>Lonicera tatarica</i>	Tartarian Honeysuckle	A	-3					x	x	x
<i>Lycopus uniflorus</i>	Bugleweed	N		5	-5	S5		x	x	x
<i>Lysimachia ciliata</i>	Fringed Loosestrife	N		4	-3	S5		x		x

Scientific Name	Common Name	Native or Adventive	WEED	CC	CWet	S-RANK	SARO	Com 1	Com 2	Com 3
<i>Lysimachia nummularia</i>	Moneywort	A	-3					x	x	
<i>Malus pumila</i>	Apple	A	-1					x	x	
<i>Malus sp</i>	Crabapple	A							x	
<i>Malva neglecta</i>	Common Mallow	A	-1					x		
<i>Matricaria discoidea</i>	Pineapple Weed	A	-1					x		
<i>Matteuccia struthiopteris</i>	American Ostrich Fern	N		5	-3	S5		x		
<i>Medicago lupulina</i>	Black Medick	A	-1					x	x	x
<i>Mentha arvensis</i>	Field Mint	N		3	-3	S5		x	x	x
<i>Mentha x piperita</i>	(M. aquatica X M. spicata)	A	-1					x	x	
<i>Monarda fistulosa var. fistulosa</i>	Wild Bergamot	N		6	3	S5		x	x	
<i>Myosotis laxa</i>	Smaller Forget-me-not	N		6	-5	S5		x	x	x
<i>Myosotis sylvatica</i>	Forget-me-not	A	-1					x		x
<i>Oenothera biennis</i>	Hairy Yellow Evening-primrose	N		0	3	S5		x	x	
<i>Onoclea sensibilis</i>	Sensitive Fern	N		4	-3	S5		x	x	
<i>Oxalis stricta</i>	European Wood-sorrel	N		0	3	S5		x	x	x
<i>Panicum capillare</i>	Witch Grass	N		0	0	S5		x		
<i>Parthenocissus inserta</i>	Virginia Creeper	N		3	3	S5		x	x	x
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	N		6	1	S4?				x
<i>Penstemon digitalis</i>	Foxglove Beard-tongue	N		6	1	S4S5		x	x	
<i>Penstemon hirsutus</i>	Hairy Beard-tongue	N		7	5	S4			x	
<i>Persicaria hydropiperoides</i>	Water-pepper	N		5	-5	S5		x	x	
<i>Persicaria maculosa</i>	Lady's-thumb	A	-1					x		
<i>Phalaris arundinacea</i>	Reed Canary Grass	N		0	-4	S5		x		x
<i>Phleum pratense</i>	Timothy	A	-1					x	x	x
<i>Phlox paniculata</i>	Garden Phlox	A	-1					x		x
<i>Phragmites australis ssp. australis</i>	Common Reed	A	-3					x		
<i>Physalis alkekengi</i>	Chinese Lantern	A	-1					x		
<i>Physocarpus opulifolius var. opulifolius</i>	Ninebark	N		5	-2	S5		x		
<i>Picea abies</i>	Norway Spruce	A	-1					x	x	x

Scientific Name	Common Name	Native or Adventive	WEED	CC	CWet	S-RANK	SARO	Com 1	Com 2	Com 3
<i>Picea glauca</i>	White Spruce	N		6	3	S5		x	x	
<i>Pilea pumila</i>	Clearweed	N		5	-3	S5				x
<i>Pinus strobus</i>	White Pine	N		4	3	S5		x		x
<i>Pinus sylvestris</i>	Scots Pine	A	-3					x	x	
<i>Plantago lanceolata</i>	English Plantain	A	-1					x	x	x
<i>Plantago major</i>	Common Plantain	A	-1					x	x	x
<i>Plantago rugelii</i>	Rugel's Plantain	N		1	0	S5		x	x	x
<i>Poa pratensis ssp. pratensis</i>	Kentucky Bluegrass	N		0	1	S5		x	x	x
<i>Podophyllum peltatum</i>	May-apple	N		5	3	S5		x		
<i>Populus deltoides ssp. deltoides</i>	Cottonwood	N		4	-1	S5		x		
<i>Potentilla norvegica</i>	Rough Cinquefoil	N		0	0	S5		x		
<i>Potentilla recta</i>	Rough-fruited Cinquefoil	A	-2					x		
<i>Prunella vulgaris ssp. lanceolata</i>	Heal-all	N		1	0	S5		x	x	x
<i>Prunus avium</i>	Sweet Cherry	A	-2							x
<i>Prunus nigra</i>	Canada Plum	N		4	4	S4		x		
<i>Prunus serotina</i>	Wild Black Cherry	N		3	3	S5		x	x	x
<i>Prunus virginiana</i>	Choke Cherry	N		2	1	S5		x	x	x
<i>Ranunculus acris</i>	Common Buttercup	A	-2					x	x	x
<i>Ranunculus hispidus var. caricetorum</i>	Hispid Buttercup	N		7	0	S5		x	x	x
<i>Ranunculus repens</i>	Creeping Buttercup	A	-1					x		
<i>Rhamnus cathartica</i>	Common Buckthorn	A	-3					x	x	x
<i>Rhus typhina</i>	Staghorn Sumac	N		1	5	S5		x	x	
<i>Ribes americanum</i>	Wild Black Currant	N		4	-3	S5		x	x	x
<i>Ribes rubrum</i>	Garden Red Currant	A	-2							x
<i>Rosa multiflora</i>	Multiflora Rose	A	-3					x	x	x
<i>Rubus idaeus ssp. strigosus</i>	Wild Red Raspberry	N		0	-2	S5		x	x	
<i>Rubus occidentalis</i>	Black Raspberry	N		2	5	S5		x	x	x
<i>Rudbeckia hirta var. pulcherrima</i>	Black-eyed Susan	N		0	3	S5		x	x	
<i>Rumex crispus</i>	Curly Dock	A	-2					x	x	x
<i>Rumex obtusifolius</i>	Bitter Dock	A	-1					x	x	x
<i>Sagittaria latifolia</i>	Common Arrowhead	N		4	-5	S5		x	x	
<i>Salix alba</i>	White Willow	A	-2					x	x	
<i>Salix bebbiana</i>	Bebb's Willow	N		4	-4	S5		x	x	

Scientific Name	Common Name	Native or Adventive	WEED	CC	CWet	S-RANK	SARO	Com 1	Com 2	Com 3
<i>Salix eriocephala</i>	Heart-leaved Willow	N		4	-3	S5		x	x	
<i>Salix interior</i>	Sandbar Willow	N		3	-5	S5		x	x	
<i>Salix nigra</i>	Black Willow	N		6	-5	S4?		x	x	
<i>Salix purpurea</i>	Basket Willow	A	-2					x		
<i>Sambucus canadensis</i>	Common Elder	N		5	-2	S5		x		x
<i>Sambucus racemosa</i>	Red-berried Elder	N		5	2	S5		x		
<i>Sanguinaria canadensis</i>	Bloodroot	N		5	4	S5				x
<i>Schedonorus pratensis</i>	Meadow Fescue	A	-1					x	x	x
<i>Scirpus atrovirens</i>	Dark Green Bulrush	N		3	-5	S5		x	x	
<i>Scirpus pendulus</i>	Nodding Bulrush	N		3	-5	S5		x	x	
<i>Setaria viridis</i>	Green Foxtail	A	-1					x		
<i>Silene latifolia</i>	White Cockle	A	-2					x	x	x
<i>Sisymbrium officinale</i>	Hedge Mustard	A	-1					x		
<i>Solanum dulcamara</i>	Climbing Nightshade	A	-2					x	x	x
<i>Solanum ptycanthum</i>	Eastern Black Nightshade	A	-1							x
<i>Solidago altissima ssp. altissima</i>	Late Goldenrod	N		1	3	S5		x	x	x
<i>Solidago canadensis var. canadensis</i>	Canada Goldenrod	N		1	3	S5			x	x
<i>Solidago gigantea</i>	Tall Goldenrod	N		4	-3	S5		x		
<i>Sonchus arvensis</i>	Perennial Sow-thistle	A	-1					x	x	x
<i>Sonchus asper</i>	Spiny-leaved Sow-thistle	A	-1							x
<i>Sonchus oleraceus</i>	Annual Sow-thistle	A	-1						x	x
<i>Sorbus aucuparia</i>	European Mountain-ash	A	-2							x
<i>Sorghastrum nutans</i>	Indian Grass	N		8	2	S4			x	
<i>Stellaria media</i>	Common Chickweed	A	-1					x		
<i>Symphotrichum cordifolium</i>	Heart-leaved Aster	N		5	5	S5		x		
<i>Symphotrichum lanceolatum ssp. lanceolatum</i>	Panicled Aster	N		3	-3	S5		x	x	x
<i>Symphotrichum lateriflorum</i>	Calico Aster	N		3	-2	S5		x	x	x
<i>Symphotrichum novae-angliae</i>	New England Aster	N		2	-3	S5		x	x	x
<i>Symphotrichum pilosum var. pilosum</i>	Hairy Aster	N		4	2	S5			x	

Scientific Name	Common Name	Native or Adventive	WEED	CC	CWet	S-RANK	SARO	Com 1	Com 2	Com 3
<i>Symphotrichum puniceum</i>	Purple-stemmed Aster	N		6	-5	S5		x	x	
<i>Symphotrichum urophyllum</i>	Arrow-leaved Aster	N		6	5	S4		x		
<i>Symplocarpus foetidus</i>	Skunk-cabbage	N		7	-5	S5		x	x	x
<i>Syringa vulgaris</i>	Common Lilac	A	-2							x
<i>Taraxacum officinale</i>	Common Dandelion	A	-2					x	x	x
<i>Thalictrum pubescens</i>	Tall Meadow-rue	N		5	-2	S5		x	x	x
<i>Thuja occidentalis</i>	White Cedar	N		4	-3	S5		x	x	x
<i>Tilia americana</i>	Basswood	N		4	3	S5		x	x	
<i>Tragopogon pratensis</i>	Yellow Goat's-beard	A	-1					x		
<i>Trifolium hybridum</i>	Alsike Clover	A	-1							x
<i>Trifolium pratense</i>	Red Clover	A	-2					x	x	x
<i>Trifolium repens</i>	White Clover	A	-1					x	x	x
<i>Tussilago farfara</i>	Coltsfoot	A	-2					x	x	x
<i>Typha angustifolia</i>	Narrow-leaved Cattail	A	-3					x		
<i>Typha latifolia</i>	Common Cattail	N		3	-5	S5		x	x	
<i>Ulmus americana</i>	American Elm	N		3	-2	S5		x	x	x
<i>Ulmus rubra</i>	Slippery Elm	N		6	0	S5				x
<i>Urtica dioica ssp. gracilis</i>	Stinging Nettle	N		2	-1	S5		x		
<i>Verbascum thapsus</i>	Common Mullein	A	-2					x	x	
<i>Verbena hastata</i>	Blue Vervain	N		4	-4	S5		x		
<i>Verbena urticifolia</i>	White Vervain	N		4	-1	S5		x	x	x
<i>Veronica anagallis-aquatica</i>	Water Speedwell	A	-1					x		
<i>Veronica peregrina ssp. peregrina</i>	Purslane Speedwell	N		0	-4	S5		x	x	x
<i>Veronica persica</i>	Persian Speedwell	A	-1					x	x	
<i>Viburnum lentago</i>	Nannyberry	N		4	-1	S5		x	x	
<i>Viburnum opulus ssp. Opulus</i>	European Highbush-cranberry	A	-1						x	
<i>Viburnum opulus ssp. Trilobum</i>	Highbush-cranberry	N		5	-3	S5		x	x	x
<i>Vicia cracca</i>	Cow Vetch	A	-1					x	x	x
<i>Viola cucullata</i>	Marsh Violet	N		5	-5	S5		x	x	x
<i>Viola sororia</i>	Common Blue Violet	N		4	1	S5				x
<i>Vitis riparia</i>	Riverbank Grape	N		0	-2	S5		x	x	x
<i>Zizia aurea</i>	Golden Alexanders	N		7	-1	S5		x	x	

Scientific Name	Common Name	Native or Adventive	WEED	CC	CWet	S-RANK	SARO	Com 1	Com 2	Com 3
<i>Total</i>			-143	481	-126		0			
<i>Count</i>		219	86	132	132		0	185	147	120
<i>Average/Mean</i>			-1.7	3.6	-1.0					
<b>OVERALL</b>										
<i>Number of Native Species</i>		132						116	94	70
<i>Number of Adventive Species</i>		87						69	53	50
<i>Total Number of Species</i>		219						185	147	120
<i>Percent Adventive Species</i>		40						37	36	42
<i>Number of S1-S3</i>		0								
<i>Number of S4-S5</i>		132								
<i>Number of CC 8, 9 or 10 species</i>		2								
<b>BY COMMUNITY</b>										
<i>Mean Weediness Score by Community</i>								-1.7	-1.7	-0.8
<i>Mean CC Score by Community</i>								3.5	3.5	3.4
<i>Mean Wetness Score by Community</i>								-1.2	-1.0	-0.8
<i>Number of S1-S3 Species by Community</i>								0	0	0



## Appendix B. Species Lists – Notes and Notations

Descriptive indices such as Mean Conservatism Coefficient (MCC) and Wetness Index (CW) can decrease the variability that is caused by misidentification of species (Coles-Ritchie *et al.* 2004). This is because similar dominant species are often ecological equivalents, in that they are found in similar habitats and perform similar ecosystem functions. For this reason, taxonomic differences, which can be difficult to identify in the field, may not be important when trying to understand the functioning of the riparian ecosystem (Coles-Ritchie *et al.* 2004). Descriptive indices have the advantage of minimizing the influence of differences in species that are unimportant for the index. The most useful indices are those with many gradations that are based on scientific information about vegetation.

Code and Measure	Description	Examples
<p><b>CC</b></p> <p><b>Coefficient of Conservatism</b></p>	<p>Each native plant species is assigned a coefficient of conservatism (CC) score between 0 and 10 using the floristic quality assessment system for southern Ontario (Oldham <i>et al.</i>, 1995)</p> <p>CCs represent an estimated probability that a plant species is likely to occur in a landscape relatively unaltered from what is believed to be pre-European settlement conditions (DNR Wisconsin 2001). Higher CCs are given to plants more specialized in habitat or condition and conserve themselves to very specific environments and communities (i.e., fidelity to a habitat).</p>	<p>0 to 3: Plants found in a wide variety of plant communities, including disturbed sites</p> <p>4 to 6: Plants that typically are associated with a specific plant community but tolerate moderate disturbance. Most woodland species fall in this category</p> <p>7 to 8: Plants associated with a plant community in an advanced successional stage that has undergone minor disturbance.</p> <p>9 to 10: Plants with a high degree of fidelity to a narrow range of synecological parameters or habitat specialists.</p>
<p><b>MCC</b></p> <p><b>Mean Conservatism Coefficient</b></p>	<p>MCC is used as a measure of the pristiness or lack of disturbance of a site (Oldham <i>et al.</i> 1995). Communities or sites with high MCCs contain more plants unlikely to be found in disturbed habitat.</p> <p>Middlesex Natural Heritage Study (UTRCA 2003) found MCC scores of 3.0 to 5.0 in woodland sites. Burke <i>et al.</i> 2007 found MCC scores of 4.1 to 5.3 at 12 woodlots with 75 km of London.</p> <p><b>Formula:</b> Add all of the CC scores for a particular site or community and then divide by the number of species (native only).</p>	<p>3.0 to 5.0 MNHS, UTRCA 2003</p> <p>4.1 to 5.3 Burke 2007</p> <p>3.3 to 3.8 London Dykes (UTRCA 2013)</p> <p>London Subwatershed Study, thresholds for woodland protection:</p> <p>&lt;4.0 low priority</p> <p>4.0 to 4.5 medium priority</p> <p>&gt;4.5 high priority</p>

**Appendix B continued**

<p align="center"><b>Number of Conservative Species</b></p>	<p>The number of plant species with a CC of 8 to 10 gives an indication of site quality and highlights species of concern for management.</p> <p>Dr. Jane Bows (pers. com) indicated that using CC of 8 to 10 for Conservative Plants is a combination of intuition, convention, experience and data.</p> <p>Species with 0 to 2 CC score are generalists, and 8 to 10 are specialists. The rest are the in-betweens.</p> <p><b>Formula:</b> Count the number of species with CC score of 8, 9 and 10.</p>	<p>CC scores: 0 to 2 generalist species 3 to 7 in-betweens 8 to 10 specialist species</p>
<p align="center"><b>WEED Weediness Score</b></p>	<p>Each non-native plant species has been assigned a weediness score between -1 and -3, where -1 represents a weed with low invasiveness and a -3 a very invasive species (Oldham <i>et al</i>, 1995).</p> <p>The Weediness Score represents an estimated probability that a non-native plant is likely to infest and negatively impact a natural area by displacing native plants.</p>	<p>-1 little or no impact on natural areas -2 occasional impacts on natural areas, generally infrequent or localized -3 major potential impacts on natural areas</p>
<p align="center"><b>MWS Mean Weediness Score</b></p>	<p>The mean weediness score can be used like MCC to measure the representation of weedy adventive (alien) species abundance in a site (Moc 2001). In combination with the percentage of non-native plants, this measure can be used as an indicator of disturbance. Also, it is an indication of the threat to native species from highly invasive adventive species.</p> <p><b>Formula:</b> Add all the weediness scores from a particular site or community and divide by the number of non-native species.</p>	<p>-1.0 to -1.6 little or no impact on natural areas -1.7 to -2.3 occasional impacts on natural areas, generally infrequent or localized -2.4 to -3.0 major potential impacts on natural areas</p> <p><i>*The above is an estimation devised by C. Quinlan at UTRCA using equal divisions between -1 and -3.</i></p>
<p align="center"><b>CW (CWet) Coefficient of Wetness</b></p>	<p>Each plant species is assigned a value from -5 to +5 based on the probability of being found in a wetland or not.</p> <p>Usually only native species are used, even though a CW exists for adventive species also.</p>	<p>-5 occurs in wetlands under natural conditions (obligate wetland species) -4 to -2 usually occurs in wetlands, but occasionally found in non-wetlands -1 to 1 equally likely to be occur in wetlands or non-wetlands (facultative) 2 to 4 occasionally occurs in wetlands, but usually occurs in non-wetlands 5 almost never occurs in wetlands under natural conditions (obligate upland)</p>

## Appendix B continued

Code and Measure	Description	Values, Examples, Assessments
<b>WI</b> <b>Wetness Index (Mean Wetness Coefficient)</b>	Wetness Index is an assessment of a plant community as to whether it has a predominance of wetland species or not. It is not an indication of site quality. The MNHS 2003 found mean wetness coefficients from individual woodland patches ranged from -2.5 to +2.1. Formula: Add all the CW scores (native species only) from a particular site or community and divide by the number of native species found (Michigan DNR).	Examples: -0.4 to -1.1 London Dykes -2.5 to 2.1 MNHS 2003 woodlands  Overall: <0 site has a predominance of native wetland species >0 site has a predominance of native upland species

### Provincial (SARO) Status:

The Committee on the Status of Species at Risk in Ontario (COSSARO), an independent committee of experts, considers which plants and animals should be listed as at risk. There are seven categories:

<b>Extinct</b>	A wildlife species that no longer exists
<b>EXT - Extirpated</b>	A wildlife species no longer existing in the wild in Ontario but exists elsewhere
<b>END - Endangered</b>	A wildlife species facing imminent extirpation or extinction in Ontario
<b>THR - Threatened</b>	A wildlife species likely to become endangered if limiting factors are not reversed.
<b>SC – Special Concern</b>	A wildlife species that may become a threatened or endangered species because of a combination of biological characteristics and identified threats.
<b>NAR – Not at Risk</b>	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances
<b>UNK – Data Deficient</b>	A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment of (b) to permit an assessment of the wildlife species' risk of extinction

### SRanks – Provincial Ranks

SRANKS are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities in Ontario.

<b>SX</b>	Presumed Extirpated	<b>S1</b>	Extremely rare in Ontario
<b>SH</b>	Possibly Extirpated (Historical)	<b>S2</b>	Very rare in Ontario
<b>SNR</b>	Unranked, or, if following a ranking, rank uncertain (e.g. S3?). S? species are thought to be rare in Ontario but there is insufficient information available to assign a more accurate rank.	<b>S3</b>	Rare to uncommon in Ontario
<b>SE</b>	Exotic; not believed to be a native component of Ontario's flora	<b>S4</b>	Common and apparently secure in Ontario
<b>SNA</b>	Not Applicable; a conservation status rank is not applicable because the species is not a suitable target for conservation activities (e.g. is exotic or migrant)	<b>S5</b>	Very common and demonstrably secure in Ontario
<b>SU</b>	Status unknown		

## Appendix C. Native Wetland Emergent Plants Growing Along the Reservoir Edge

Scientific Name	Common Name	CC	CWET	SRank S1-S3	SARO	Community		
						1	2	3
<i>Alisma plantago-aquatica</i>	Water-plantain	3	-5			X	X	
<i>Angelica atropurpurea</i>	Angelica	6	-5			X	X	X
<i>Aster puniceus</i>	Purple-stemmed Aster	6	-5			X	X	
<i>Bidens cernua</i>	Nodding Beggarticks	2	-5			X	X	X
<i>Bidens frondosa</i>	Devil's Beggarticks	3	-3			X	X	
<i>Carex stricta</i>	Tussock Sedge	4	-5				X	
<i>Chelone glabra</i>	Turtlehead	7	-5			X	X	X
<i>Cicuta maculata</i>	Spotted Water-hemlock	6	-5				X	
<i>Cornus amomum</i>	Silky Dogwood	5	-4			X	X	X
<i>Cornus stolonifera</i>	Red-osier Dogwood	2	-3			X	X	X
<i>Equisetum fluviatile</i>	Water Horsetail	7	-5			X		
<i>Eupatorium maculatum</i>	Spotted Joe-Pye-weed	3	-5			X	X	
<i>Eupatorium perfoliatum</i>	Boneset	2	-4			X	X	
<i>Galium palustre</i>	Marsh Bedstraw	5	-5				X	X
<i>Impatiens capensis</i>	Spotted Touch-me-not	4	-3			X	X	X
<i>Juncus effusus</i>	Soft Rush	4	-5			X		
<i>Leersia oryzoides</i>	Rice Cut Grass	3	-5			X		
<i>Lycopus uniflorus</i>	Bugleweed	5	-5			X	X	X
<i>Myosotis laxa</i>	Smaller Forget-me-not	6	-5			X	X	X
<i>Persicaria hydropiperoides</i>	Water-pepper	4	-5				X	
<i>Sagittaria latifolia</i>	Common Arrowhead	4	-5			X	X	
<i>Salix bebbiana</i>	Bebb's Willow	4	-4			X	X	
<i>Salix eriocephala</i>	Heart-leaved Willow	4	-3			X	X	
<i>Salix exigua</i>	Sandbar Willow	3	-5			X	X	
<i>Salix nigra</i>	Black Willow	6	-5			X	X	
<i>Scirpus atrovirens</i>	Dark Green Bulrush	3	-5			X	X	
<i>Scirpus pendulus</i>	Nodding Bulrush	3	-5			X	X	
<i>Thalictrum pubescens</i>	Tall Meadow-rue	5	-2			X	X	X
<i>Verbena hastata</i>	Blue Vervain	4	-4			X		
<i>Typha latifolia</i>	Common Cattail	3	-5				X	
<b>Total</b>		<b>117</b>	<b>-135</b>	<b>0</b>	<b>0</b>			
<b>Count</b>		<b>30</b>	<b>30</b>	<b>0</b>	<b>0</b>	<b>33</b>	<b>32</b>	<b>13</b>
<b>Mean</b>		<b>4.2</b>	<b>-4.5</b>	<b>0</b>	<b>0</b>			

**Abbreviations:**

CC Coefficient of Conservatism  
 CW Coefficient of Wetness  
 SRank Provincial Rank, S1-extremely rare, S2-very rare, S3- rare to uncommon  
 SARO Species at Risk in Ontario

## Appendix D. Bird Sightings at Harrington CA (Apr 22 – Aug 26, 2015)

Common Name	SARO	SRank (S1-S3)	Regional Status	Br	s	S	F	W
<b>DUCKS, GEESE &amp; SWANS</b>								
Mallard			Common BS	4	C	C	A	C
Canada Goose			Common PR	4	A	C	A	C
Mute Swan			Introduced (SE)	3	R	R	R	R
<b>STORKS, CORMORANTS, ANHINGAS, PELICANS</b>								
Double-crested Cormorant			Common Migrant	1	U	U	C	O
<b>VULTURES</b>								
Turkey Vulture			Common BS	4	C	C	C	O
<b>HAWKS, KITES, EAGLES</b>								
Osprey			Uncommon BS	1	U	U	U	
<b>PLOVERS, SANDPIPERS &amp; ALLIES</b>								
Spotted Sandpiper			Common BS	4	C	C	C	
Killdeer			Common BS	4	C	C	A	O
<b>PIGEONS &amp; DOVES</b>								
Mourning Dove			Common PR	4	C	C	C	C
<b>HUMMINGBIRDS</b>								
Ruby-throated Hummingbird			Common BS	4	C	C	C	
<b>KINGFISHERS</b>								
Belted Kingfisher			Common BS	4	C	C	C	U
<b>WOODPECKERS</b>								
Northern Flicker			Common BS	4	C	C	C	R
Pileated Woodpecker			Uncommon PR	4	U	U	U	U
Downy Woodpecker			Common BS	4	C	C	C	C
<b>TYRANT FLYCATCHERS</b>								
Eastern Kingbird			Common BS	4	C	C	C	
Eastern Phoebe			Common BS	4	C	U	C	U
<b>VIREOS</b>								
Red-eyed Vireo			Common BS	4	C	C	C	
Warbling Vireo			Common BS	4	C	C	C	
<b>JAYS, CROWS, RAVENS</b>								
American/Common Crow			Common PR	4	A	C	C	A
Blue Jay			Common BS	4	C	C	C	C
<b>SWALLOWS</b>								
Barn Swallow	THR		Common BS	4	C	C	C	
Northern Rough-winged Swallow			Common BS	4	C	C	C	
Tree Swallow			Common BS	4	C	C	C	U

## Appendix D continued

Common Name	SARO	Srank (S1-S3)	Regional Status	Br	s	S	F	W
<b>CHICKADEES &amp; ALLIES</b>								
Black-capped Chickadee			Common PR	4	C	C	C	C
<b>WRENS</b>								
House Wren			Common BS	4	C	C	C	
<b>THRUSHES</b>								
American Robin			Common BS	4	A	C	A	U
<b>MOCKINGBIRDS, THRASHERS</b>								
Gray Catbird			Common BS	4	C	C	C	O
<b>STARLINGS</b>								
European Starling			Common PR (SE)	4	C	C	A	C
<b>WAXWINGS, SILKY-FLYCATCHERS</b>								
Cedar Waxwing			Common BS	4	C	C	C	E
<b>WOOD-WARBLERS</b>								
Common Yellowthroat			Common BS	4	C	C	C	O
Yellow Warbler			Common BS	4	C	C	C	
<b>SPARROWS</b>								
Chipping Sparrow			Common BS	4	C	C	C	O
Dark-eyed Junco			Common WR	0	C		C	C
Song Sparrow			Common BS	4	C	C	C	U
<b>TANAGERS, CARDINALS &amp; ALLIES</b>								
Northern Cardinal			Common PR	4	C	C	C	C
Rose-breasted Grosbeak			Common BS	4	C	C	C	
Indigo Bunting			Common BS	4	C	C	C	
<b>BLACKBIRDS</b>								
Baltimore / Northern Oriole			Common BS	4	C	C	U	
Brown Headed Cowbird			Common BS	4	C	C	C	U
Common Grackle			Common BS	4	C	C	A	R
Red-winged Blackbird			Common BS	4	C	C	R	R
<b>FINCHES</b>								
American Goldfinch			Common PR	4	C	C	C	C
<b>TOTAL of 42 Species</b>	<b>1</b>	<b>0</b>						

### NOTES

BS – Breeding Species, PR – Permanent Resident, WR – Winter Resident, SE = Status Exotic

Regional Status based on: Checklist of the Birds of Oxford County, 1st edition, May 2007 by Jeffrey H. Skevington and James M. Holdsworth. Available through The Woodstock Field Naturalists' Club.

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## Appendix D continued

### **Br (Breeding Codes)**

- 0 = no evidence of breeding
- 1 = status uncertain, possibly breeds
- 2 = formerly bred
- 3 = sporadically breeds
- 4 = regularly breeds

### **Abundance Codes**

- V = accidental vagrant
- O = occasional; very few records; normally absent
- R = rare; usually present annually, but seen infrequently
- U = uncommon; present in low numbers, unlikely to be found daily without concerted effort
- C = common; can be found daily, usually in moderate numbers
- A = abundant; found daily in large numbers
- E = erratic; numbers highly variable

### **Seasonal Codes (relating to bird activities, not calendar dates)**

- s = Spring; period when a species is migrating to its breeding area
- S = summer; the period when a species is nesting
- F = Fall; the period when a species is migrating to its wintering area
- W = Winter; the period when a species is over-wintering.

## Appendix E. Animal Sightings (Incidental)

Common Name	Scientific Name	SARO	SRank (S1-S3)	Regional Status
<b>Mammals</b>				
Eastern Chipmunk	<i>Tamias striatus</i>			Common
Eastern Cottontail	<i>Sylvilagus floridanus</i>			Common
Grey Squirrel	<i>Sciurus carolinensis</i>			Common
Red Squirrel	<i>Sciurus vulgaris</i>			Common
Groundhog (Woodchuck)	<i>Marmota monax</i>			Common
<b>Reptiles and Amphibians</b>				
Green Frog	<i>Rana clamitans</i>			Common
American Toad	<i>Anaxyrus americanus</i>			Common