
APPENDIX C
NATURAL ENVIRONMENT

Appendix C1

MNR/GRCA Correspondence - April 6, 1999

Proposed Highway 7 – Priorities for Possible Alignment Changes

Ministry of
Natural Resources

Ministère des
Richesses naturelles



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April 6, 1999

Mr. Dave Wake
Ministry of Transportation
Southwestern Region
659 Exeter Road
London, ON N6E 1L3

Dear Mr. Wake:

SUBJECT: Proposed Highway No. 7 - Kitchener to Guelph

As agreed at our meeting in February, staff from MNR and the Grand River Conservation Authority (GRCA) agreed to jointly review the various locations at which the proposed Highway No. 7 crosses major natural areas. The purpose of the MNR/GRCA review was to identify issues and prioritize the need for mitigation and/or protection in relation to the seven major crossing locations.

I am pleased to attach a paper outlining the result of the GRCA/MNR discussions. This paper discusses the significance of the seven main crossing locations, identifies mitigation issues, and suggests options for compensation. Staff from the MNR and GRCA hope that this document will aid the Ministry of Transportation in undertaking a review of the proposed Highway 7 corridor alignment.

Should you have any questions or concerns regarding this document, please contact me.

Yours sincerely,

David N. Cooper
District Planner
Guelph District

Attachment

cc: Mr. Wayne MacMillan, Grand River Conservation Authority
Mr. Craig Selby, MNR Guelph District
Mr. Drew Cherry, MNR Guelph District
Mr. Art Timmerman, MNR Guelph District
Mr. Ed DeBruyn, Department of Fisheries and Oceans, Fisheries Habitat Management

April 6, 1999

Proposed Highway 7 - Kitchener to Guelph Priorities For Possible Alignment Changes

Introduction

The preferred alignment for the "new" Highway 7 between Kitchener and Guelph will have both direct and indirect impacts to 7 main natural areas along its route. Staff at the Ministry of Transportation (MTO) have indicated that there may be opportunities to reduce or eliminate the impacts to some of these natural areas through alignment changes.

It is unlikely that it will be possible to eliminate or reduce the environmental impacts at all of these natural areas given that:

1. alignment changes to avoid or reduce impacts on one natural area may result in increased impacts to other natural areas;
2. alignment changes to avoid or reduce impacts on natural areas may result in increased cultural, social or economic impacts; and,
3. MTO will seek to strike a balance between environmental, social and economic issues during their review of the alignment.

To assist MTO in their review and evaluation of possible alignment changes, the Ministry of Natural Resources (MNR) and the Grand River Conservation Authority (GRCA) have agreed to prioritize these natural areas according to their preference for protection.

Factors Considered

In developing the following priorities, MNR and GRCA have considered four factors in the ranking of these natural areas:

1. the general significance of the natural area;
2. the sensitivity of the natural area to disturbance;
3. the technical ability to mitigate the anticipated impacts to these natural areas; and,
4. the potential to implement compensation measures which will result in "no net loss" or possibly even a "net gain" in habitat features.

Assumptions

Several assumptions have also been made in developing these priorities:

1. The Federal Fisheries Act requires compensation for the harmful alteration, destruction or disruption (HADD) of fish habitat.
2. The Department of Fisheries and Oceans hierarchy of preferences to achieve no net loss of fish habitat where avoidance and mitigation is impossible are:
 - a) create similar habitat ("like for like") at or near the site;
 - b) create similar habitat for the same species elsewhere within the same watershed;
 - c) increase productive capacity of existing habitat at or near the site;
 - d) increase the productive capacity of habitat for the same species elsewhere within the watershed; and,

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MNR and GRCA

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Kitchener to Guelph
Preferences for Protection

- e) increase the productive capacity for a different stock or species either on or off site.
3. None of the watercourses along the alignment are considered as "Type 1" fish habitats as defined by the Department of Fisheries and Oceans.
4. Under current land use and development guidelines and trends, the 7 main natural areas of concern would generally be avoided and sustained or enhanced through stewardship or development projects.
5. MTO will consider undertaking "off-site" compensation.
6. MTO will consider opportunities to compensate for the loss of wetlands and/or uplands.

The following preferences for protection have been based on the above assumptions. Should any of these assumptions be invalid, a reassessment of the preferences for protection may be required.

PRIORITIES FOR PROTECTION

The following list is ranked from the highest priority to the lowest priority for protection.

1. Rosendale Creek and Bloomingdale-Rosendale Wetland Complex

Significance:

The watercourse at this site is locally known as "Rosendale Creek". It supports a small population of fish. Its contribution of relatively cold, clean flow to the fishery in the Grand River is perhaps more significant than its own fish population. The wetland complex associated with the watercourse is locally significant. Approximately 1175 linear metres of wetland and adjacent upland will be impacted.

The wetland complex includes two areas in which there are woodland core areas which are separated from the woodland edge by 100 metres or more.

Sensitivity to Disturbance:

The hydrological regime of Rosendale Creek, its fish population, and many of the vegetation communities associated with the Bloomingdale-Rosendale wetland complex at this site are dependent on groundwater discharge. The proposed alignment and interchange would have a significant impact on the hydrological regime of the watercourse and wetland.

Mitigation Issues:

Relative to other impacts, impacts on groundwater discharge patterns are difficult to mitigate. Furthermore, the long term success of techniques for mitigating impacts to groundwater discharge are largely unproven. Avoidance of woodland core areas by at least 100 metres is important. Consequently, an alignment shift (north or south) at this location to avoid impacts is considered a high priority by both the GRCA and MNR.

Compensation Options:

Within the DFO hierarchy of compensation preferences, the preferred options (i and ii) may not be practical in this watershed. These options would require the creation of additional

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groundwater discharge either at the site or elsewhere in the watershed - this would be technically difficult. It may be possible to "increase the productive capacity of habitat at or near the site or within the same watershed" (options iii and iv) by removing barriers to fish migration that have been identified at two culverts and by increasing the riparian buffer in one area where it is lacking. However, these are not the preferred options. As well, it is unlikely that these measures would achieve the "no net loss" principle in this watershed. In addition, this watershed in its present condition has a positive contribution to a more significant fishery in the Grand River.

2. Hopewell Creek

Significance:

Both the main stem of Hopewell Creek and the tributary at the crossing location are defined as "coldwater" due to the presence of mottled sculpin which are an indicator of coldwater. Some groundwater discharge occurs in both the main stem and the tributary at the proposed crossing site. The wetlands associated with this watercourse are unevaluated and deemed to be locally significant by MNR. Approximately 375 linear metres of wetland and adjacent upland will be impacted.

Sensitivity to Disturbance:

The main stem and especially the tributary of this creek have been disturbed somewhat by cattle grazing. Some groundwater discharge occurs into both the main stem and tributary at this site.

Mitigation Issues:

The impact of crossing these watercourses will depend on the size and nature of the crossing structures. The impacts to groundwater discharge into the western tributary could be mitigated if a large enough structure would span the channel.

Along the main stem, groundwater discharge occurs over a much wider area adjacent to the stream channel. Groundwater discharge in the main stem decreases in a downstream (southerly) direction and those impacts to groundwater discharge could be reduced by shifting the alignment to the south. An alignment shift of at least 400m to the south would allow for one crossing structure rather than two. An alignment shift to the south would also reduce the potential for erosion and sedimentation of the main branch of Hopewell Creek due to construction activities along the steep west bank of the creek.

The use of a bridge to cross the main stem of Hopewell would aid in the long term efforts to protect and enhance Hopewell Creek as a viable natural corridor. A bridge would also facilitate wildlife movement along the corridor.

Compensation Options:

Compensation options in this watershed are considerably greater than those in Rosendale Creek because of the larger size of the watershed. As with Rosendale Creek, creation of similar habitat (e.g., like for like) may not be practical because of the technical difficulties and uncertainty associated with creating and maintaining groundwater discharge. Numerous opportunities exist off-site to "increase the productive capacity of habitat at or

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near the site or in the same watershed". These opportunities consist of creating or improving riparian buffers through passive means or by excluding cattle. The most significant opportunity to increase productive capacity within this watershed involves the removal of the on-stream dam and pond in Breslau. The dam is a barrier to the upstream migration of fish from the Grand River and it is presumed to cause an increase in water temperatures in Hopewell Creek before discharge to the river. The dam and pond have no flood control/low flow augmentation functions. This dam is owned and operated by the GRCA. Removal or alteration of this structure would require further input from the GRCA, DFO and the local community. The removal of the dam would support recommendations from the Grand River Fisheries Management Plan. The opportunity for "no net loss" or possibly even "net gain" exists in this watershed.

Hopewell Creek has a significant opportunity for future restoration and enhancement efforts. The corridor downstream of the existing Highway No. 7 will be in public ownership as the adjacent lands are developed. The upper portions of the watershed are located in the rural area between Guelph and Kitchener. Natural corridors within the rural area have the potential to support long term restoration and protection efforts. They also play a role in the larger efforts of the GRCA to identify and protect a natural heritage system within the Grand River watershed.

3. Tillich Wetland

Significance:

The watercourse at this location is known as the Tillich Drain which is a man-made agricultural drain that discharges to Hopewell Creek. This drain likely contains fish and fish habitat. The wetland at this location is **locally significant**. Approximately 550 linear metres of wetland and adjacent upland habitat will be disturbed at this site. This area has an interior woodland area that is separated from the woodland edge by 100 metres.

Sensitivity to Disturbance:

This watercourse is more tolerant to disturbances, because of its artificial nature and fact that the fishery in the drain does not appear dependent on groundwater inputs.

Mitigation Issues:

For the reasons mentioned above, the impacts on this watercourse are expected to be relatively mitigatable.

Compensation Options:

The impact of the Tillich Drain on Hopewell Creek is unknown. Given that this watercourse drains an area which is intensively used for agriculture, potential impacts include inputs of sediment, pesticide and fertilizer. The drain, when observed in the fall of 1998, was wide and it is suspected that there may be thermal impacts on Hopewell Creek. A more thorough evaluation of the effect of the Tillich Drain on Hopewell Creek may identify opportunities to compensate for any HADD associated with a crossing of the drain. Given the above, the opportunity exists to undertake "on-site" compensation options at this site. As discussed above, opportunities also exist elsewhere throughout the Hopewell Creek watershed.

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The woodland could be enhanced through reforestation of lands contiguous to the north and east sides of the woodlot and through enhancement of links to other habitats.

4. Townline Wetland West

Significance:

There is a defined watercourse at this location. It is unknown if the watercourse contains fish or fish habitat or if the watercourse contributes groundwater to Hopewell Creek. Further investigations will be required to determine if DFO authorization and compensation will be required. It is expected that during certain times of the year, it contributes surface water to the Hopewell Creek. The wetland at this location is unevaluated and is deemed to be locally significant by MNR. This woodland has a secluded core area that is separated from the woodlot edge by 150 to 200 metres, making this a significant component of the natural heritage framework of the rural area midway between Kitchener and Guelph. Approximately 550 linear metres of wetland and adjacent upland will be disturbed at this location.

Sensitivity to Disturbance:

Sensitivities to disturbance are unknown at this time.

Mitigation Issues:

Relatively minor adjustments to the south would result in significant reductions to the area of wetland and upland being disturbed. A southerly shift may also result in MTO being able to avoid the requirement to obtain an authorization and/or compensation from DFO for this site should it be needed. In general, secluded woodland core areas should be avoided by 150 to 200 metres. Methods to mitigate impacts such as noise should also be considered.

Compensation Options:

The same compensation options and opportunities exist here as with the crossings of Hopewell Creek. The opportunity exists for "no net loss" of fish habitat at this site. "Net gain" may be achieved if compensation is done off-site. The woodlot at this location could be enhanced through reforestation on its north and east sides.

5. Ellis Creek Wetland

Significance:

Ellis Creek has been observed to be intermittent downstream of this location in the past. The fish population at the site would be expected to be minimal or non-existent. The wetland associated with this watercourse is Provincially Significant. This swamp also has a secluded core area that is separated from the woodland edge by 150 to 200 metres. The Ellis Creek wetland is also an important component of the natural heritage framework for the rural area between Kitchener and Guelph. Approximately 270 linear metres of wooded wetland/adjacent upland will be disturbed by the proposed alignment.

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Sensitivity to Disturbance:

The groundwater contribution to Ellis Creek at this location is thought to be minimal based on the fact that the creek has been observed to be dry downstream of the site at the existing Highway 7.

Mitigation Issues:

Standard erosion/sediment control and storm water management conditions will apply.

Compensation Options:

Because of its size, numerous compensation options exist within the Ellis Creek watershed. The most significant opportunities for "no net loss" or possibly even "net gain" occur near the downstream end of the watershed where golf courses and an on-stream impoundments have had significant impacts on the stream. Implementation of these options would require the co-operation of private landowners and in the case of one of the ponds, the GRCA. Opportunity exist for "no net loss" or possibly even "net gain" of fish habitat in this watershed.

6. Marden South Wetland

Significance:

MNR mapping indicates that the watercourse associated with this wetland area drains in a northwesterly direction towards Ellis Creek. The watercourse is not likely to contain fish habitat. The wetland at this location is Provincially Significant. The wetland has also been identified as part of a deer wintering area. Approximately 350 linear metres of wetland and associated upland will be disturbed at this site.

Sensitivity to Disturbance:

This wetland area has been disturbed in the past due to development within the City of Guelph. Given its proximity to the City limits, the long-term viability of the ecological functions of this area are questionable. Even if it would be possible to completely avoid this wetland area via an approach from a northerly direction, the area would be isolated and this would decrease its ecological values.

Mitigation Issues:

Mitigation issues are unknown at this time.

Compensation Options:

It is unlikely that DFO would require any substantial compensation for the loss of fish habitat at this site and therefore, compensation options and opportunities are limited. However, some compensation for the loss of a portion of this significant swamp could comprise enlargement of other swamps and woodlands avoided by a modified route and by creation of wetlands for stormwater management.

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Kitchener to Guelph
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7. Grand River Crossing

Significance:

Although the consultants have identified smallmouth bass spawning activity in the vicinity of the crossing location, suitable smallmouth bass spawning habitat is widespread in this section of the Grand River. Consequently, destruction, alteration or disruption of the habitat at this site would not be expected to result in a reduction of the productive capacity of the river for smallmouth bass. In addition, the new structure at this site is not expected to physically alter the river channel. The wetland area which will be impacted by this crossing is unevaluated and deemed to be locally significant by MNR.

A wooded area on the south contains an interior core area that is separated from the woodland edge by 100 metres. This area also contains steep slopes with seepage areas. This area represents a significant contribution to the Grand River valleyland corridor. A large area will be disturbed by the new highway and associated ramps. Very little information on terrestrial resources of this site and potential impacts and mitigative measures is presented in the EA.

Approximately 425 linear metres of wetland, upland and floodplain will be disturbed by this crossing.

Sensitivity to Disturbance:

Groundwater discharge is known to occur along both the southern and northern banks of the river. This discharge should be maintained as it contributes to temperature moderation of the river and improves water quality.

Mitigation Issues:

Unknown at this time.

Compensation Options:

Unless the proposed crossing structure will leave a "foot print" in the river, there may not be a requirement for authorization and compensation from DFO. Thus, opportunities to seek a "net gain" of fish habitat at this location may not exist. Modifications to the location and alignment of the Grand River crossing may provide the opportunity to reduce impacts associated with the crossing of the Bloomingdale-Rosendale wetland complex and associated Rosendale Creek.

Without documentation of the resources and site functions it is difficult to examine means by which compensation could be achieved. However, enhancements of other forested slopes and riparian areas upstream and downstream should be considered. The review of the whole study area, impacts of the preferred alignment, necessary trade-offs, and enhancement opportunities may produce other options.

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Summary

From Highest Priority For Protection To Lowest:

1. Rosendale Creek and Bloomingdale-Rosendale Wetland Complex - It may not be possible to mitigate impacts to groundwater discharge; not possible to avoid loss of fish habitat within this watershed; by far the longest linear distance of habitat affected (1175 m). The impacts of the crossing on this area are, by far, more significant than any of the other crossings.
2. Hopewell Creek - 375 linear metres disturbed, impacts on groundwater discharge difficult to mitigate, steep slope on west bank of main channel, opportunity for "net gain" in this watershed, however, preferred compensation option would require removal of Breslau dam and pond. A bridged crossing of the main stem of Hopewell Creek would facilitate the long term restoration and enhancement of this watercourse as a natural corridor.
3. Tillich Wetland - 550 linear metres of habitat affected, groundwater discharge is not an issue, opportunities for "net gain" exist off-site.
4. Townline Wetland West - 550 linear metres of habitat affected, possibly more significant contribution of surface flow and groundwater flow to downstream watercourse than Ellis Creek wetland crossing, impacts can be mitigated.
5. Ellis Creek Wetland - only 270 linear metres of habitat affected, impacts relatively easy to mitigate. Insignificant fish habitat at site.
6. Marden South Wetland - 350 linear metres of habitat affected, likely no opportunity to achieve "net gain" via compensation, ecological functions not sustainable over the long term because of proximity to developing area.
7. Grand River - not possible to "protect" since a river crossing is required with all of the options, impacts can be mitigated, flexibility required here to reduce impacts on Rosendale Creek and Bloomingdale-Rosendale Wetland Complex.

Appendix C2

MNR Townline Wetland PSW Evaluation
Summary Report (2000)

Townline Wetland

The Townline Wetland complex is a palustrine wetland that drains to both Ellis Creek (Speed River sub-watershed) and Hopewell Creek (middle Grand River drainage). The wetland complex consists of two large wetland areas, one on each side of the Woolwich Township (Waterloo Region)/Guelph Township (Wellington County) boundary. These two wetlands are connected hydrologically by a culvert under the Woolwich/Guelph Townline road. Water has been observed flowing in an east to west direction through this culvert.

The outside boundary of the Townline West wetland was mapped by the Ministry of Natural Resources in 1999 as part of an effort to map and/or evaluate all previously unevaluated wetlands in Woolwich Township. Information on vegetation communities, plant species, possible breeding birds, mammals, groundwater discharge and adjacent land use was obtained by Ecoplans Limited in 1999 as part of the planning study for the proposed new highway 7 between Kitchener and Guelph.

Ecoplans Limited also provided information on possible breeding birds in the wetland. Ecoplans Limited defined possible bird breeding evidence as "a species observed or singing males present in suitable nesting habitat during the breeding season. A concerted effort to obtain definitive breeding evidence for all species was not undertaken. Possible breeding evidence was found for five locally significant bird species; brown creeper, winter wren, veery, northern waterthrush and mourning warbler. All locally significant breeding birds identified by Ecoplans Ltd. were considered to highly to moderately dependent on wetlands (Guild I – III = 34 – 100% wetland dependency) based on Brooks and Croonquist (1990).

Additional information on breeding birds was also obtained by the Kitchener-Waterloo Field Naturalists in 1999 as part of their involvement in the Highway 7 planning study. The Field Naturalists provided only presence/absence data of breeding birds. However, the Field Naturalists also observed three of the locally significant breeding birds observed by Ecoplans Limited. No additional locally significant species were observed by the Field Naturalists.

The Ministry of Natural Resources mapped the outside boundary of the Townline East wetland in the spring of 2000. Information on breeding birds in this wetland area was obtained by the Kitchener-Waterloo Field Naturalists in 1999. Their most significant finding was a heronry in the north-central portion of the wetland. The heronry is estimated to contain up to 100 nests and was first established in

the spring of 1998. The heronry is thought to be the result of the relocation of a heronry that had been in the Breslau area for many years.

This wetland is a Provincially Significant Wetland because of a score of 201 in the special features component. The total score for this wetland is 591 points.

Ministry of Natural Resources -Guelph District
April 2000

Appendix C3

Updated Vegetation and Wetland Work
Priority Natural Areas – Highway 7
(1999 – 2001)

- Air Photo Mosaic Maps
- Summary Descriptions – Wetland Areas
- Vegetation Community and Species Information
- Working Vascular Plant List

BREEDING BIRD HIGHLIGHTS

- Winter Wren recorded (Ecoplans and KWFN)
- Otherwise, typical forest bird species (such as Eastern Wood-peewee and Red-eyed Vireo) present
- Core forest interior conditions limited by habitat size/shape.
- See Appendix C for details.

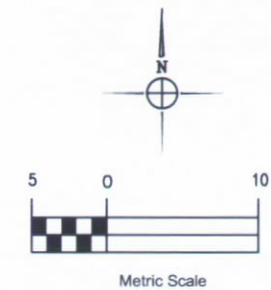
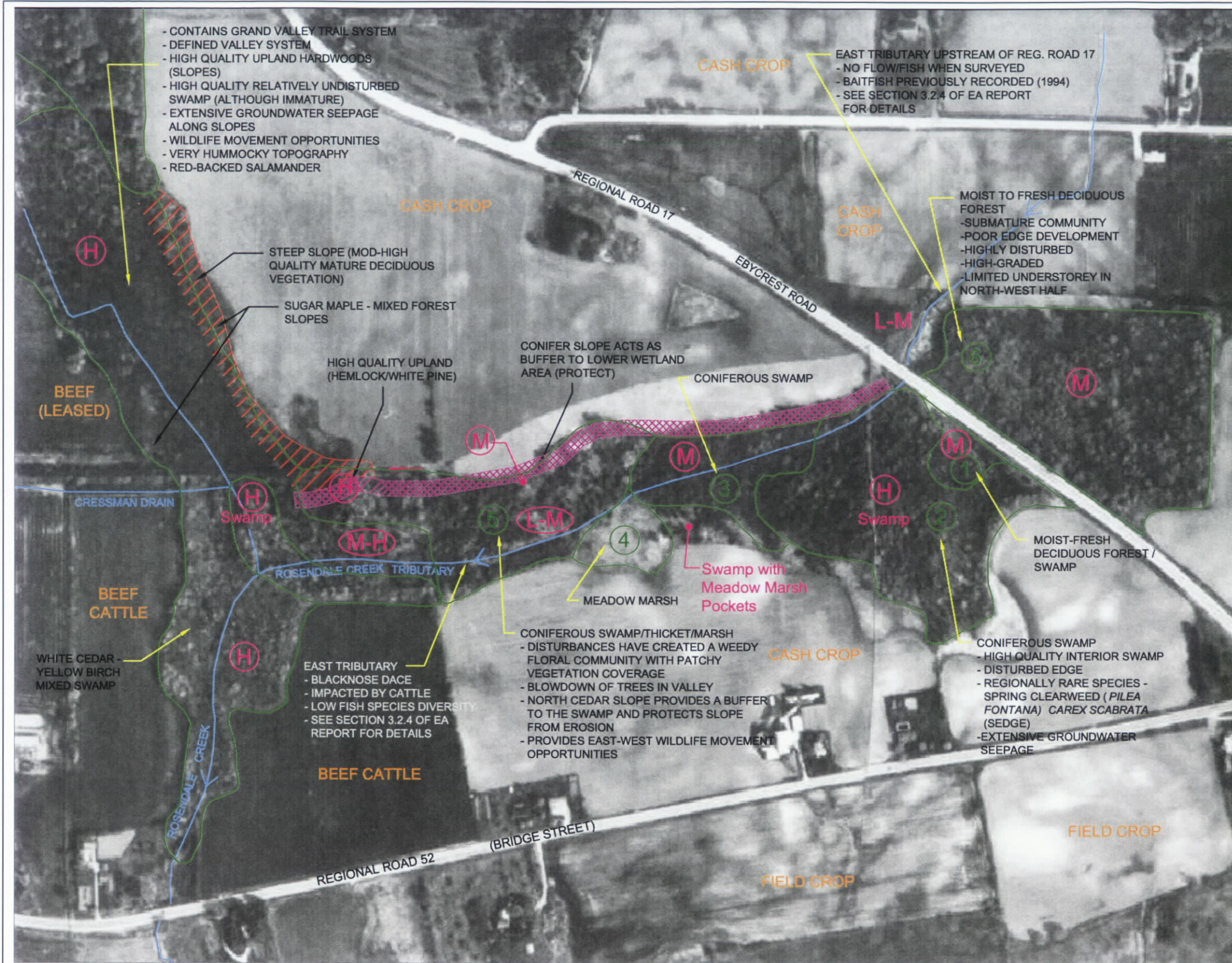
AGRICULTURAL NOTES

- Cash crop and beef cattle operations border natural area

OTHER WILDLIFE NOTES

- Eastern Chipmunk, Red Squirrel, Grey Squirrel, Raccoon
- Mink tracks along Rosendale Creek tributary
- White-tailed Deer tracks

- Rosendale Creek
- Creek chub
 - Blacknose dace
 - Brook stickleback
 - See Section 3.2.4 of EA report for details



Vegetation Sensitivity Ratings

In the definitions provided below, the quality of vegetation is assessed on the basis of the community type and species association (and its relative scarcity in the landscape), maturity or age, relative importance of native versus non-native species, and presence of absence of rare or unusual species.

- (H) High**
- Mature, native, higher quality vegetation features that are virtually impossible to recreate or restore in the short term (ie. less than 60 years);
 - Higher quality wetland features that exhibit limited if any disturbance and that are sensitive to changes in the hydrological and hydrogeological regimes (such as bogs and fens, or some swamps depending on site conditions);
 - Mature, native vegetation on erodible slopes;
 - Communities that provide habitat for provincially rare to uncommon species (ie. ranked 'S3' by the Natural Heritage Information Center - see Oldham 1996).
- (M) Moderate**
- Immature to submature, native, vegetation features of moderate quality that might, conceivably, be recreated or restored in the short term (ie. less than 60 years);
 - Wetland vegetation features of moderate quality that may or may not exhibit some disturbance and that are moderately sensitive to changes in the hydrological and hydrogeological regimes (such as some treed and shrub swamps);
 - Immature, native vegetation on erodible slopes.
- (L) Low**
- Open, early successional communities that have formed as a result of recent human activity and can be readily recreated or restored in the shortest term (ie. less than 5-10 years);
 - Disturbed wetland communities dominated by invasive species (such as Reed Canary Grass, Purple Loosestrife) that have formed as a result of past and present disturbance or been heavily influenced by alterations to the hydrological and hydrogeological regime.

LEGEND

- Vegetation Community Boundary
- 1 - Vegetation Unit Number (see Appendix C for Details)
- M - Vegetation Sensitivity
- ▨ - Steep Slopes
- ▩ - Conifer Slope

Job Title:

**PROPOSED HWY 7
KITCHENER TO GUELPH**

Sheet Title:

**BLOOMINGDALE-ROSENDALE
WETLAND**

No.	Revision/Date
1	July 08, 2003



Date:

Dec. 1999

Scale:

1:5,000

Drawn By:

T.C./M.P.

Checked By:

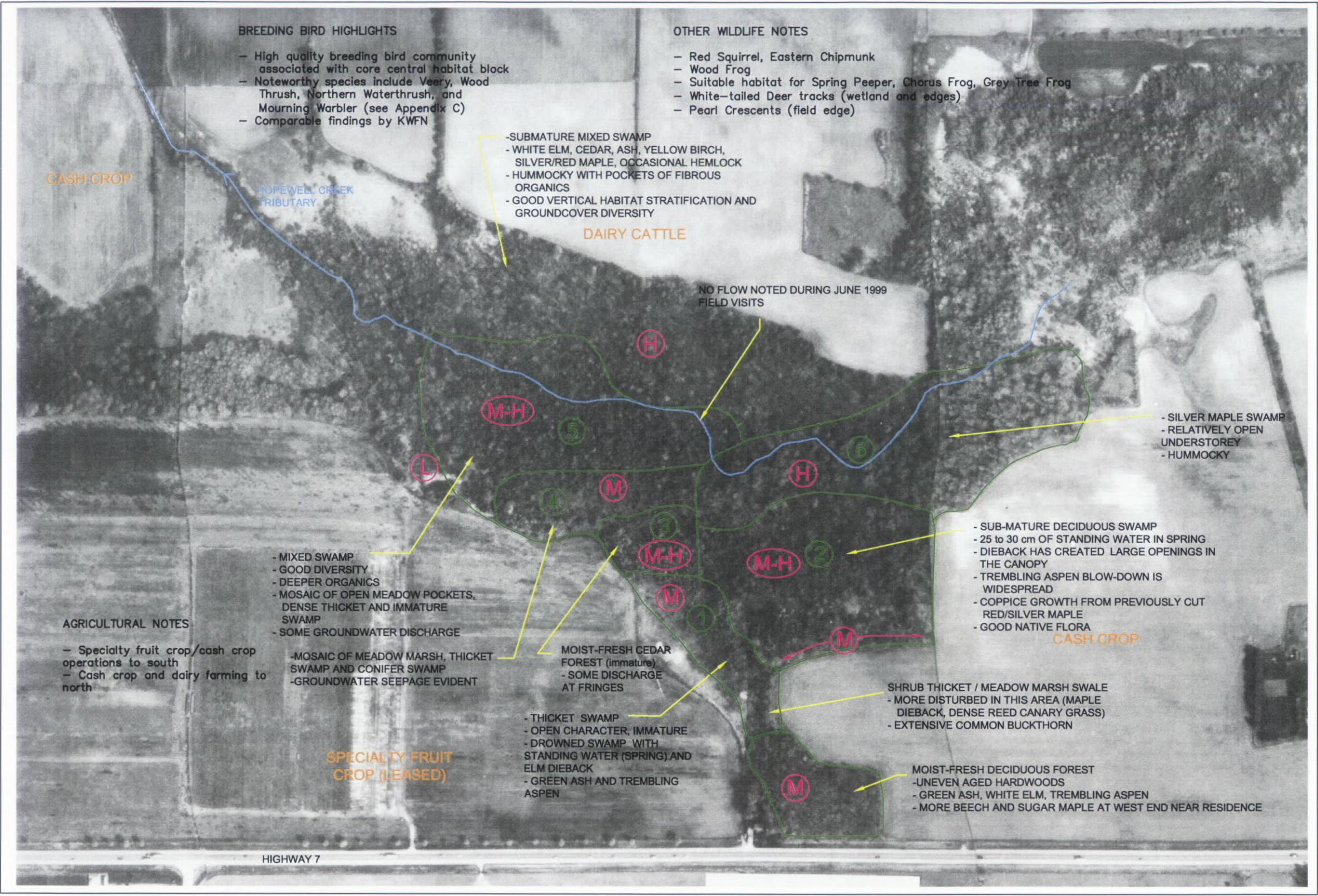
J.K./G.G.

Project No.

99-2100

Figure No.

1

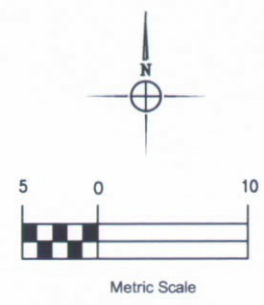


BREEDING BIRD HIGHLIGHTS

- High quality breeding bird community associated with core central habitat block
- Noteworthy species include Veery, Wood Thrush, Northern Waterthrush, and Mourning Warbler (see Appendix C)
- Comparable findings by KWFN

OTHER WILDLIFE NOTES

- Red Squirrel, Eastern Chipmunk
- Wood Frog
- Suitable habitat for Spring Peeper, Chorus Frog, Grey Tree Frog
- White-tailed Deer tracks (wetland and edges)
- Pearl Crescents (field edge)



Vegetation Sensitivity Ratings

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 - Immature, native vegetation on erodible slopes.
- (L) Low**
- Open, early successional communities that have formed as a result of recent human activity and can be readily recreated or restored in the shortest term (ie. less than 5-10 years);
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LEGEND

	Vegetation Community Boundary
1	Vegetation Community Number (See Appendix C for details)
M	Vegetation Sensitivity

Job Title:	PROPOSED HWY 7 KITCHENER TO GUELPH	
Sheet Title:	TOWNLIN WEST WOODLAND/WETLAND	
No.	1	July 08, 2003
		Revision Date

 72 Victoria St. S. Ste 100, Kitchener, Ontario, N2G 4Y9 phone: (519) 741-8850 • fax: (519) 741-8884 email: ecoplans@ecoplans.com	Date:	Dec. 1999	Project No.	99-2100
	Scale:	1: 5000	Figure No.	
	Drawn By:	T.C./M.P.		3
	Checked By:	J.K./G.G.		

AQUATIC NOTES (ELLIS CREEK)

- Intermittent flow
- Coldwater potential
- No flow or fish observed in September 1999
- Baitfish recorded in 1994
- See Section 3.2.4 of EA report

BREEDING BIRD HIGHLIGHTS

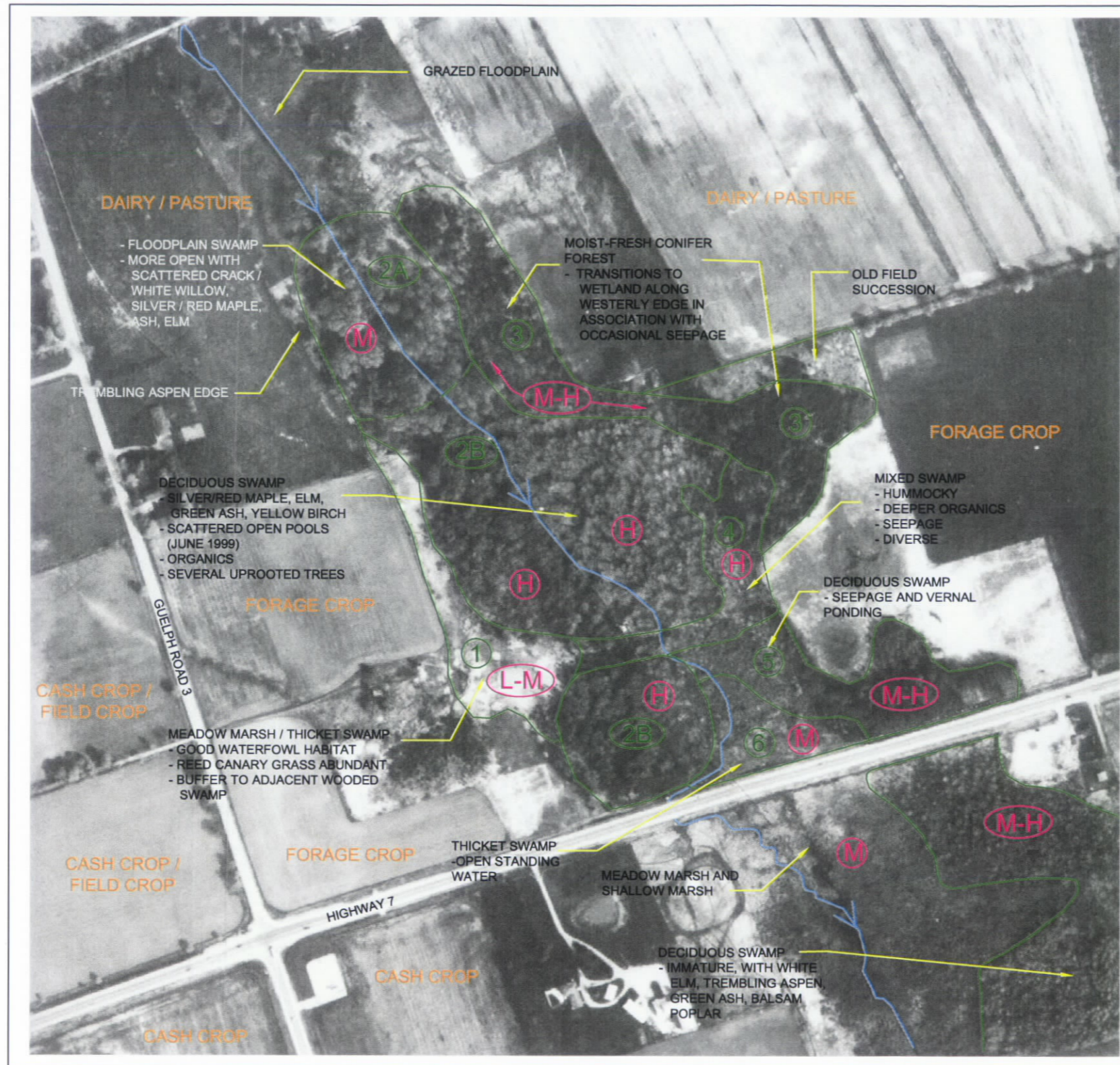
- Diverse breeding bird community (See Appendix C)
- Majority of significant records clustered in central and southern forested wetland
- Territorial Northern Waterthrush within 50 metres of existing Highway 7 (South-west corner of wetland)
- Good diversity recorded by KWFN

OTHER WILDLIFE NOTES

- Occasional white-tailed deer tracks
- Habitat for typical herpetofauna such as Red-backed Salamander, Wood Frog, Grey Tree Frog, Leopard Frog, Green Frog
- Woodchuck burrows (field edge)

AGRICULTURE

- Significant dairy operations bordering north section of wetland



Vegetation Sensitivity Ratings

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 - Disturbed wetland communities dominated by invasive species (such as Reed Canary Grass, Purple Loosetrife) that have formed as a result of past and present disturbance or been heavily influenced by alterations to the hydrological and hydrogeological regime.

LEGEND

- Vegetation Community Boundary
- 1 Vegetation Unit Number (see Appendix C for Details)
- M Vegetation Sensitivity

Job Title:

**PROPOSED HWY 7
KITCHENER TO GUELPH**

Sheet Title:

**ELLIS CREEK WETLAND
COMPLEX (PART)**

1	July 08, 2003
No.	Revision Date



Date:	Dec. 1999	Project No.	99-2100
Scale:	1:5000	Figure No.	4
Drawn By:	T.C./M.P.		
Checked By:	J.K./G.G.		

BREEDING BIRD HIGHLIGHTS

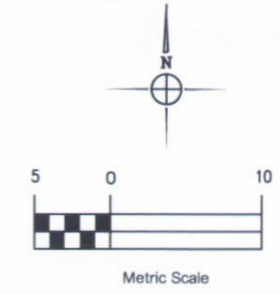
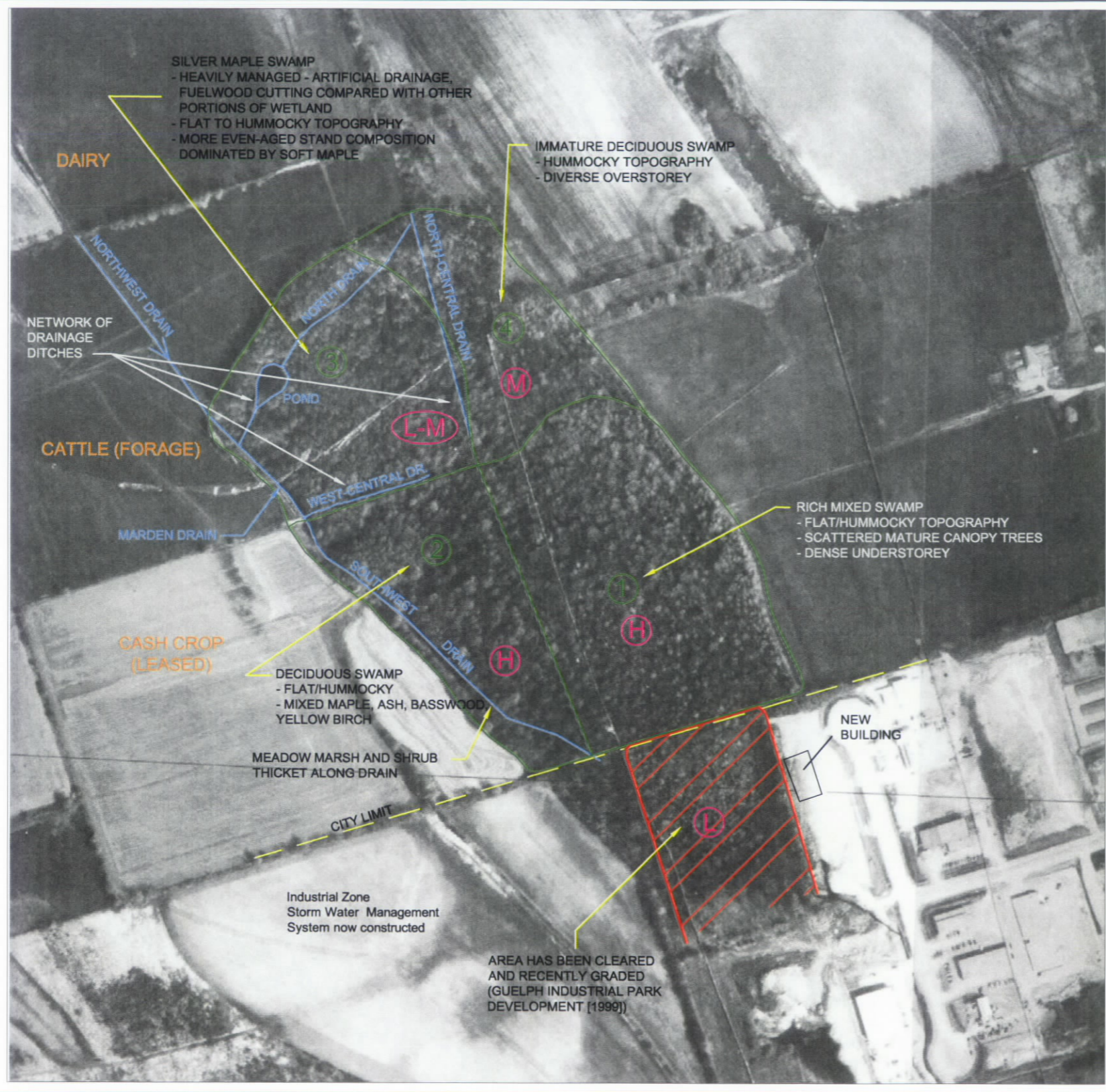
- Expected bird species recorded by Ecoplans Limited (low density noted)
- Northern Waterthrush and Wood Thrush recorded by KWFN
- Highest habitat quality in central/south sections - north section heavily disturbed
- See Appendix C for details

AGRICULTURAL NOTES

- dairy operation to north
- forage (for cattle) and cash crop to west
- City industrial zone to south

MARDEN DRAIN

- No flow when surveyed
- Seasonal batfish potential
- Extensive drainage alteration in area
- See Section 3.2.4 of EA report for details.



Vegetation Sensitivity Ratings

In the definitions provided below, the quality of vegetation is assessed on the basis of the community type and species association (and its relative scarcity in the landscape), maturity or age, relative importance of native versus non-native species, and presence of absence of rare or unusual species.

- (H) High**
- Mature, native, higher quality vegetation features that are virtually impossible to recreate or restore in the short term (i.e. less than 60 years);
 - Higher quality wetland features that exhibit limited if any disturbance and that are sensitive to changes in the hydrological and hydrogeological regimes (such as bogs and fens, or some swamps depending on site conditions);
 - Mature, native vegetation on erodible slopes;
 - Communities that provide habitat for provincially rare to uncommon species (i.e. ranked 'S3' by the Natural Heritage Information Center - see Oldham 1996).
- (M) Moderate**
- Immature to submature, native, vegetation features of moderate quality that might, conceivably, be recreated or restored in the short term (i.e. less than 60 years);
 - Wetland vegetation features of moderate quality that may or may not exhibit some disturbance and that are moderately sensitive to changes in the hydrological and hydrogeological regimes (such as some treed and shrub swamps);
 - Immature, native vegetation on erodible slopes.
- (L) Low**
- Open, early successional communities that have formed as a result of recent human activity and can be readily recreated or restored in the shortest term (i.e. less than 5-10 years);
 - Disturbed wetland communities dominated by invasive species (such as Reed Canary Grass, Purple Loosestrife) that have formed as a result of past and present disturbance or been heavily influenced by alterations to the hydrological and hydrogeological regime.

LEGEND

- Vegetation Community Boundary
- 1 Vegetation Community Number (See Appendix C)
- M Vegetation Sensitivity
- ▨ Heavily Disturbed

Job Title:	PROPOSED HWY 7 KITCHENER TO GUELPH	
Sheet Title:	MARDEN SOUTH WETLAND	
No.	1	July 08, 2003
		Revision Date



Date:	Dec. 1999	Project No.	99-2100
Scale:	1:5000	Figure No.	5
Drawn By:	T.C./M.P.		
Checked By:	J.K./G.G.		

Bloomington-Rosendale Wetland

- The main complex is located north of Bridge Street and extends further to the north of Ebycrest Road. A riparian meadow marsh and lowland floodplain component is located south of Bridge Street extending to the Grand River. The wetland is locally significant (LSW), but the wetland block north of Bridge Street was identified by MNR as a high priority area for further consideration during the present MTO review;
- The component north of Bridge Street is a linear wetland and creek valley system comprising conifer swamp, deciduous swamp, meadow marsh, and mixed swamp. Steep deciduous wooded slopes are associated with the north-south Rosendale Creek valley. There is extensive groundwater seepage throughout the system, and a good diversity of vegetation and wetland communities despite some historical disturbances associated with agricultural activities;
- Rosendale Creek and its tributary flow through the wetland with the main creek continuing south under Bridge Street to the Grand River;
- Sensitivity to disturbance is moderate to high reflecting the extensive seepage, presence of shallow-rooted trees, presence of good quality vegetation associations, and steep slopes.
- There is an upland submature deciduous forest stand bordering the east side of Ebycrest Road opposite the wetland block. The forest stand has been high-graded and disturbed and exhibits limited understory in the northwest section. However, tree health and overall condition appears good. This stand was assigned a moderate sensitivity rating;

Hopewell Creek Riparian Woodland/Wetland

- The main block is comprised of mixed swamp and soft maple swamp with fresh deciduous forest (Sugar Maple), pockets of White Cedar, and a local trail network. This block is located in the northwest quadrant of Highway 7 and Shantz Station Road;
- A network of dug drains in the wetland carry drainage to the main agricultural drain located along the west side of the wetland block. This main drain flows to Hopewell Creek to the northwest. This drain system has undoubtedly influenced wetland water levels to some degree;
- There has been past land alteration at the south end of the wetland associated with vegetation clearing, irrigation pond construction, granular borrow, and spoil pile storage. The irrigation pond provides a water source for irrigation of the Tillich Nursery land bordering the south side of the wetland;

- Irrigation pond water levels in early September 2001 were about 2 metres below surface ground level. This likely reflects in part the extremely dry summer of 2001. It is anticipated that during typical seasonal conditions the local water table is probably within 1 metre of the surface, and contributes to wetland site conditions (in addition to surface water collection). The swamp system is typically wettest during the spring period, and then experiences a cycle of drying as the water table level drops during the summer/early fall period;
- This is a locally significant wetland (LSW) with moderate to high sensitivity in the main (core) block (reflecting less disturbed wetland and deciduous forest cover). The narrow south lobe of the wetland is rated moderate in sensitivity, reflecting past disturbance, some drain work, narrower width (more edge in nature) and younger growth associated with colonization of dieback openings.

Townline West Woodland/Wetland

- This large wetland block is located north of Highway 7 and west of Townline Road;
- Wetland vegetation associations encompass thicket swamp, shrub thicket and meadow marsh, moist-fresh cedar forest, mixed swamp, deciduous swamp, and soft maple swamp;
- The wetland block is somewhat triangular in nature with the narrow and relatively more disturbed section at the south (closest to existing Highway 7) and the broader, less disturbed section to the north;
- The south end of the wetland narrows considerably into a more disturbed, seasonally wet thicket swamp/transitional shrub thicket with meadow marsh elements (Unit 1). This narrow unit grades into a small deciduous forest lobe (moist-fresh with ash, elm and aspen that borders existing Highway 7);
- Drainage through the narrow lobe (Unit 1) is seasonal in nature in a north direction, with pockets of standing water typically in the spring. Drainage tends to be imperfect, in this unit, with no evidence of discharge. This narrow unit is less sensitive than the main wetland block, particularly at the narrow connection to the small forest stand. This narrow connection dries out in the summer, has a heavy Common Buckthorn component, and is younger and more tolerant than the mature wetland associations to the north;
- Discharge conditions, deeper organics, less disturbance, and greater diversity characterize the larger wetland section to the north. For these reasons, this part of the wetland rates a moderate-high to high sensitivity rating. The discharge contributes to base flow in the poorly defined

tributary that traverses the main wetland block (east to west drainage gradient) and that carries the drainage to Hopewell Creek to the northwest;

- A second relatively large woodland/wetland block is present just east of Townline Road (about 650 metres north of existing Highway 7). This block is characterized by Soft Maple swamp with poorly drained mineral soils (shallow organic layer) with a transitional mix of hardwood, aspen growth and shrub thicket growth around the margins. Drainage from the main wetland block flows southerly along an intermittent grass/thicket swale that connects with Ellis Creek just south of existing Highway 7. This wetland was named Townline East during the course of the current MTO review. During the review the study team was made aware of an active heronry (Great Blue Heron) within the north-central part of the stand – confirmed through field check in June 1999;

Ellis Creek Wetland

- This large wetland complex straddles existing Highway 7 near Guelph Road 3 but also extends further to the north as well as to the south and west (along the Ellis Creek system);
- The review area during the current MTO update was the wetland block between existing Highway 7 and Guelph Road 3;
- This wetland block is characterized by a mosaic of deciduous swamp, mixed swamp, floodplain swamp, thicket swamp, and meadow marsh/shallow marsh;
- Ellis Creek flows southerly through the wetland as a diffuse poorly defined channel network. Backwater ponding at Highway 7 has resulted in development of a zone of thicket swamp with open standing water on the north side of Highway 7 (Unit 6);
- Deciduous and mixed tree swamp communities characterize the main (core) wetland block to the north (Units 2B, 4, 5). Unit 2B is bordered by more open marsh and thicket swamp habitat (Unit 1 – mineral soils);
- Towards the north end of the forested block the wetland becomes floodplain swamp with a more open willow/maple canopy (Unit 2A). Beyond the forest limit, the wetland is an open, pastured floodplain system extending to Guelph Road 3;
- Overall, the forested wetland components exhibit both perched and discharge (seepage) conditions, varying depth of organic material, and flat to hummocky topography. The best quality and more sensitive sections are associated with Units 2B, 4 and 5. Moist conifer forest borders and transitions into wetland along the east side (Unit 3). Wetland quality and sensitivity is somewhat lower through the transition from floodplain swamp to pastured wetland;

- This part of the Ellis Creek Wetland was complexed with the provincially significant lower Ellis Creek Swamp in 1992.

Marden South Wetland

- This wetland block is located north of Highway 7 and about midway between County Road 86 and the Silvercreek Parkway;
- The wetland block is one of 9 wetland areas comprising the provincially significant Marden South Wetland complex;
- Historically, the south end of the wetland block was cleared and graded within the Guelph Industrial Park limits. The balance of this block to the north is deciduous and mixed treed swamp;
- The treed swamp has sustained differing levels of management. The northwest portion of the stand has been managed for fuelwood cutting over the years, resulting in an even-aged stand of predominately soft maple. A network of drainage ditches carries drainage from this area to the main drain located along the west side of the wetland block. The other sections of the wetland that have not sustained ongoing fuelwood management exhibit moderate to high species diversity and moderate to high sensitivity. All sections of the wetland block exhibit flat to hummocky topography, poor drainage, and organic materials;
- The wetland block was identified by MNR as part of a deer wintering area (1 of 9 wetlands comprising the overall wetland complex). In this particular block, conifer cover that would provide some winter shelter is generally limited to the mixed swamp in the southeast zone where conifers are interspersed with deciduous trees. Existing industrial development in the City of Guelph borders this area to the south.

SPECIES KEY FOR VEGETATION COMMUNITY SUMMARY TABLE

Acronym	Scientific Name	Common Name	Introduced
ABIBALS	<i>Abies balsamea</i>	Balsam Fir	
ACERUBR	<i>Acer rubrum</i>	Red Maple	
ACESACC	<i>Acer saccharinum</i>	Silver Maple	
AGRGIGA	<i>Agrostis gigantea</i>	Redtop	I
AMPBRAC	<i>Amphicarpaea bracteata</i>	Hog-peanut	
ARANUDI	<i>Aralia nudicaulis</i>	Wild Sarsaparilla	
ARARACE	<i>Aralia racemosa racemosa</i>	Spikenard	
ARITRIP	<i>Arisaema triphyllum triphyllum</i>	Jack-in-the-pulpit	
ASACANA	<i>Asarum canadense</i>	Wild Ginger	
ASCINCA	<i>Asclepias incarnata incarnata</i>	Swamp Milkweed	
ASTLANC	<i>Aster lanceolatus</i>	Tall White Aster	
ASTLATE	<i>Aster lateriflorus</i>	One-sided Aster	
ASTPUNI	<i>Aster puniceus</i>	Purple-stemmed Aster	
BETALLE	<i>Betula alleghaniensis</i>	Yellow Birch	
BIDCERN	<i>Bidens cernua</i>	Nodding Beggar-ticks	
BOECYLI	<i>Boehmeria cylindrica</i>	False Nettle	
CALCANA	<i>Calamagrostis canadensis</i>	Canada Blue-joint	
CARBROM	<i>Carex bromoides</i>	Brome-like Sedge	
CARCOMO	<i>Carex comosa</i>	Bristly Sedge	
CARHYST	<i>Carex hystericina</i>	Porcupine Sedge	
CARINTU	<i>Carex intumescens</i>	Bladder Sedge	
CARLACU	<i>Carex lacustris</i>	Lake Sedge	
CARLUPU	<i>Carex lupulina</i>	Hop Sedge	
CARPEDU	<i>Carex pedunculata</i>	Peduncled Sedge	
CARPENS	<i>Carex pensylvanica</i>	Pennsylvania Sedge	
CARPSEU	<i>Carex pseudo-cyperus</i>	Cyperus-like Sedge	
CARRADI	<i>Carex radiata</i>	Sedge	
CARRETR	<i>Carex retrorsa</i>	Retorse Sedge	
CARSTRI	<i>Carex stricta</i>	Tussock Sedge	

Acronym	Scientific Name	Common Name	Introduced
CARVULP	<i>Carex vulpinoidea</i>	Fox Sedge	
CHEGLAB	<i>Chelone glabra</i>	Turtlehead	
CICBULB	<i>Cicuta bulbifera</i>	Bulbous Water-hemlock	
CIRLUTE	<i>Circaea lutetiana canadensis</i>	Enchanter's Nightshade	
CLIBORE	<i>Clintonia borealis</i>	Bluebead-lily	
COPTRIF	<i>Coptis trifolia groenlandica</i>	Gold-thread	
CORFOEM	<i>Cornus foemina racemosa</i>	Grey Dogwood	
CORSTOL	<i>Cornus stolonifera</i>	Red-osier Dogwood	
CYSBULB	<i>Cystopteris bulbifera</i>	Bulblet Fern	
DRYCART	<i>Dryopteris carthusiana</i>	Spinulose Wood Fern	
DRYCRIS	<i>Dryopteris cristata</i>	Crested Wood Fern	
ELYVIRG	<i>Elymus virginicus</i>	Virginia Wild-rye	
EPIHIRS	<i>Epilobium hirsutum</i>	Great Hairy Willow-herb	
EQUARVE	<i>Equisetum arvense</i>	Field Horsetail	
EUOOBOV	<i>Euonymus obovata</i>	Running Strawberry-bush	
EUPMACU	<i>Eupatorium maculatum</i>	Spotted Joe-Pye-weed	
EUPPERF	<i>Eupatorium perfoliatum</i>	Boneset	
EUPRUGO	<i>Eupatorium rugosum</i>	White Snakeroot	
FAGGRAN	<i>Fagus grandifolia</i>	American Beech	
FRAAMER	<i>Fraxinus americana</i>	White Ash	
FRANIGR	<i>Fraxinus nigra</i>	Black Ash	
FRAPENN	<i>Fraxinus pennsylvanica</i>	Red Ash, Green Ash	
GALTRIL	<i>Galium triflorum</i>	Sweet-scented Bedstraw	
GEURIVA	<i>Geum rivale</i>	Water Avens	
GLYGRAN	<i>Glyceria grandis</i>	Tall Manna Grass	
GLYSTRI	<i>Glyceria striata</i>	Fowl Manna Grass	
ILEVERT	<i>Ilex verticillata</i>	Winterberry	
IMPCAPE	<i>Impatiens capensis</i>	Spotted Touch-me-not	
IRIVERS	<i>Iris versicolor</i>	Wild Blue Flag	
JUGCINE	<i>Juglans cinerea</i>	Butternut	

Acronym	Scientific Name	Common Name	Introduced
JUNEFFU	<i>Juncus effusus solutus</i>	Common Rush	
LAPCANA	<i>Laportea canadensis</i>	Wood Nettle	
LARLARI	<i>Larix laricina</i>	Tamarack	
LEEORYZ	<i>Leersia oryzoides</i>	Rice Cut Grass	
LEMMINO	<i>Lemna minor</i>	Common Duckweed	
LOBSIPH	<i>Lobelia siphilitica</i>	Great Blue Lobelia	
LYSNUMM	<i>Lysimachia nummularia</i>	Moneywort	I
LYSTHYR	<i>Lysimachia thysiflora</i>	Tufted Loosestrife	
LYTSALI	<i>Lythrum salicaria</i>	Purple Loosestrife	I
MAICANA	<i>Maianthemum canadense</i>	Wild Lily-of-the-valley	
MATSTRU	<i>Matteuccia struthiopteris</i>	American Ostrich Fern	
ONOSENS	<i>Onoclea sensibilis</i>	Sensitive Fern	
OSMCINN	<i>Osmunda cinnamomea</i>	Cinnamon Fern	
PARINSE	<i>Parthenocissus inserta</i>	Virginia Creeper	
PHAARUN	<i>Phalaris arundinacea</i>	Reed Canary Grass	
PILFONT	<i>Pilea fontana</i>	Clearweed	
PILPUMI	<i>Pilea pumila</i>	Clearweed	
PINSTRO	<i>Pinus strobus</i>	White Pine	
POLACRO	<i>Polystichum acrostichoides</i>	Christmas Fern	
POLPUBE	<i>Polygonatum pubescens</i>	Solomon's-seal	
POPTREM	<i>Populus tremuloides</i>	Trembling Aspen	
PRUSERO	<i>Prunus serotina</i>	Wild Black Cherry	
PRUVIRG	<i>Prunus virginiana virginiana</i>	Chokecherry	
QUEMACR	<i>Quercus macrocarpa</i>	Bur Oak	
QUERUBR	<i>Quercus rubra</i>	Red Oak	
RANHISPCAR	<i>Ranunculus hispidus var. caricetorum</i>	Swamp Buttercup	
RHACATH	<i>Rhamnus cathartica</i>	Common Buckthorn	I
RHAFRAN	<i>Rhamnus frangula</i>	Alder Buckthorn	I
RHURADIRYD	<i>Rhus radicans rydbergii</i>	Rydberg's Poison-ivy	
RUBPUBE	<i>Rubus pubescens</i>	Dwarf Raspberry	

Acronym	Scientific Name	Common Name	Introduced
SAGLATI	<i>Sagittaria latifolia</i>	Common Arrowhead	
SALALBA	<i>Salix alba</i>	White Willow	I
SALAMYG	<i>Salix amygdaloides</i>	Peach-leaved Willow	
SALDISC	<i>Salix discolor</i>	Pussy Willow	
SALERIO	<i>Salix eriocephala</i>	Heart-leaved Willow	
SALLUCI	<i>Salix lucida</i>	Shining Willow	
SALPETI	<i>Salix petiolaris</i>	Slender Willow	
SAMCANA	<i>Sambucus canadensis</i>	Common Elder	
SANCANA	<i>Sanguinaria canadensis</i>	Bloodroot	
SCIATRO	<i>Scirpus atrovirens</i>	Black Bulrush	
SCICYPE	<i>Scirpus cyperinus</i>	Wool-grass	
SIUSUAV	<i>Sium suave</i>	Water-parsnip	
SOLPATU	<i>Solidago patula</i>	Rough-leaved Goldenrod	
SOLRUGO	<i>Solidago rugosa rugosa</i>	Rough Goldenrod	
SPIALBA	<i>Spiraea alba</i>	Meadowsweet	
TAXCANA	<i>Taxus canadensis</i>	American Yew	
THAPUBE	<i>Thalictrum pubescens</i>	Tall Meadow-rue	
THEPALU	<i>Thelypteris palustris</i>	Marsh Fern	
THUOCCI	<i>Thuja occidentalis</i>	White Cedar	
TIACORD	<i>Tiarella cordifolia</i>	Foamflower	
TILAMER	<i>Tilia americana</i>	American Basswood	
TRIBORE	<i>Trientalis borealis borealis</i>	Starflower	
TRIGRAN	<i>Trillium grandiflorum</i>	White Trillium	
TSUCANA	<i>Tsuga canadensis</i>	Eastern Hemlock	
TYPLATI	<i>Typha latifolia</i>	Common Cattail	
ULMAMER	<i>Ulmus americana</i>	White Elm	
VIBTRIL	<i>Viburnum trilobum</i>	Highbush-cranberry	

Table 2: Vegetation Resources

BLOOMINGDALE WETLAND

Site	Bloomingtondale	Bloomingtondale	Bloomingtondale	Bloomingtondale	Bloomingtondale	Bloomingtondale
Unit #	1	2	3	4	5	6
EA Code	part of W3g	W3g	W3g	not mapped	Part of W3g	W3i
Community Description	Mixed Lowland Deciduous Forest/Swamp	Coniferous Swamp	Coniferous Swamp	Meadow Marsh	Coniferous Swamp Thicket/Marsh	Moist to fresh Deciduous Forest
Canopy Closure	2	3	2	1	2	3
Avg. Diam (cm)	10	15	10	10	10	20
Drainage	imperfect	poor	poor	imperfect	imperfect	good
Topography	flat/hummocky	hummocky	Extremely Hummocky	flat	flat/hummocky	Rolling/undulating
Diversity	low-mod	high	high	low	mod	mod
Soils	shallow org	org	org	mineral	org	mineral
H2O	discharge	discharge	discharge	localized discharge	localized discharge	localized discharge (along ravine)
Overstorey	ULMAMER	THUOCCI	THUOCCI	ULMAMER	THUOCCI	ACESACC
	FRAPENN	TSUCANA	ULMAMER	ACERUBR	FRAPENN	FRAAMER
	TILAMER	FRAPENN	FRANIGR		ACERUBR	QUERUBR
	BETALLE	ULMAMER	FRAPENN			PRUSERO
	POPTREM	LARLARI	SPIALBA			FAGGRAN
	TSUCANA	BETALLE				TSUCANA
	PINSTRO	POPTREM				TILAMER JUGCINE
Understorey	FRAPENN	THUOCCI	THUOCCI	PRUVIRG	THUOCCI	PRUVIRG
	FRANIGR	CORSTOL	ABIBALS	CORRACE	SAMCANA	CORALTE
	THUOCCI	ACERUBR	FRANIGR		CORSTOL	FRAAMER
	TAXCANA	FRAPENN	CORSTOL		SAL	JUGCINE
	ABIBALS	FRANIGR	CORRACE			TAXCANA
		VIBTRIL	SALDISC			
		QUEMACR SAMCANA	SALERIO			
Groundcovers	IMPCAPE	SOLPATU	Similar to Unit 2	AGRGIGA	Similar but less rich than 2	ARITRIP
	ONOSENS	SOLRUGO	POLPUBE	TYPLATI		CARPEDU
	GLYSTR	CYSBULB	GEURIVA	CARVULP		CARPENS
		MATSTRU	ARITRIP	ASTPUNI		MAICANA
		OSMCINN		SOLRUGO		ASACANA
		PILFONT		LYTSALI		TRIGRAN
		BOECYLI				EUOBOV
		CIRLUTE				POLACRO
		EUPMACU				ALLPETI
		EUPPERF				
		LOBSIPH				
		GLYSTR				
		CARINTU				
		CARRETR				
		TYPLATI				
		TIARCORD				
		SCIATRO				
	DRYCART					
	EPIHIRS					
	COPTRIF					
	CLIBORE					
	TRIBORE					
Comments	Disturbed - dumping and blowdown	Rich swamp system with good structure and some discernable channels	Very dense cedar swamp, lots of blowdown	Wet meadow	Mosaic of thicket with wet meadow pockets; dense understorey	Highly disturbed- high-graded woodlot. Limited understorey in north west half

Canopy Closure Key: Expressed as a percentage of forest floor shaded by the canopy overstorey 1=<25%, 2=25% to 50%, 3=>50%

Table 2: Vegetation Resources

HOPEWELL CREEK RIPARIAN WETLAND / WOODLAND

Site	Hopewell	Hopewell	Hopewell	Hopewell
Unit #	1	2	3	4
EA Code	W-8d	W-8c	W-8b	W-8a
Community Description	Mixed Swamp	Broadleaf Swamp	Broadleaf Upland Woods	Conifer Plantation
Canopy Closure	2	2	2	2 to 3
Avg. Diam (cm)	32	35	32	20
Drainage	imperfect-poor	poor	good	good
Topography	flat/hummocky	low-lying/ flat	steep slope	gente slope
Diversity	mod	mod	mod	low
Soils	shallow organics	organic	mineral	mineral
H2O				
Overstorey	THUOCCI BETALLE FRANIGR ACESACC POPTREM	ACESACC BETALLE ULMAMER QUEMACR THUOCCI	ACESACH ULMAMER PRUSERO POPTREM	PICGLA PINSTR PICABI PINSYL THUOCCI PINRES
Understorey	ACESACC ACERUBR CORSTOL CORRACE RUBIDAE RIBAMER CRAT Sp. RHACATH VIBLENT SAMCAN RHURAD	CORSTOL VIBLENT SAMCAN	TILAMER CORALT PARINSE PRUVIRG	RUBIDAE RIBAMER RHACATH
Groundcovers	CARE Sp. THEPALU MATSTRU	CARE Sp. MATSTRU THEPALU EQUI Sp. AST Sp. JUNC Sp.	GEUM Sp. AST Sp. MAICANA CARPENS ASACANA TRIGRAN POLACRO FRAVESC	Weedy Groundcovers
Comments	Degraded by drainage ditches and cutting	Wetland located in topographical deppresion. Aggregate extraction has disturbed southern edge	Upland ridge surrounds the wetland (Unit 2)	Windbreak plantation of predominantly non-native conifers.

Canopy Closure Key: Expressed as a percentage of forest floor shaded by the canopy overstorey 1=<25%, 2=25% to 50%, 3=>50%

Table 2: Vegetation Resources

TOWNLIN WETLAND

Site	Townline	Townline	Townline	Townline	Townline	Townline
Unit #	1	2	3	4	5	6
EA Code	not mapped	9c and 9e	9b	9a	9a	9d
Community Description	Thicket Swamp	Deciduous Swamp	Moist - Fresh Cedar Forest	Meadow Marsh/ Thicket Swamp	Mixed Swamp	Silver Maple Swamp
Canopy Closure	2	2(3)	3	2	2	3
Avg. Diam (cm)	10	15	15	10	15	20
Drainage	imperfect	imperfect-poor	imperfect	imperfect	poor	poor
Topography	flat/hummocky	flat/hummocky	flat/hummocky	flat/hummocky	flat/hummocky	flat/hummocky
Diversity	mod	mod	low	high	high	mod
Soils	shallow org	shallow org	shallow org	deep org	deep org	org
H2O	perched	perched	discharge at fringes	discharge	discharge	perched
Overstorey	ULMAMER	POPTREM	THUOCCI	ACERUBR	FRAPENN	ACESACC
	FRAPENN	FRAPENN	FRAPENN	THUOCCI	POPTREM	ACERUBR
	POPTREM	ACERUBR	POPTREM	TILAMER	ACERUBR	FRAPENN
		ULMAMER	FRANIGR	FRANIGR	QUEMACR	BETALLE
		ABIBALS		SALNIGR	ACESACC	FRANIGR
		THUOCCI		POPTREM	ABIBALS	POPTREM
				ULMAMER	THUOCCI	THUOCCI
					TILAMER	
					BETALLE	
					ULMAMER	
				FRANIGR		
Understorey	SALERIO	THUOCCI	THUOCCI	CORSTOL	ILEVERT	THUOCCI
	CORSTOL	PRUVIRG	RHAFRAN	SAMCANA	CORRACE	BETALLE
	VITRIPA	PARINSE	POPTREM	THUOCCI	ACERUBR	TILAMER
	PARINSE	FRAPENN	FRAPENN	FRANIGR	FRAPENN	ABIBALS
	CORRACE	RHURADIRYD	CORSTOL	VIBTRIL	SAMCANA	ACESPIC
				ILEVERT	THUOCCI	
				CORSTOL		
Groundcovers	GLYSTRI	BOECYLI	DRYCART	ASCINCA	BOECYLI	ARARACE
	ASTLATE	ONOSENS	GLYSTRI	ASTPUNI	DRYCRIS	GLYSTRI
	SOLRUGO	GLYSTRI	DRYCART	EUPMACU	DRYCART	DRYCART
	CARVULP	ASTLATE	TIACORD	EUPPERF	ONOSENS	SIUSUAV
		CIRLUTE	SOLRUGO	LEEORYZ	CYSBULB	ONOSENS
			CYSBULB	SCIATRO	ASTPUNI	CARINTU
				SCICYPE	SOLRUGO	CARLUPU
				ASTLATE	GLYSTRI	IMPCAPE
				SIUSUAV	CIRLUTE	CARBROM
				TYPLATI	EUPPERF	
					CARINTU	
					CARRETR	
					CARRADI	
Comments			Disturbed, Lots of Aspen blowdown	Dense Cedar thicket fringed by swamp	High quality, discharge evident	Mosaic of open meadow pockets, dense thicket, and immature swamp

Canopy Closure Key: Expressed as a percentage of forest floor shaded by the canopy overstorey 1=<25%, 2=25% to 50%, 3=>50%

Table 2: Vegetation Resources

ELLIS WETLAND

Site	Ellis	Ellis	Ellis	Ellis	Ellis	Ellis
Unit #	1	2	3	4	5	6
EA Code	Not Mapped	Part of W12a, W12b and W12c	W12c and part of W12b	Part of W12c and W12d	Part of W12d	Part of W12d
Community Description	Meadow Marsh/Thicket Swamp	Deciduous Swamp	Moist-Fresh Coniferous Forest	Mixed Swamp	Deciduous Swamp	Thicket Swamp
Canopy Closure	1	3	3	2	3	2
Avg. Diam (cm)	25	25	15	10	25	10
Drainage	imperfect	poor	imperfect	poor	poor	poor
Topography	flat	flat/hummocky	gentle-flat	hummocky	wetland fringe, hummocky	flat, low-lying
Diversity	low-mod	mod	low	high	mod	mod
Soils	mineral	org	shallow org	deep org	shallow org	org
H2O	perched	perched	seepage	discharge	seepage and vernal flooding	open standing water
Overstorey	ULMAMER SALALBA THUOCCI LARLARI	ACESACC ACERUBR SPIALBA ULMAMER FRAPENN BETALLE	THUOCCI POPTREM FRAPENN ACERUBR	ACERUBR FRAPENN THUOCCI ULMAMER LARLARI POPTREM BETALLE	ACESACC FRAPENN	ACESACC ULMAMER
Understorey	CORSTOL SALERIO SALDISC SALPETI SAMCANA	CORSTOL PRUVIRG	THUOCCI RHACATH FRAPENN RUBPUBE	CORSTOL THUOCCI SALDISC SALERIO SALLUCI ILEVERT	CORSTOL SAL	SAL CORSTOL
Groundcovers	PHAARUN LEEORYZ TYPLATI IMPCAPE CARSTRI ASTPUNI ASTLANC CARRETR EUPMACU EUPPERF SIUSUAV GALTRIL ASCINCA LYTSALI	ONOSENS PILPUMI BOECYLI IMPCAPE GLYSTRI CARLACU CARINTU LAPCANA LYSNUMM THAPUBE ELYVIRG CARBROM AMPBRAC DRYCART	ONOSENS ARITRIP SANCANA POLACRO CARPEDU	CALCANA IRIVERS SIUSUAV CARLACU ONOSENS GLYGRAN GLYSTRI CICBULB IMPCAPE CARCOMM CARHYST BIDCERN SCIATRO SCICYPE JUNEFFU LEMMINO MATSTRU LYTTHYR SAGLATI ASTPUNI	GLYSTRI IMPCAPE CARLUPU	PHAARUN CALCANA CARSTRI CARPSEU
Comments	meadow marsh to north; thicket to south	2B - Good closed canopy in core wetland area	Transitions to wetland along westerly edges in association with seepage	Immature mixed swamp with pockets of thicket and meadow. High Diversity	Typical mix of wetland species	Seasonal standing water likely reflects some backwater effect of existing Hwy. 7

Canopy Closure Key: Expressed as a percentage of forest floor shaded by the canopy overstorey 1=<25%, 2=25% to 50%, 3=>50%

Table 2: Vegetation Resources

MARDEN WETLAND

Site	Marden	Marden	Marden	Marden
Unit #	1	2	3	4
EA Code	W13	W13	W13	W13
Community				
Description	Mixed Swamp	Deciduous Swamp	Deciduous Swamp	Deciduous Swamp
Canopy Closure	3	3	3	3
Avg. Diam (cm)	20	25	20	15
Drainage	poor	poor	poor	poor
Topography	flat/hummocky	flat/hummocky	flat	gentle/hummocky
Diversity	high	mod	low	mod-high
Soils	org	org	org	org
H2O	perched	perched	perched	perched
Overstorey	ACESACC TSUCANA ACERUBR FRAPENN ABIBALS SALAMYG FRANIGR THUOCCI BETALLE	ACERUBR ACESACC FRAPENN TILAMER BETALLE	ACESACC ACERUBR FRAPENN BETALLE	ACESACC FRANIGR BETALLE POTTREM ACERUBR TSUCANA ABIBALS SALAMYG
Understorey	THUOCCI ABIBALS ACERUBR QUEMACR PRUVIRG RHAFRAN RUBPUBE PARINSE VITRIPA RHURADIRYD TAXCANA	ACERUBR FRAPENN FRANIGR SAMCANA PARINSE RHURADIRYD RUBPUBE	TSUCANA FRAPENN TAXCANA ABIBALS THUOCCI SAMCANA	THUOCCI TSUCANA ABIBALS FRANIGR FRAPENN ACESPIC
Groundcovers	ONOSENS ARANUDI ARARACE BOECYLI IMPCAPE MATSTRU EUPMACU EUPPERF EUPRUGO GLYSTRI EQUARVE SOLRUGO THEPALU DRYCRIS DRYCART CHEGLAB MAICANA CARINTU CARBROM OSMCINN	SIMILAR TO 1	solid IMPCAPE CIRLUTE BOECYLI	CLIBORE TRIBORE RANHISPCAR CYSBULB
Comments	Dense Understorey	Open Understorey	Disturbed, Heavily Managed Even-aged monoculture	

Canopy Closure Key: Expressed as a percentage of forest floor shaded by the canopy overstorey 1=<25%, 2=25% to 50%, 3=>50%



**Working Vascular Plant Checklist - Proposed Highway 7 (Kitchener-Guelph)
Version 1.0**

The following is a working vascular plant checklist that documents the flora encountered during surveys of five focal points along the alignment during the 1999 field season. Nomenclature follows Morton and Venn (1990) with a few exceptions. Status for Ontario was determined using Oldham (1999). Species status for the Regional Municipality of Waterloo was determined using the *Region of Waterloo Significant Species List: Native Vascular Plants 1999*. Substantiating voucher specimens of significant taxa have been collected and will be deposited at the University of Toronto Erindale Campus Herbarium (TRTE).

The majority of the sites that were surveyed are wetlands, hence upland species are poorly represented in the checklist that follows. A total of 255 taxa have been recorded to date, of which 16 taxa or 6% of the flora are non-native or introduced. This is not surprising since many of the non-native species in southern Ontario occur in upland or terrestrial environments. Some non-native species occur in large numbers within the study area (e.g., *Epilobium hirsutum*, *Lythrum salicaria*, *Rhamnus cathartica*). No species considered rare or rare to uncommon in Ontario were recorded (based on Oldham 1999). Three species considered significant in the Regional Municipality of Waterloo were recorded: *Carex scabrata*, *C. tuckermanii* and *Pilea fontana*.

Checklist Codes and Abbreviations

Status

- I - Introduced/non-native to southern Ontario (based on Morton and Venn 1990)
- W - Significant plant species in R.M. of Waterloo (based on R.M. of Waterloo 1999)

Location

- Blo. - Bloomingdale-Rosendale Wetland
- Hop. - Hopewell Creek Riparian Wetland Complex
- Tow. - Townline Road West Woodland - Wetland
- Ell. - Ellis Creek Wetland
- Mar. - Marden South Wetland



Working Vascular Plant Checklist

Scientific Name	Common Name	Status	Blo.	Hop.	Tow	Ell.	Mar
<i>Abies balsamea</i>	Balsam Fir		X	X	X	X	X
<i>Acalypha virginica</i>	Three-seeded Mercury		X		X		
<i>Acer negundo</i>	Manitoba Maple		X	X	X	X	X
<i>Acer rubrum</i>	Red Maple		X	X	X	X	X
<i>Acer saccharinum</i>	Silver Maple		X	X	X	X	X
<i>Acer saccharum saccharum</i>	Sugar Maple		X		X	X	X
<i>Acer spicatum</i>	Mountain Maple		X	X	X	X	X
<i>Actaea pachypoda</i>	White Baneberry		X				
<i>Agrimonia gryposepala</i>	Yellow Agrimony		X			X	
<i>Agrostis gigantea</i>	Redtop	I	X	X	X	X	X
<i>Agrostis stolonifera</i>	Creeping Bent Grass		X	X	X	X	X
<i>Alisma plantago-aquatica</i>	Water-plantain		X	X	X	X	X
<i>Alliaria petiolata</i>	Garlic Mustard	I	X	X		X	X
<i>Allium tricoccum</i>	Wild Leek		X				
<i>Amelanchier laevis</i>	Smooth Juneberry					X	X
<i>Amphicarpaea bracteata</i>	Hog-peanut					X	X
<i>Anemone canadensis</i>	Canada Anemone		X		X	X	
<i>Aralia nudicaulis</i>	Wild Sarsaparilla		X				X
<i>Aralia racemosa racemosa</i>	Spikenard		X		X		X
<i>Arisaema triphyllum triphyllum</i>	Jack-in-the-pulpit		X	X	X	X	
<i>Asarum canadense</i>	Wild Ginger		X		X		
<i>Asclepias incarnata incarnata</i>	Swamp Milkweed		X	X	X	X	X
<i>Aster cordifolius</i>	Heart-leaved Aster		X			X	
<i>Aster lanceolatus</i>	Tall White Aster		X	X	X	X	X
<i>Aster lateriflorus</i>	One-sided Aster		X	X	X	X	X
<i>Aster macrophyllus</i>	Large-leaved Aster		X				
<i>Aster puniceus</i>	Purple-stemmed Aster		X	X	X	X	X
<i>Athyrium filix-femina angustum</i>	Northeastern Lady Fern		X	X	X		X
<i>Betula alleghaniensis</i>	Yellow Birch		X	X	X	X	X



Scientific Name	Common Name	Status	Blo.	Hop.	Tow	Ell.	Mar
<i>Betula papyrifera</i>	White Birch		X				X
<i>Bidens cernua</i>	Nodding Beggar-ticks		X	X	X	X	X
<i>Bidens frondosa</i>	Devil's Beggar-ticks		X	X	X	X	X
<i>Bidens tripartita</i>	Beggar-ticks		X	X		X	X
<i>Bidens vulgata</i>	Tall Beggar-ticks				X		
<i>Boehmeria cylindrica</i>	False Nettle		X	X	X	X	X
<i>Botrychium virginianum</i>	Rattlesnake Fern		X				
<i>Bromus ciliatus</i>	Fringed Brome Grass		X			X	X
<i>Calamagrostis canadensis</i>	Canada Blue-joint		X	X	X	X	X
<i>Caltha palustris</i>	Marsh Marigold		X	X	X	X	X
<i>Cardamine pensylvanica</i>	Pennsylvania Bitter Cress		X	X			X
<i>Carex alopecoidea</i>	Foxtail Sedge					X	
<i>Carex arctata</i>	Compressed Sedge		X		X		X
<i>Carex bebbii</i>	Bebb's Sedge		X	X	X	X	X
<i>Carex blanda</i>	Smooth Sedge		X				
<i>Carex bromoides</i>	Brome-like Sedge		X	X	X	X	X
<i>Carex communis</i>	Common Sedge		X				
<i>Carex comosa</i>	Bristly Sedge					X	
<i>Carex deweyana</i>	Dewey's Sedge		X				
<i>Carex eburnea</i>	Ivory Sedge		X				
<i>Carex gracillima</i>	Filiform Sedge		X				X
<i>Carex granularis</i>	Granular Sedge				X		
<i>Carex hystericina</i>	Porcupine Sedge		X	X	X	X	X
<i>Carex interior</i>	Inland Sedge		X			X	X
<i>Carex intumescens</i>	Bladder Sedge		X	X	X	X	X
<i>Carex lacustris</i>	Lake Sedge					X	X
<i>Carex leptalea leptalea</i>	Bristle-stalked Sedge					X	
<i>Carex lupulina</i>	Hop Sedge		X	X	X	X	X
<i>Carex pedunculata</i>	Peduncled Sedge		X			X	
<i>Carex pensylvanica</i>	Pennsylvania Sedge		X				



Scientific Name	Common Name	Status	Blo.	Hop.	Tow	Ell.	Mar
<i>Carex projecta</i>	Spreading Sedge				X	X	X
<i>Carex pseudo-cyperus</i>	Cyperus-like Sedge		X	X	X	X	X
<i>Carex radiata</i>	Sedge		X		X		
<i>Carex retrorsa</i>	Retorse Sedge		X	X	X	X	X
<i>Carex rosea</i>	Sedge		X				
<i>Carex scabrata</i>	Rough Sedge	W	X				
<i>Carex stipata</i>	Awl-fruited Sedge		X	X	X	X	X
<i>Carex stricta</i>	Tussock Sedge		X	X	X	X	X
<i>Carex tribuloides</i>	Blunt-broom Sedge				X	X	
<i>Carex tuckermanii</i>	Tuckermans's Sedge	W		X			
<i>Carex vulpinoidea</i>	Fox Sedge		X	X	X	X	X
<i>Chelone glabra</i>	Turtlehead		X			X	X
<i>Cicuta bulbifera</i>	Bulbous Water-hemlock				X	X	
<i>Cicuta maculata</i>	Spotted Water-hemlock		X	X	X	X	X
<i>Cinna latifolia</i>	Nodding Wood Grass		X				
<i>Circaea alpina</i>	Small Enchanter's Nightshade		X		X		
<i>Circaea lutetiana canadensis</i>	Enchanter's Nightshade		X	X	X	X	X
<i>Cirsium arvense</i>	Canada Thistle		X	X	X	X	X
<i>Clematis virginiana</i>	Virgin's-bower		X	X			X
<i>Clintonia borealis</i>	Bluebead-lily		X				X
<i>Coptis trifolia groenlandica</i>	Gold-thread		X				X
<i>Cornus alternifolia</i>	Alternate-leaved Dogwood		X		X	X	X
<i>Cornus canadensis</i>	Bunchberry		X				
<i>Cornus foemina racemosa</i>	Grey Dogwood		X		X		
<i>Cornus stolonifera</i>	Red-osier Dogwood		X	X	X	X	X
<i>Crataegus punctata</i>	Dotted Hawthorn			X	X	X	X
<i>Cryptotaenia canadensis</i>	Honewort		X		X		
<i>Cuscuta gronovii</i>	Swamp Dodder			X	X	X	
<i>Cystopteris bulbifera</i>	Bulblet Fern		X	X	X	X	X
<i>Dryopteris carthusiana</i>	Spinulose Wood Fern		X	X	X	X	X



Scientific Name	Common Name	Status	Blo.	Hop.	Tow	Ell.	Mar
<i>Dryopteris clintoniana</i>	Clinton's Wood Fern		X				
<i>Dryopteris cristata</i>	Crested Wood Fern		X	X	X	X	X
<i>Dryopteris marginalis</i>	Marginal Wood Fern		X				
<i>Echinocystis lobata</i>	Wild Cucumber		X	X	X	X	X
<i>Eleocharis erythropoda</i>	Red-based Spike-rush		X		X	X	
<i>Eleocharis obtusa</i>	Blunt Spike-rush			X	X	X	X
<i>Elymus virginicus</i>	Virginia Wild-rye					X	
<i>Epilobium hirsutum</i>	Great Hairy Willow-herb	I	X	X	X	X	X
<i>Equisetum arvense</i>	Field Horsetail		X	X	X	X	X
<i>Erigeron annuus</i>	Annual Fleabane			X	X		
<i>Erigeron philadelphicus philadelphicus</i>	Philadelphia Fleabane			X	X	X	
<i>Euonymus obovata</i>	Running Strawberry-bush		X			X	
<i>Eupatorium maculatum</i>	Spotted Joe-Pye-weed		X	X	X	X	X
<i>Eupatorium perfoliatum</i>	Boneset		X	X	X	X	X
<i>Eupatorium rugosum</i>	White Snakeroot		X	X	X	X	X
<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod		X	X	X	X	X
<i>Fagus grandifolia</i>	American Beech		X		X		
<i>Fragaria vesca americana</i>	Woodland Strawberry		X			X	X
<i>Fraxinus americana</i>	White Ash		X		X	X	X
<i>Fraxinus nigra</i>	Black Ash		X	X	X	X	X
<i>Fraxinus pennsylvanica</i>	Red Ash, Green Ash		X	X	X	X	X
<i>Galium aparine</i>	Cleavers		X	X	X	X	
<i>Galium asprellum</i>	Rough Bedstraw		X	X	X	X	
<i>Galium triflorum</i>	Sweet-scented Bedstraw		X	X	X	X	X
<i>Geranium maculatum</i>	Wild Geranium		X				
<i>Geum aleppicum</i>	Yellow Avens		X	X		X	
<i>Geum canadense</i>	White Avens		X			X	
<i>Geum rivale</i>	Water Avens		X				
<i>Glyceria grandis</i>	Tall Manna Grass					X	
<i>Glyceria striata</i>	Fowl Manna Grass		X	X	X	X	X



Scientific Name	Common Name	Status	Blo.	Hop.	Tow	Eil.	Mar
<i>Gymnocarpium dryopteris dryopteris</i>	Oak Fern		X		X		
<i>Hesperis matronalis</i>	Dame's Rocket	I	X	X	X	X	X
<i>Hydrocotyle americana</i>	Water-pennywort		X		X		
<i>Hydrophyllum virginianum</i>	Virginia Waterleaf		X				
<i>Hypericum perforatum</i>	Common St. John's-wort		X	X	X		
<i>Hystrix patula</i>	Bottle-brush Grass		X				
<i>Ilex verticillata</i>	Winterberry		X	X	X	X	X
<i>Inula helenium</i>	Elecampagne	I	X	X	X		
<i>Impatiens capensis</i>	Spotted Touch-me-not		X	X	X	X	X
<i>Iris versicolor</i>	Wild Blue Flag					X	
<i>Juglans cinerea</i>	Butternut		X				
<i>Juncus articulatus</i>	Jointed Rush		X			X	
<i>Juncus dudleyi</i>	Dudley's Rush		X	X	X	X	X
<i>Juncus effusus solutus</i>	Common Rush					X	
<i>Juncus nodosus</i>	Rush		X			X	
<i>Juncus tenuis</i>	Path Rush		X				
<i>Laportea canadensis</i>	Wood Nettle		X	X	X	X	X
<i>Larix laricina</i>	Tamarack		X			X	X
<i>Leersia oryzoides</i>	Rice Cut Grass		X	X	X	X	X
<i>Lemna minor</i>	Common Duckweed					X	
<i>Lilium michiganense</i>	Michigan Lily		X		X		
<i>Liparis loeselii</i>	Loesel's Twayblade		X			X	
<i>Lobelia siphilitica</i>	Great Blue Lobelia		X				
<i>Ludwigia palustris</i>	Water-purslane		X			X	
<i>Lycopodium lucidulum</i>	Shining Clubmoss		X				
<i>Lycopus americanus</i>	American Water-horehound		X	X	X	X	X
<i>Lycopus uniflorus</i>	Water-horehound		X	X	X	X	X
<i>Lysimachia ciliata</i>	Fringed Loosestrife		X	X	X	X	X
<i>Lysimachia nummularia</i>	Moneywort	I				X	
<i>Lysimachia thysiflora</i>	Tufted Loosestrife					X	



Scientific Name	Common Name	Status	Blo.	Hop.	Tow	Eil.	Mar
<i>Lythrum salicaria</i>	Purple Loosestrife	I	X	X	X	X	X
<i>Maianthemum canadense</i>	Wild Lily-of-the-valley						X
<i>Matteuccia struthiopteris</i>	American Ostrich Fern		X	X	X	X	X
<i>Medeola virginiana</i>	Indian Cucumber-root		X				
<i>Mentha arvensis borealis</i>	Common Mint		X	X	X	X	X
<i>Mimulus ringens</i>	Square-stemmed Monkeyflower		X		X	X	X
<i>Muhlenbergia mexicana</i>	Satin Grass		X	X	X	X	X
<i>Myosotis laxa</i>	Smaller Forget-me-not		X	X	X	X	X
<i>Onoclea sensibilis</i>	Sensitive Fern		X	X	X	X	X
<i>Oryzopsis asperifolia</i>	Rough-leaved Mountain-rice		X				
<i>Osmunda cinnamomea</i>	Cinnamon Fern		X				X
<i>Ostrya virginiana</i>	Ironwood		X		X	X	
<i>Oxalis stricta</i>	Common Wood-sorrel			X	X		X
<i>Parthenocissus inserta</i>	Virginia Creeper		X	X	X	X	X
<i>Phalaris arundinacea</i>	Reed Canary Grass		X	X	X	X	X
<i>Phragmites australis</i>	Common Reed			X			X
<i>Pilea fontana</i>	Clearweed	W	X				
<i>Pilea pumila</i>	Clearweed		X	X	X	X	X
<i>Pinus strobus</i>	White Pine		X	X	X	X	X
<i>Poa palustris</i>	Fowl Meadow Grass		X	X	X	X	X
<i>Polygala paucifolia</i>	Fringed Polygala		X				
<i>Polygonatum pubescens</i>	Solomon's-seal		X			X	
<i>Polygonum amphibium</i>	Water Smartweed					X	
<i>Polygonum hydropiper</i>	Marshpepper Smartweed	I	X	X	X	X	X
<i>Polygonum lapathifolium</i>	Nodding Smartweed		X		X	X	
<i>Polygonum pensylvanicum</i>	Bigseed Smartweed					X	X
<i>Polygonum persicaria</i>	Lady's Thumb	I	X	X	X	X	X
<i>Polystichum acrostichoides</i>	Christmas Fern		X			X	
<i>Populus balsamifera</i>	Balsam Poplar					X	X
<i>Populus tremuloides</i>	Trembling Aspen					X	X



Scientific Name	Common Name	Status	Blo.	Hop.	Tow	Ell.	Mar
<i>Prenanthes altissima</i>	Tall White Lettuce		X				
<i>Prunella vulgaris</i>	Heal-all		X	X	X	X	X
<i>Prunus serotina</i>	Wild Black Cherry		X		X	X	
<i>Prunus virginiana virginiana</i>	Chokecherry		X	X	X	X	X
<i>Pteridium aquilinum</i>	Eastern Bracken Fern		X				
<i>Quercus macrocarpa</i>	Bur Oak		X				X
<i>Quercus rubra</i>	Red Oak		X				
<i>Ranunculus abortivus</i>	Small-flowered Buttercup		X	X	X	X	X
<i>Ranunculus acris</i>	Tall Buttercup	I	X	X	X	X	X
<i>Ranunculus hispidus var. caricetorum</i>	Swamp Buttercup		X	X	X	X	X
<i>Ranunculus recurvatus</i>	Hooked Buttercup		X		X		
<i>Ranunculus sceleratus</i>	Cursed Crowfoot		X	X	X	X	X
<i>Rhamnus cathartica</i>	Common Buckthorn	I	X	X	X	X	X
<i>Rhamnus frangula</i>	Alder Buckthorn	I	X	X	X	X	X
<i>Rhus radicans rydbergii</i>	Rydberg's Poison-ivy		X	X	X	X	X
<i>Rhus typhina</i>	Staghorn Sumac		X	X	X	X	X
<i>Ribes americanum</i>	Wild Black Currant		X	X	X	X	X
<i>Ribes cynosbati</i>	Prickly Gooseberry		X	X	X	X	X
<i>Ribes triste</i>	Swamp Red Currant				X		X
<i>Rubus idaeus melanolasius</i>	Wild Red Raspberry		X	X	X	X	X
<i>Rubus occidentalis</i>	Black Raspberry			X			X
<i>Rubus pubescens</i>	Dwarf Raspberry		X			X	X
<i>Rumex crispus</i>	Curly Dock	I	X	X	X	X	X
<i>Rumex orbiculatus</i>	Great Water Dock			X		X	
<i>Sagittaria latifolia</i>	Common Arrowhead					X	
<i>Salix alba</i>	White Willow	I	X			X	
<i>Salix amygdaloides</i>	Peach-leaved Willow						X
<i>Salix bebbiana</i>	Bebb's Willow		X	X		X	X
<i>Salix discolor</i>	Pussy Willow		X			X	
<i>Salix eriocephala</i>	Heart-leaved Willow		X			X	



Scientific Name	Common Name	Status	Blo.	Hop.	Tow	Ell.	Mar
<i>Salix lucida</i>	Shining Willow		X			X	
<i>Salix nigra</i>	Black Willow				X	X	
<i>Salix petiolaris</i>	Slender Willow		X			X	
<i>Salix X rubens</i>	Crack Willow	I	X	X	X	X	X
<i>Sambucus canadensis</i>	Common Elder					X	X
<i>Sambucus racemosa pubens</i>	Red-berried Elder		X	X	X	X	X
<i>Sanguinaria canadensis</i>	Bloodroot					X	
<i>Scirpus atrovirens</i>	Black Bulrush		X	X	X	X	X
<i>Scirpus cyperinus</i>	Wool-grass		X	X	X	X	X
<i>Scutellaria galericulata</i>	Common Skullcap		X	X	X	X	X
<i>Scutellaria lateriflora</i>	Mad-dog Skullcap		X			X	
<i>Senecio aureus</i>	Golden Ragwort		X				
<i>Sium suave</i>	Water-parsnip		X	X	X	X	X
<i>Smilax herbacea</i>	Carrion-flower		X				
<i>Smilax hispida</i>	Bristly Greenbrier		X	X	X		
<i>Solidago altissima</i>	Tall Goldenrod			X			X
<i>Solidago canadensis</i>	Canada Goldenrod		X	X	X	X	X
<i>Solidago flexicaulis</i>	Zig-zag Goldenrod		X			X	
<i>Solidago patula</i>	Rough-leaved Goldenrod		X				
<i>Solidago rugosa rugosa</i>	Rough Goldenrod		X	X	X	X	X
<i>Sphenopholis intermedia</i>	Slender Wedge Grass		X	X	X	X	X
<i>Spiraea alba</i>	Meadowsweet		X	X	X	X	X
<i>Streptopus roseus</i>	Rose-twisted Stalk		X		X		
<i>Symplocarpus foetidus</i>	Skunk Cabbage		X				
<i>Taxus canadensis</i>	American Yew		X	X	X	X	X
<i>Thalictrum dioicum</i>	Early Meadow-rue		X				
<i>Thalictrum pubescens</i>	Tall Meadow-rue		X	X	X	X	X
<i>Thelypteris palustris</i>	Marsh Fern		X	X	X	X	X
<i>Thuja occidentalis</i>	White Cedar		X	X	X	X	X
<i>Tiarella cordifolia</i>	Foamflower		X	X	X	X	X



Scientific Name	Common Name	Status	Blo.	Hop.	Tow.	Eli.	Mar.
<i>Tilia americana</i>	American Basswood		X	X	X	X	X
<i>Trientalis borealis borealis</i>	Starflower		X				X
<i>Trillium erectum</i>	Purple Trillium		X				
<i>Trillium grandiflorum</i>	White Trillium		X				
<i>Tsuga canadensis</i>	Eastern Hemlock		X				X
<i>Typha angustifolia</i>	Narrow-leaved Cattail					X	
<i>Typha latifolia</i>	Common Cattail		X	X	X	X	X
<i>Ulmus americana</i>	White Elm		X	X	X	X	X
<i>Urtica dioica gracilis</i>	American Stinging Nettle		X	X	X	X	X
<i>Verbena hastata</i>	Blue Vervain		X			X	
<i>Viburnum trilobum</i>	Highbush-cranberry		X			X	
<i>Viola conspersa</i>	Dog Violet		X	X	X	X	X
<i>Viola cucullata</i>	Marsh Violet		X		X	X	
<i>Viola pubescens</i>	Downy Yellow Violet		X			X	
<i>Viola sororia</i>	Woolly Blue Violet		X				
<i>Vitis riparia</i>	Riverbank Grape		X	X	X	X	X
<i>Waldsteinia fragarioides</i>	Barren Strawberry		X		X		



Appendix C4

Updated Vegetation Community Review
South of Bridge Street (Refer to Exhibit 3.4)

Table C4. Vegetation and Flora, Highway 7 – South of Bridge Street West of Regional Road 17 (See Exhibit 3.4 for location of Vegetation Units)

Vegetation Unit / Type	Associated Species	Canopy Closure	Soil Moisture and Drainage	Comments
<p>Unit 1</p> <p>Cultural Meadow and Ditch</p>	<p>Canopy: Predominantly open, with a small stand of Manitoba Maple (<i>Acer negundo</i>), shrub Willow (<i>Salix</i> sp.) and Common Buckthorn (<i>Rhamnus cathartica</i>) located adjacent to the gravel pit approximately 50 m south of Bridge Street.</p> <p>Understory and Ground Cover: Dominated by a mixture of common disturbance tolerant and facultative ground covers, with some obligate wetland species along the ditch. Species include Jewelweed (<i>Impatiens capensis</i>), Purple Loosestrife (<i>Lythrum salicaria</i>), Bittersweet Nightshade (<i>Solanum dulcamara</i>), Nodding Beggar-ticks (<i>Bidens cernua</i>), Great Hairy Willow-herb (<i>Epilobium hirsutum</i>), Grass-leaved Goldenrod (<i>Euthamia graminifolia</i>), Canada Goldenrod (<i>Solidago canadensis</i>), New England Aster (<i>Aster novae-anglae</i>), Common Burdock (<i>Arctium minus</i>), Teasel (<i>Dipsacus sylvestris</i>), Common Cattail (<i>Typha latifolia</i>) and Narrow-leaved Cattail (<i>Typha angustifolia</i>).</p>	<p>Variable: predominantly open with a partially closed canopy in Manitoba Maple stand</p>	<p>Mesic to wet soils along the ditch with drier soils on the fringes.</p> <p>Standing water dissipates approximately 40 m south of Bridge Street.</p> <p>Flat to very gently sloping.</p>	<p>This large unit is predominantly cultural meadow, with a narrow, anthropogenically derived community associated with a small ditch near the west edge. The ditch conveys flows from north to south under Bridge Street.</p> <p>It is dominated by common, disturbance tolerant and invasive / exotic species typical of cultural meadows and ditches.</p> <p>The channel is poorly defined and does not exhibit bed and banks characteristic of aquatic systems. It was dry approximately 40 m south of Bridge Street at the time of surveying.</p> <p>This unit is bordered by Bridge Street to the north, a gravel pit adjacent to or abutting (at the south end) the west edge, a tributary creek valley at the east edge and the Grand River floodplain to the south.</p> <p>Wildlife: Limited potential for bird / mammal foraging or as a corridor for movement. Some potential for butterfly use with the following species noted: Monarch, Painted Lady, Clouded Sulphur and Cabbage White.</p>

Table C4. Vegetation and Flora, Highway 7 – South of Bridge Street West of Regional Road 17 (See Exhibit 3.4 for location of Vegetation Units)

Vegetation Unit / Type	Associated Species	Canopy Closure	Soil Moisture and Drainage	Comments
<p>Unit 2</p> <p>Grand River Floodplain Terrace</p> <p>Cultural Meadow, Meadow Marsh and Cultural Woodland</p>	<p>Canopy: Sparse to partially closed canopy of Manitoba Maple, Cottonwood (<i>Populus deltoides</i>), Eastern White Cedar (<i>Thuja occidentalis</i>), Trembling Aspen (<i>Populus tremuloides</i>), Balsam Poplar (<i>Populus balsamifera</i>), Crack Willow (<i>Salix fragilis</i>) and White Birch (<i>Betula papyrifera</i>).</p> <p>Understory and Ground Cover: Abundant regeneration of Trembling Aspen throughout the unit. The understory also includes Common Buckthorn, Glossy Buckthorn (<i>Rhamnus frangula</i>), shrub Willow and Scots Pine (<i>Pinus sylvestris</i>).</p> <p>The ground layer is characterized by a diverse mix of typical old field species, in addition to facultative and obligate wetland species in imperfectly and poorly drained pockets scattered throughout. Species include Reed canary-grass (<i>Phalaris arundinaceae</i>), White Bedstraw (<i>Galium mollugo</i>), Wild Carrot (<i>Daucus carota</i>), Grass-leaved Goldenrod, Canada Goldenrod, Common and Narrow-leaved Cattail, Common Reed (<i>Phragmites australis</i>), Common Mullein (<i>Verbascum thapsus</i>), Gray Goldenrod (<i>Solidago nemoralis</i>), Spotted Joe-pyeweed (<i>Eupatorium maculatum</i>), Scouring Rush (<i>Equisetum hyemale</i>), Riverbank Grape (<i>Vitis riparia</i>) and Jointed Rush (<i>Juncus articulatus</i>)</p>	<p>Variable.</p> <p>Predominantly open, with pockets of young regeneration (partially closed canopy) and hedgerows.</p>	<p>Variable:</p> <p>Imperfect to poorly drained in depressions (with associated wetland habitat)</p> <p>Moderate to well drained in transitional and upland areas.</p>	<p>This floodplain terrace includes a mosaic of intergrading cultural and natural habitats with species typically found on floodplains.</p> <p>The area has a history of disturbance with a flood control berm present along the north edge, and grading south of the active gravel pit. Some of the wetland pockets may have resulted from grading and changes to hydrology.</p> <p>Wildlife: Wildlife or sign observed includes White-tailed Deer, Groundhog, Green Frog, Monarch Butterfly, Cabbage White Butterfly, Mourning Cloak Butterfly and Clouded Sulphur Butterfly.</p>

Table C4. Vegetation and Flora, Highway 7 – South of Bridge Street West of Regional Road 17 (See Exhibit 3.4 for location of Vegetation Units)

Vegetation Unit / Type	Associated Species	Canopy Closure	Soil Moisture and Drainage	Comments
<p>Unit 3</p> <p>Disturbed Area Southwest of Gravel Pit</p> <p>Cultural Meadow and Meadow Marsh / Shallow Marsh</p>	<p>Canopy: None</p> <p>Understory and Ground Cover: Very sparse understory of a few scattered saplings, Eastern White Cedar, White Birch and shrub Willow.</p> <p>The moderately dense ground layer includes Common Reed, Grass-leaved Goldenrod, Gray Goldenrod, Canada Goldenrod, Common Cattail, Jointed Rush, Sedges (<i>Carex</i> sp.), New-England Aster, Scouring Rush and Purple Loosestrife.</p>	<p>None.</p>	<p>Imperfectly drained dry-mesic to wet soils.</p>	<p>This rectangular shaped depression is bordered by man-made shallow berms. The area is very flat and slopes gently to the south.</p> <p>It likely retains water seasonally, with pools remaining into the late summer along the south edge of the feature.</p> <p>The community includes cultural meadow, meadow marsh and shallow cattail marsh habitats, determined by the microtopography and localized moisture regimes.</p> <p>Wildlife: Green Frog</p>
<p>Unit 4</p> <p>Grand River Floodplain</p> <p>Cultural Meadow Lowland Forest Thicket Swamp (Pond)</p>	<p>Canopy: Variable. Generally open, with partial canopy along river's edge and bordering the pond.</p> <p>Crack Willow is the dominant species along the river, with Manitoba Maple, White Elm (<i>Ulmus americana</i>) and Domestic Apple (<i>Malus</i> sp.) present within the fallow agricultural fields.</p> <p>Understory and Ground Cover: The ground layer is dominated by common disturbance tolerant species characteristic of old fields, including Canada Goldenrod, Common Tansy (<i>Tanacetum vulgare</i>), Canada Thistle (<i>Cirsium arvense</i>), White Bedstraw, Canada Anemone (<i>Anemone canadensis</i>), Field Strawberry (<i>Fragaria virginiana</i>), Common Milkweed (<i>Asclepias syriaca</i>) and Grass-leaved Goldenrod.</p> <p>The pond is dominated by a dense stand of shrub Willow and Red-osier Dogwood (<i>Cornus stolonifera</i>).</p>	<p>Variable.</p> <p>Mostly open with partial cover in the Willow strip bordering the river.</p>	<p>Predominantly dry-mesic imperfectly drained soils, with moist-wet soils in the pond.</p> <p>Topography is flat, gently sloping toward the river</p>	<p>Dominated by cultural meadow on former agricultural fields, with areas of lowland forest, some woody regeneration along hedgerows and field borders, with shrub thicket swamp in the former agricultural pond.</p> <p>At the time of surveying, the pond was characterized by moist to wet soils, but no standing water was present.</p> <p>Wildlife: Monarch Butterfly, Red-winged Blackbird</p>

Table C4. Vegetation and Flora, Highway 7 – South of Bridge Street West of Regional Road 17 (See Exhibit 3.4 for location of Vegetation Units)

Vegetation Unit / Type	Associated Species	Canopy Closure	Soil Moisture and Drainage	Comments
<p>Unit 5</p> <p>Floodplain Lowland Forest</p> <p>Mixed Plantation (Coniferous and Deciduous)</p>	<p>Canopy: Partially closed canopy of sub-mature Crack Willow and Silver Maple (<i>Acer saccharinum</i>), with Manitoba Maple in the sub-canopy and along the edges.</p> <p>Partial to full canopy of sub-mature White Spruce (<i>Picea glauca</i>) and Black Walnut (<i>Juglans nigra</i>) in mixed plantation adjacent to the river.</p> <p>Understory and Ground Cover: Moderately dense understory of Common Buckthorn and Manitoba Maple. Moderately dense ground layer of mostly facultative herbs including Jewelweed, False Nettle (<i>Boehmeria cylindrica</i>), Stinging Nettle (<i>Urtica dioica</i>), Wood Nettle (<i>Laportea canadensis</i>), Common Mallow (<i>Malva neglecta</i>), Water Horehound (<i>Lycopus americana</i>), Yellow Avens (<i>Geum aleppicum</i>), Forget-me-not (<i>Myosotis scorpioides</i>), Enchanter's Nightshade (<i>Circaea lutetiana</i>), Spotted Joe-pyeweed, Bittersweet Nightshade, Garlic Mustard (<i>Alliaria petiolata</i>) and Dame's Rocket (<i>Hesperis matronalis</i>).</p>	<p>60-70% in lowland forest.</p> <p>70-80% in plantation.</p>	<p>Mesic-moist soils, with vernal pooling evident in micro-depressions in the lowland forest.</p> <p>Gently sloping toward creek at the east edge of the community.</p> <p>Mesic –dry soils in plantation. Drains south toward the river.</p>	<p>Common lowland deciduous forest typical of floodplains, with an expected mix of facultative species in the ground layer.</p> <p>Direct connectivity with Unit 6 deciduous forest to the east.</p> <p>Plantation provides shelter and opportunity for natural regeneration.</p> <p>Wildlife: Black-capped Chickadee, Song Sparrow</p>

Table C4. Vegetation and Flora, Highway 7 – South of Bridge Street West of Regional Road 17 (See Exhibit 3.4 for location of Vegetation Units)

Vegetation Unit / Type	Associated Species	Canopy Closure	Soil Moisture and Drainage	Comments
<p>Unit 6 Deciduous Forest on Valley Slope</p>	<p>Canopy: Closed canopy of sub-mature and mature Bur Oak (<i>Quercus macrocarpa</i>), Black Maple (<i>Acer nigrum</i>), Sugar Maple (<i>Acer saccharum</i>), Silver Maple, Basswood (<i>Tilia americana</i>), Bitternut Hickory (<i>Carya cordiformis</i>), Hackberry (<i>Celtis occidentalis</i>) and Black Cherry (<i>Prunus serotina</i>), with Ironwood (<i>Ostrya virginiana</i>), Hackberry and Butternut (<i>Juglans cinerea</i>) in the subcanopy.</p> <p>Understory and Ground Cover: Moderate to abundant regeneration of Common Buckthorn in the understory and ground layer. Limited regeneration of canopy species. Other species include Alternate-leaved Dogwood (<i>Cornus alternifolia</i>), Chokecherry (<i>Prunus virginiana</i>), Garlic Mustard and Zigzag Goldenrod (<i>Solidago flexicaulis</i>).</p>	<p>85-95%</p>	<p>Imperfect to well drained dry soils with abundant surface stoniness (cultural in origin)</p> <p>Rapid surface drainage over moderate to steep valley slope to the south.</p>	<p>Remnant deciduous woodland on south facing valley slopes along the Grand River floodplain. Diverse canopy of deciduous species, two regionally significant species.</p> <p>Black Walnut and Hackberry are regionally significant species (Region of Waterloo, 1999) if demonstrably indigenous - a strong possibility given the location within the Grand River valley, a prominent seed dispersal corridor.</p> <p>Contiguous with Unit 7, upland deciduous forest to the east and Unit 5 lowland forest / plantation to the south.</p> <p>Cultural influences include a fenceline and boulder piles from past agricultural history and a trail adjacent to the north dripline.</p> <p>Wildlife: Gray Catbird, Black-capped Chickadee, Ruffed Grouse, Brown Creeper, Downy Woodpecker, Blue Jay, Eastern Chipmunk, Gray Squirrel, Groundhog</p>
<p>Unit 7 Deciduous Forest on Valley Slope</p>	<p>Canopy: Closed canopy of sub-mature and mature Sugar Maple, American Beech, Bitternut Hickory and Basswood on the upper slopes with Hackberry, White Elm, Bur Oak and Crack Willow on the lower slopes.</p> <p>Understory and Ground Cover: Dense regeneration of Sugar Maple on the upper slopes, with Hawthorn (<i>Crataegus</i> sp.), White Elm, White Ash (<i>Fraxinus americana</i>), Common Buckthorn and Manitoba Maple present on the lower slopes and base of slope. The relatively sparse ground layer includes False Solomon's-seal (<i>Maianthemum racemosum</i>), Yellow Dog's-tooth Violet (<i>Erythronium americanum</i>), Zigzag Goldenrod and Evergreen Woodfern (<i>Dryopteris intermedia</i>).</p>	<p>85-90% overall, with gaps at southwest edge of the forest.</p>	<p>Moderate to well drained soils, generally dry.</p> <p>Rapid surface drainage over steep valley slope to the south.</p>	<p>Relatively large deciduous forest on valley slopes, including steep ravines with small tributary creeks.</p> <p>Fairly low diversity of native species in the understory / ground layer, but good regeneration of young Sugar Maple.</p> <p>Some disturbance-tolerant invasive exotic species along the edges and base of slope, with Common Buckthorn present.</p> <p>Wildlife: Blue Jay, Downy Woodpecker, Black-capped Chickadee, Eastern Chipmunk</p>

Table C4. Vegetation and Flora, Highway 7 – South of Bridge Street West of Regional Road 17 (See Exhibit 3.4 for location of Vegetation Units)

Vegetation Unit / Type	Associated Species	Canopy Closure	Soil Moisture and Drainage	Comments
<p>Unit 8</p> <p>Cultural Meadow and Meadow Marsh</p>	<p>Canopy: None</p> <p>Understory and Ground Cover: The understory is very sparse and consists of a few shrub Willow. The ground layer is a typical assemblage of common old field herbs and grasses including Goldenrods (<i>Solidago canadensis</i>, <i>Solidago altissima</i>), New England Aster, Teasel, Mullein, Evening Primrose (<i>Oenothera biennis</i>), Burdock and Reed canary-grass.</p> <p>The wetland pockets are dominated by Common Cattail, Reed canary-grass and Purple-stemmed Aster (<i>Aster puniceus</i>).</p>	None	<p>Dry-mesic with moist to wet soils in wetland pocket.</p> <p>Surface drainage over gentle to moderate slopes to the south.</p>	<p>Predominantly cultural meadow with several small wetland pockets likely associated with groundwater seepage approximately 20 – 30 m south of Bridge Street.</p> <p>Dominated by common and expected species.</p> <p>Two wetland pockets at the east end of the unit contribute to an ephemeral surface drainage channel flowing southward.</p> <p>Wildlife: Cabbage White Butterfly, Clouded Sulphur Butterfly, Meadow Vole, Field Sparrow</p>
<p>Unit 9</p> <p>Rosendale Creek Valley</p> <p>Cultural Meadow and Thicket</p>	<p>Canopy: Sparse to moderate canopy of Eastern White Cedar in the south half of the community and a few scattered Crack Willow, Black Willow (<i>Salix nigra</i>) and Manitoba Maple.</p> <p>Understory and Ground Cover: Moderately dense understory of Common Buckthorn, Manitoba Maple, Bebb’s Willow (<i>Salix bebbiana</i>), White Elm, Domestic Apple, Hawthorns, Wayfaring Tree (<i>Viburnum lentana</i>), Nannyberry (<i>Viburnum lentago</i>), Russian Olive (<i>Elaeagnus angustifolia</i>) and Red-osier Dogwood.</p> <p>The ground layer is a mix of common old field herbs and grasses and facultative herbs. Species include Blue Vervain (<i>Verbena hastata</i>), Purple Loosestrife, Spotted Joy-pyeweed, Garlic Mustard, Goldenrods, Bittersweet Nightshade and Reed canary-grass.</p>	<p>Variable.</p> <p>0-10% in the north half</p> <p>40-65% in the south half</p>	<p>Dry-mesic</p> <p>Surface drainage conveyed via a well-defined channel discharging into the Grand River</p>	<p>Predominantly open floodplain in the north half, with woody regeneration in the south half.</p> <p>Common and expected species dominate.</p> <p>Limited potential for wildlife usage (forage, movement) due to the lack of woody cover in the northern half.</p> <p>Area of young White Ash and Poplar regeneration at the southeast end of the unit.</p> <p>Direct connectivity with Units 5 and 6.</p> <p>Wildlife: Cabbage White Butterfly, Clouded Sulphur Butterfly, Field Sparrow, Red-winged Blackbird, Eastern Kingbird, Mourning Dove, White-tailed Deer</p>

Table C4. Vegetation and Flora, Highway 7 – South of Bridge Street West of Regional Road 17 (See Exhibit 3.4 for location of Vegetation Units)

Vegetation Unit / Type	Associated Species	Canopy Closure	Soil Moisture and Drainage	Comments
<p>Unit 10</p> <p>Cultural Meadow and Meadow Marsh</p> <p>Cultural Thicket</p>	<p>Canopy: Very sparse canopy of a few Black Locust (<i>Robinia pseudoacacia</i>), White Ash, White Elm and a hedgerow of Sugar Maple along the south top-of-bank fence line.</p> <p>Understory and Ground Cover: Limited understory of Red-osier Dogwood. The ground layer is dominated by common old field herbs and grasses and facultative species including Purple Loosestrife, Goldenrods, Bittersweet Nightshade, Reed canary-grass and Canada Thistle.</p> <p>Watercress (<i>Nasturtium officinale</i>) noted in the creek channel in the vicinity of groundwater seepage areas.</p>	< 10%	<p>Mesic imperfectly drained soils.</p> <p>Well defined channel that discharges into the Grand River to the south.</p> <p>Groundwater seepage noted on south slope (likely tile discharge).</p>	<p>Predominantly open cultural meadow with limited woody regeneration.</p> <p>Common expected ground covers present.</p> <p>Good connectivity with wooded riparian corridor and upland deciduous forest to the southwest.</p> <p>Wildlife: Field Sparrow, Red-winged Blackbird, Mourning Dove, White-tailed Deer</p>
<p>Unit 11</p> <p>Tributary Valley</p> <p>Deciduous Forest</p> <p>Cultural Woodland and Thicket</p>	<p>Canopy: Partial to closed canopy of Sugar Maple, White Ash, Hawthorns, White Elm and Balsam Poplar.</p> <p>Understory and Ground Cover: Moderately dense understory of Common Buckthorn, Domestic Apple, Bur Oak, Red-osier Dogwood and Blue Beech (<i>Carpinus caroliniana</i>). The ground layer is a mix of old field, facultative and forest species including Canada Goldenrod, Scouring Rush, Calico Aster (<i>Aster lateriflorus</i>), Reed canary-grass, Bittersweet Nightshade, Zigzag Goldenrod, Marginal Woodfern (<i>Dryopteris marginalis</i>), Sensitive Fern (<i>Onoclea sensibilis</i>), Common Cattail, Wild Red Raspberry (<i>Rubus idaeus</i>), Canada Anemone, Grass-leaved Goldenrod and Sedges (<i>Carex</i> sp.).</p>	<p>Variable.</p> <p>40-50% along the northwest tributary channel.</p> <p>70-80% along the main channel.</p>	<p>Mesic overall, with moist to wet areas in the riparian zone.</p> <p>Surface drainage along well-defined channels that discharge into the Grand River</p> <p>Groundwater seepage noted on the slopes.</p>	<p>Forested riparian/valley corridor with direct connectivity to the upland deciduous forest to the southwest.</p> <p>The main (east) channel contains a denser, more diverse and mature assemblage of trees. The west channel has been altered and has undergone nature regeneration of young trees.</p> <p>Wildlife: Downy Woodpecker, American Woodcock, White-tailed Deer.</p>

Information collected during field visits on November 6, 2000, April 10, 2001 and September 17, 2001.

Appendix C5

Breeding Bird Survey Work (1999)

- **Ecoplans Limited Surveys**
- **Field Naturalist Surveys (KWFN and GFN)**

Ecoplans Limited
Breeding Bird Observations at Specific Areas of Interest along the Highway 7 Study
Corridor - 1999
(See Section 3.2.6 of report for text review)

Breeding bird surveys were completed on six dates in June and early July 1999 (June 13th, 18th, 19th, 21st, July 1st and 4th). Efforts were focussed on Specific Areas of Interest: Grand River crossing (GR); Bloomingdale-Rosendale Wetland (B-R); Hopewell Creek riparian Woodland/Wetland (Hope); Townline West Woodland/Wetland (Town); Ellis Creek Wetland (Ellis); and Marden South Wetland (Mard). The regional, provincial, or national significance (Sig) is also identified.

Species	Gr	B-R	Hope	Town	Ellis	Mard	Sig	Comments
Great Blue Heron	X	X	X	X	X		W	A large heronry (at least 50 nests have been counted) is located in the woodlot to the east of the Townline; herons were observed flying in the direction of both the Grand and Speed Rivers
Green Heron			X				W CP(4)	Bird recorded flying to the west on the north side of the Tillich block
Canada Goose	X			X				
Wood Duck		X			O		W CP(4)	Observed flying over the Bloomingdale-Rosendale Wetland, also flushed from the creek in the Ellis Creek Wetland
Mallard		X						
Turkey Vulture			X				CP(4)	
Red-tailed Hawk			X	X				
Ruffed Grouse		O					CP(3)	
Wild Turkey				O				Wing feathers were located near the northwestern edge of the Townline Wetland (rated CP 4 in Wellington County)
Killdeer		X				X		
Spotted Sandpiper						X	CP(3)	
American Woodcock				O				
Rock Dove	X		X			X		
Mourning Dove	O	O	O	O	O	O		
Chimney Swift				X				
Ruby-throated Hummingbird					O		CP(3)	
Belted Kingfisher	X							
Downy Woodpecker	O	O	O	O	O	O		
Hairy Woodpecker				O	O			
Northern Flicker		O			O			
Eastern Kingbird	O				O		CP(3)	
Great Crested Flycatcher	O	O	O	O	O			
Willow Flycatcher	O				O	X		
Least Flycatcher					O		W CP(3)	
Eastern Wood-Pee wee		O	O	O	O	O	CP(3)	
Horned Lark		X		X			CP(3)	
Barn Swallow	X				X		CP(3)	
Tree Swallow		X	X		O			
Northern Rough-winged	X				X	X	CP(2)	

Species	Gr	B-R	Hope	Town	Ellis	Mard	Sig	Comments
Swallow								
Blue Jay	O	O	O	O	O	O		
American Crow	O	O	X	O	X	O		
Black-capped Chickadee	O	O	O	O	O	O	CP(4)	
White-breasted Nuthatch				O				
Brown Creeper				O	O		W CP(2)	At least two singing males were present in the Townline Woodlot; recorded at Ellis Creek wetland on both visits.
House Wren	O	O	O		O	O		
Winter Wren		O		O	O		W CP(3)	
Blue-gray Gnatcatcher					O		W CP(4)	A pair was recorded in the Ellis Creek Wetland at the northerly edge of the meadow marsh habitats
Veery				O	O		W CP(2)	At least two singing males were present in the Townline Wetland; also present in the heronry woodlot
American Robin	O	O	O	O	O	O		
Wood Thrush				O		O	CP(4)	At least two pairs were present in the Townline Wetland (no CP rating for Wellington County)
Gray Catbird	O	O	O		O	O	CP(4)	
Brown Thrasher		X					W CP(1)	A singing male was recorded along the hedgerows to the west of the Bloomingdale-Rosendale Wetland
Cedar Waxwing	O		O	O	O	O		
European Starling	O			X	X			
Red-eyed Vireo	O	O	O	O	O	O		
Warbling Vireo	O		O		O			
Yellow Warbler	O			O	O	X		
American Redstart					O		W CP(2)	Singing male in the Ellis Creek wetland at the northern edge of the emergent/shrub thicket wetland
Northern Waterthrush				O	O		W CP(2)	Three to four singing males were present in both the Townline Wetland, and the Ellis Creek Wetland, fledged young were recorded at Ellis Creek; numerous singing males were also present in the heronry woods
Louisiana Waterthrush					O		OV CV CP(1)	A singing male was recorded on June 18 th and 19 th ; no additional breeding evidence obtained despite lengthy observation periods; designated as provincially vulnerable
Mourning Warbler				O			W CP(2)	Recorded only at the southeast corner of the Townline Wetland
Common Yellowthroat		O			O			
Northern Cardinal	O	O		O		O		
Rose-breasted Grosbeak			O		O			
Indigo Bunting	O	O	O	O		O		
Chipping Sparrow			O		X			
Field Sparrow	O						CP(3)	

Species	Gr	B-R	Hope	Town	Ellis	Mard	Sig	Comments
Vesper Sparrow				X			W CP(2)	A singing male was recorded in the agricultural fields south and east of the Townline Wetland
Savannah Sparrow			X		X	X	CP(1)	
Song Sparrow	O	O	O	O	O	O		
Swamp Sparrow					O		CP(1)	
White-throated Sparrow					O		W CP(1)	Recorded in the White Cedar shrub thicket habitats at the northeast corner of the Ellis Creek wetland block
Bobolink					X		CP(2)	
Red-winged Blackbird	O	O	O	X	O	O		
Eastern Meadowlark	O				X		CP(2)	
Common Grackle	O		O			O		
Brown-headed Cowbird	O	O	O	O	O	O		
Baltimore Oriole	O		O	O	O	O		
American Goldfinch	X	X			X	X	CP(3)	
Total O =	25	20	20	27	36	19		
Total X =	7	8	8	8	10	8		
Total # of O = 52								
Total # of X = 18								
Total # of species observed = 70								

O = observed in specific area of concern, possible breeding record

X = observed flying over specific area of concern, or recorded in habitats adjacent to specific area of concern

W = Regionally significant within the Regional Municipality of Waterloo

OV = Provincially vulnerable (COSEWIC - Species of Concern; MNR – Vulnerable)

CV = Nationally vulnerable

CP = Conservation Priority Level for Southern Ontario, for planning consideration (Regional Municipality of Waterloo / Wellington County). Relative ranking from Level 1 (highest) to Level 4 (lowest)

BREEDING BIRDS ALONG THE PROPOSED ALIGNMENT
OF THE NEW HIGHWAY # 7 BETWEEN KITCHENER AND GUELPH:
BREEDING BIRD SURVEY SUMMARY
MAY-JUNE 1999

Prepared for
The Kitchener-Waterloo Field Naturalists

By
Dave Locky

August 1999

INTRODUCTION

This breeding survey was conducted during spring 1999 to summarize the species richness of breeding birds in eight tracts of land between Kitchener and Guelph Ontario along the proposed alignment of the new Highway # 7. The objective of the study was to provide presence/absence data of breeding birds in each of the tracts of land, and include the wetland dependence and regional rarity status of each of the bird species. Little information on the significance of the lands to breeding birds along the proposed Highway # 7 alignment was available before this study. A number of regionally rare wetland dependent bird species and neotropical migrant bird species were observed during this survey. It is hoped that the results of this study will contribute valuable information to the Environmental Assessment (EA) report before it is approved.

STUDY AREAS

Eight tracts of woodland/wetland that would be directly affected by the proposed Highway # 7 alignment were chosen as areas to survey breeding birds. Most of the study areas have a significant component of wetland in the form of soft maple swamp. Three of these study areas have been classified based on the old wetland evaluation system, and include Bloomingdale (Class 5), Ellis Creek (Class 1), and Marden South (Class 3). Under the revised Ontario Wetland Classification System, Southern Ontario Manual (Ontario Ministry of Natural Resources (OMNR) 1994) Ellis Creek and Marden South would be classified as provincially significant wetlands.

The remaining wetlands along the proposed alignment require a wetland evaluation to indicate their status. However, preliminary reconnaissance suggests that at least one of these, the Townline West tract, a contiguous silver maple (*Acer saccharinum*) swamp, would be classified as a provincially significant wetland. The presence of silver maple in a wetland merits extra points under the southern Ontario wetland evaluation (OMNR 1994). Silver maple is present in the Weiland Tract and may also be found in other tracts along the proposed alignment.

The study areas are as follows:

1. **Grand River** – Surveyor: Dave Locky
Habitat: wetland/woodland/grassland west of Grand River
2. **Bloomingdale Tract** – Surveyor: Jock MacKay
Habitat: wetland/woodland
3. **Weiland Investments Tract** – Surveyor: Ted Cheskey
Habitat: woodland/wetland

4. **Hopewell Creek** – Surveyor: Peter Coe
Habitat: wetland/woodland
5. **Tillich's Tract (Hornings Tract)** – Surveyor: Peter Coe
Habitat: wetland/woodland
6. **Townline West Tract** – Surveyors: Dave Locky, Dallas Johnson
Habitat: wetland/woodland
7. **Ellis Creek** – Surveyors: Stan Kozak, Craig Potter
Habitat: wetland/woodland
8. **Marden South** – Surveyors: Stan Kozak, Craig Potter
Habitat: wetland/woodland

METHODS

Breeding bird surveys were conducted using the bird point count station technique between May 29 - June 6 and June 19 – June 27, 1999. This method is based upon the Canadian Wildlife Service Forest Breeding Bird Survey (Canadian Wildlife Service 1997). The two survey periods were necessary to allow inclusion of both early and late-breeding species of birds into this study and were together considered as one breeding season. Survey stations of approximately 100m radii and separated by a distance of 150m (centre to centre) were located throughout each of the study areas. Individual stations were surveyed for 10 minutes between dawn and mid-morning (~ 5:30 – 9:00am) and observations/calls marked onto field sheets.

Data were summarized as presence/absence and species assigned rarity status according to the regional significance species list for breeding birds of Waterloo Region (Regional Municipality of Waterloo 1996). Bird species were arranged into five guilds based on their wetland/water dependency (Brooks and Croonquist 1990) (Table 1).

GUILD		CRITERIA – WETLAND DEPENDENCY
I	Obligate Wetland Species	found > 99% in wetlands
II	Facultative Wetland Species	57-99%, found generally in or near wetlands
III	Facultative Species	34-66%, occurs frequently, but not essential
IV	Facultative Dry Species	1-33%, occasional or no use
V	Upland Species	found > 99% in uplands

Table 1 - Criteria for placing bird species in guilds. Wetland (and water) dependency refers to the estimated percent a species is dependent on wetlands or open water for its life history (e.g. courtship, breeding, brood rearing, feeding, sleeping, etc.). From Brooks and Croonquist, 1990.

RESULTS AND DISCUSSION

A total of sixty-three species of birds were observed in the eight study areas. All species were considered as possible breeders within the Region of Waterloo, although nest success was only confirmed for ruffed grouse. There was an average of 24 species observed at each study site, with a high of 40 species in the Grand River survey area and a low of 16 species in the Marden South tract (Table 2).

Of the total, 13 were regionally significant and two were uncommon breeders within the Region of Waterloo (Table 2). These fifteen regionally significant bird species made up 24% of the total observed species.

Wetland Dependency, Wetland Losses

By guild, eight species were obligate wetland, three facultative wetland, 10 facultative, 17 dry facultative, and 25 upland (Tables 1, 2). Twenty-one species observed during this survey were highly to moderately dependent on wetlands (Guild I-III = 34-100% wetland dependency), and nine species, or 43% of these birds, were either regionally significant or uncommon breeders in the Region of Waterloo. These species included northern waterthrush in six of the eight tracts, winter wren in four tracts, great blue heron in three tracts, and swamp sparrow and belted kingfisher in two tracts. In addition, a heron rookery was discovered by Julie Harwood and Susan Scott in the Townline East tract, adjacent to the Townline West Tract. A nest count will take place after leaf-fall in 1999.

Wetlands are important habitats to a variety of birds in varying degrees. For example, 60% of the 297 species in Pennsylvania are at least partially dependent on wetlands (Brooks and Croonquist 1990). Many of these species have also become rare in response to the loss of crucial wetland habitat. In Pennsylvania, almost 50% of the birds of special concern are wetland-dependent species (Dick 1993).

The incidence of wetland dependent bird species along the proposed Highway #7 alignment is meaningful, as some of the bird species have a regional rarity status and large portions of the study areas have wetland habitat. Average wetland losses for southern Ontario are estimated to be approximately 65-70% since European settlement. Although still not completely assessed, the Region of Waterloo may have approximately 60% of its wetlands intact (Snell 1988). The fact that such a high percentage of wetlands remain intact within the highly developed Waterloo Region underscores their significance. In addition to providing critical habitat for many species of birds and other life, wetlands are crucial from hydrological (water recharge/discharge, flood control) and social (education, aesthetics, quality of life) perspectives. The importance of the wetlands along the proposed Highway #7 alignment between Kitchener and Guelph to wetland-dependent breeding birds and the human residents is high.

Table 2 - Summary of presence/absence data for 1999 Breeding Bird Survey of the alignment for the proposed Highway #7 between Kitchener and Guelph. Bird species were sorted according to guild based on wetland dependency (see Table 1) and assigned status of significance within the Region of Waterloo.

BIRD		Guild	1996	Grand	Bloom-	Wetland	Hopewell	Tillich's	Townline	Ellis	Marden
Common Name	Scientific Name	#	Significance	River	ingdale	Tract	Creek	Tract	West	Creek	South
Great Blue Heron	<i>Ardea herodias</i>	I	W	1			1	1			
Canada Goose	<i>Breuta canadensis</i>	I		1							
Mallard Duck	<i>Anas platyrhynchos</i>	I		1						1	
Blue-winged Teal	<i>Anas discors</i>	I		1							
Spotted Sandpiper	<i>Actitis hypoleucos</i>	I		1							
Belted Kingfisher	<i>Ceryle alcyon</i>	I	U	1			1				
Northern Waterthrush	<i>Sialurus noveboracensis</i>	I	W	1			1	1	1	1	1
Swamp Sparrow	<i>Melospiza georgiana</i>	I					1	1		1	
OBLIGATE WETLAND (GUILD I) - found > 99% in wetlands		8	W=2, U=1	7	0	0	4	3	1	3	1
Winter Wren	<i>Troglodytes troglodytes</i>	II	W		1		1		1	1	
Common Yellowthroat	<i>Geothlypis trichas</i>	II							1	1	
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	II		1	1		1	1		1	
FACULTATIVE WETLAND (GUILD II) - 57-99% in wetlands		3	W=1	1	2	0	2	1	2	3	0
Tree Swallow	<i>Tachycineta bicolor</i>	III		1							
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	III	U						1		
Alder Flycatcher	<i>Empidonax alnorum</i>	III	W	1							
Brown Creeper	<i>Certhia americana</i>	III	W					1			
Gray Catbird	<i>Dumetella carolinensis</i>	III		1			1				
Veery	<i>Catharus fuscescens</i>	III	W							1	
Yellow Warbler	<i>Dendroica petechia</i>	III		1	1			1	1		
Mourning Warbler	<i>Oporornis philadelphia</i>	III	W			1		1	1		
Indigo Bunting	<i>Passerina cyanea</i>	III			1			1			1
Song Sparrow	<i>Melospiza melodia</i>	III		1	1	1	1	1	1	1	1
FACULTATIVE (GUILD III) - 34-66% in wetlands		10	W=4, U=1	5	3	2	2	5	4	2	2
Killdeer	<i>Charadrius vociferus</i>	IV			1						
Bank Swallow	<i>Riparia riparia</i>	IV		1							
Barn Swallow	<i>Hirundo rustica</i>	IV									
Northern Flicker	<i>Colaptes auratus</i>	IV		1	1						
Pileated Woodpecker	<i>Dryocopus pileatus</i>	IV	W					1			
Least Flycatcher	<i>Empidonax minimus</i>	IV	W							1	
Eastern Kingbird	<i>Tyrannus tyrannus</i>	IV		1							
American Crow	<i>Corvus brachymynchos</i>	IV		1		1		1		1	1
Wood Thrush	<i>Hylocichla mustelina</i>	IV				1			1	1	1
American Robin	<i>Turdus migratorius</i>	IV		1	1	1	1	1	1	1	1
Warbling Vireo	<i>Vireo gilvus</i>	IV		1		1					
Savannah Sparrow	<i>Passerculus sandwichensis</i>	IV		1							
White-throated Sparrow	<i>Zonotrichia albicollis</i>	IV	W							1	
Common Grackle	<i>Calceus lapponicus</i>	IV		1	1			1		1	1
Brown-headed Cowbird	<i>Molothrus ater</i>	IV		1		1	1	1		1	1
Baltimore Oriole	<i>Icterus galbula</i>	IV		1	1	1	1	1	1	1	
Cedar Waxwing	<i>Bombycilla cedrorum</i>	IV		1					1		
FACULTATIVE DRY (GUILD IV) - 1-33% in wetlands		17	W=3	11	5	8	3	5	4	7	5
Red-tailed Hawk	<i>Buteo jamaicensis</i>	V					1	1	1		
American Kestrel	<i>Falco sparverius</i>	V									1
Ruffed Grouse	<i>Bonasa umbellus</i>	V							1		
Mourning Dove	<i>Zenaidura macroura</i>	V		1			1	1	1	1	1
Downy Woodpecker	<i>Picoides pubescens</i>	V				1	1	1	1	1	1
Hairy Woodpecker	<i>Picoides villosus</i>	V							1	1	1
Eastern Wood Peewee	<i>Sayornis phoebe</i>	V		1		1	1	1	1	1	1
Eastern Phoebe	<i>Contopus virens</i>	V					1				
Great-crested Flycatcher	<i>Myiarchus crinitus</i>	V		1	1	1	1	1	1	1	1
Willow Flycatcher	<i>Empidonax traillii</i>	V		1						1	
Blue Jay	<i>Cyanocitta cristata</i>	V		1	1	1	1	1	1	1	1
Black-capped Chickadee	<i>Parus atricapillus</i>	V		1	1			1	1	1	1
Red-breasted Nuthatch	<i>Sitta canadensis</i>	V	W				1				
White-breasted Nuthatch	<i>Sitta carolinensis</i>	V		1		1	1				
House Wren	<i>Troglodytes aedon</i>	V		1	1		1		1	1	1
Brown Thrasher	<i>Toxostoma rufum</i>	V	W	1							
European Starling	<i>Sturnus vulgaris</i>	V		1					1		
Red-eyed Vireo	<i>Vireo olivaceus</i>	V		1	1	1	1	1	1	1	1
Northern Cardinal	<i>Cardinalis cardinalis</i>	V		1	1	1	1	1	1	1	1
Rose-breasted Grosbeak	<i>Phaeoiculus ludovicianus</i>	V				1	1		1		
Scarlet Tanager	<i>Piranga olivacea</i>	V	W			1					
Chipping Sparrow	<i>Spizella passerina</i>	V		1				1	1		
Field Sparrow	<i>Spizella pusilla</i>	V		1							
Eastern Meadowlark	<i>Sturnella magna</i>	V		1	1						
American Goldfinch	<i>Carduelis tristis</i>	V		1	1	1	1	1	1	1	1
UPLAND (GUILD V) - found > 99% in uplands		25	W=3	18	8	10	15	12	15	9	8

W = Regionally Significant in Waterloo Region
U = Uncommon Breeder In Waterloo Region

Guild	1996	Grand	Bloom-	Wetland	Hopewell	Tillich's	Townline	Ellis	Marden
Total	Significance	River	ingdale	Tract	Creek	Tract	West	Creek	South
63	W=13, U=2	40	18	18	26	26	26	24	16

Forest Habitat, Forest Fragmentation

Results from this survey placed 42 species of birds into the remaining two guilds (Guilds IV-V = 67-100% upland dependency), of which six or 16% were regionally significant or uncommon breeders in the Region of Waterloo. These species included the pileated woodpecker, least flycatcher, white-throated sparrow, red-breasted nuthatch, brown thrasher, and scarlet tanager (Table 2).

A number of species observed during this survey were neotropical migrants. These included wood thrush, mourning warbler, northern oriole, veery, common yellow-throat, gray catbird, scarlet tanager, rose-breasted grosbeak, indigo bunting, and white-throated sparrow. Although these species breed within the Region of Waterloo (Friesen 1991), their populations have experienced disturbing declines (Robbins 1989, Hussel *et al.* 1990). Some of these species require large contiguous areas to breed successfully. For example, scarlet tanagers are not usually present in forest areas smaller than 10ha in New Jersey (Galli *et al.* 1976), and also have been shown to have preferences for larger forest areas in Ontario (Cadman *et al.* 1987). Even if some species such as wood thrush, rose-breasted grosbeak, and scarlet tanager manage to breed within the interior of forest fragments, the close proximity of forest edge allows predators like cats, blue jays, and parasitic brown-headed cowbirds access to nests. Brown-headed cowbirds, which were observed in five of the eight survey sites in this study, are known to have particularly strong negative effects on many species of neotropical migrants.

Only 14% of the original forest cover of Waterloo Region remains and these areas are considered highly fragmented (Friesen 1991). Fragmentation greatly reduces the viability of a forest ecosystem and is considered to be one of the most serious threats to the preservation of biological diversity (Wilcox and Murphy 1985). Sixty to ninety percent of all breeding birds in eastern North America are neotropical migrants which rely heavily on extensive forest tracts for breeding success (Whitcomb *et al.* 1976, Terbough 1989). The forests along the proposed Highway #7 alignment between Kitchener and Guelph are of great importance to neotropical breeding birds of the region.

CONCLUSIONS

The results of this breeding bird survey have demonstrated the importance of the eight woodland/wetland tracts of land to breeding birds along the proposed alignment of the new Highway # 7. A variety of bird species from wetland dependent to upland dependent neotropical migrants, have been observed in the study areas. Twenty-four percent of the 63 species observed had rarity significance within the Region of Waterloo. Wetland and contiguous areas of forest are significant components within the ecological framework of highly developed southern Ontario. The importance to avian life of maintaining the integrity of the remaining wetlands and forest tracts within the Region of Waterloo cannot be overstated. Preservation of the lands along the proposed alignment of the new Highway # 7 is necessary to ensure continued success for breeding birds in the area.

The author gratefully acknowledges the generous assistance of the field surveyors, Ted Cheskey, Peter Coe, Dallas Johnson, Stan Kozack, Jock MacKay, and Craig Potter. Special thanks goes to Julie Harwood for organizing the survey, obtaining maps, coordinating land access, and facilitating contact between the parties.

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