AECOM

CBM Aggregates, St. Marys Cement Inc.

Level 1 and Level 2 Natural Environment Technical Report Codrington Property

Prepared by:

AECOM Canada Ltd.
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Project Number:

107451 - 40642

Date:

February, 2009

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February 23, 2009 Project Number: 107451 - 40642

Ms. Melanie Horton
CBM Aggregates
St. Marys Cement Inc.
c/o Amarjit Sandhu
MHBC Planning
10 Davey Crescent,
Kingston, ON K7N 1X6

Dear Ms. Horton:

Re: Natural Environment Technical Report – Codrington Property

We are pleased to present you with this report on the Level 1 and Level 2 Natural Environment assessment for the Codrington Property in Northumberland County. We have investigated the site and in the context of the aggregate extraction proposal we find that from a natural environment perspective the extraction could proceed if the recommended mitigation measures are followed. These would mitigate the impacts to the candidate Significant Wildlife Habitat occurring within the license area, as well as the impacts to the candidate Significant Woodlands on the adjacent lands.

We thank you for the opportunity to work on this project. Please do not hesitate to contact Rosalind Chaundy 905.477.8400, ext 322 or Dale Leadbeater 905.477.8400, ext 229, if you have any questions.

Sincerely,
AECOM Canada Ltd.

Rosalind F. Chaundy, M.Sc.F.
Rosalind.Chaundy@aecom.com

RFC:pc
Attach.

Distribution List

# of Copies	Association / Company Name	PDF	Hard Copy
1	CBM Aggregates, St. Marys Cement Inc.		X
13	MHBC Planning Ltd., Kingston		X
1	AECOM Canada Ltd.		X

Signature Page

Report Prepared By:

Rosalind F. C. Chaundy, M.Sc.F.

Report Reviewed By:

Dale A. Leadbeater, B.Sc., B.Ed.

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Appendices

1. Background and Scope

CBM Aggregates, a division of St. Marys Cement Inc., is applying for a Category 3 license application for a Class "A" Pit Above Water under the Aggregate Resources Act. The site is located approximately 13 km north of Brighton, on Part of Lots 32, 33 and 34, Concession 6 in the Municipality of Brighton, Northumberland County (Figure 1). Old Wooler Road is located about 400 m to the south of the site.

AECOM Canada Ltd. was retained to complete a Level 1 and Level 2 Natural Environment Technical Report for the proposed "Codrington Pit" as required by the Aggregate Resources of Ontario Provincial Standards (Province of Ontario 1997).

2. Goals and Objectives

The goal of this report is to satisfy the requirements of the Aggregate Resource Act and the Township of Brighton Official Plan (2001). These requirements have been described in the next section and are considered the objectives.

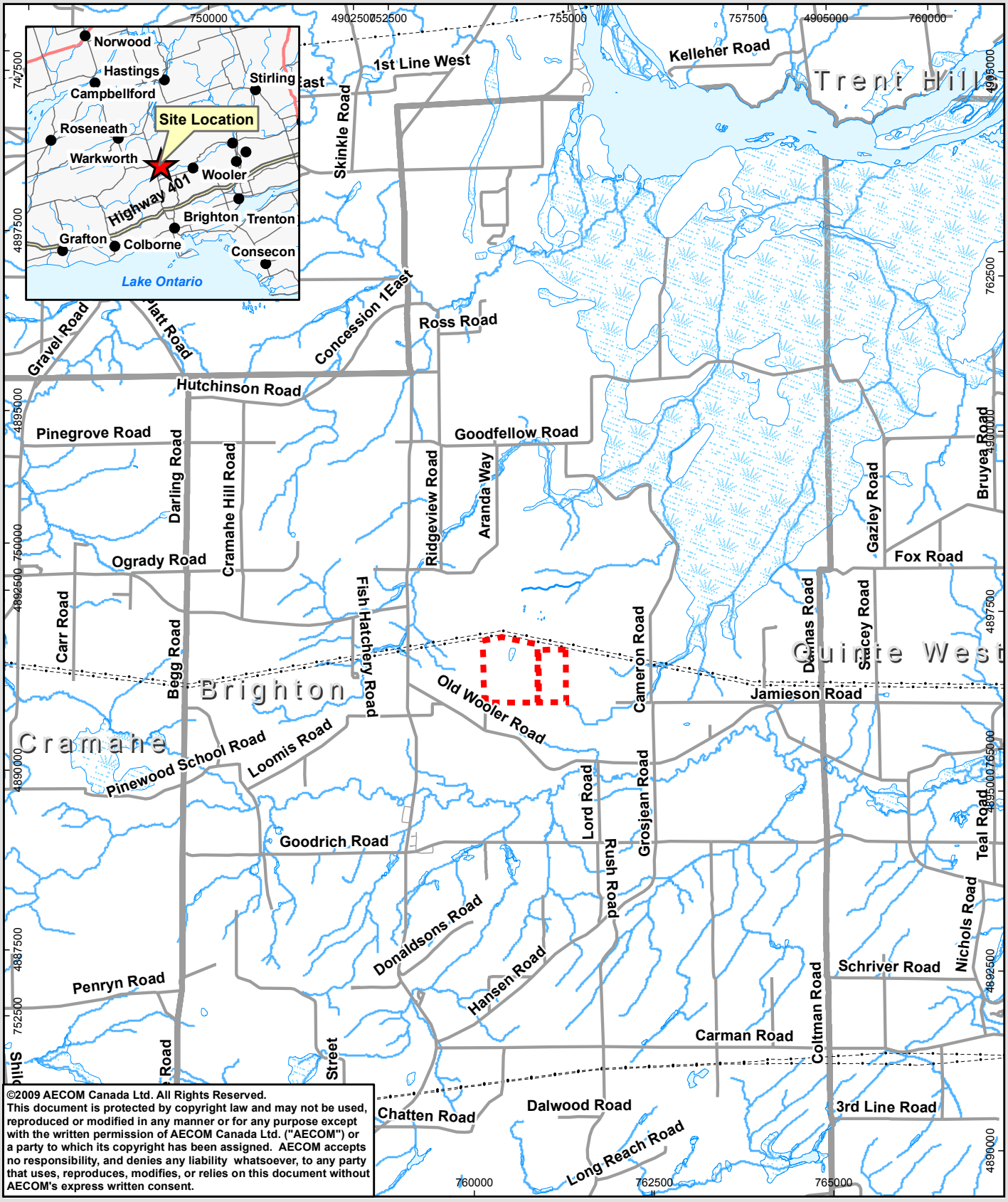
2.1 Aggregate Resource Act Requirements

The Provincial Standards (Province of Ontario 1997) define the Site Plan and Reporting requirements for a Category 3 application. Section 2.2. of the Provincial Standards (Category 3) require a Level 1 Natural Environment Technical Report that determines whether any of the following exist on or within 120 m of the site (defined as the area to be licensed):

a) significant wetland (PSW);
b) significant portions of the habitat of endangered or threatened species;
c) fish habitat;
d) significant woodlands (south and east of the Canadian Shield);
e) significant valley lands (south and east of the Canadian Shield);
f) significant wildlife habitat; and / or,
g) Areas of Natural and Scientific Interest (ANSI).

If any of the above features are present on or within 120 m of the proposed license area, then a Natural Environment Level 2 assessment is required to:

a) determine any negative impacts on the natural features or ecological functions; and
b) propose any preventative, mitigative or remedial measures that may be necessary.



Basemapping from Ontario Ministry of Natural Resources

Legend

- Stream
- Transmission Line
- Major Road
- Local Road
- Area To Be Licensed
- Municipal Division
- Waterbody
- Cartographic Wetland

Kilometers
0 0.5 1 2

1:80,000
UTM Zone 17N, NAD 83

Level 1 and Level 2, Natural Environment Assessment
- Codrington Property

Site Location

March 2009
Project 40642

AECOM

Figure 1

Map Document: (N:\Projects\2004\40642\2008\Final\GISSpatial\MXDs\ReportMXDs\40642SiteLocation-Fig1.mxd)
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This report details the results of Natural Environment Level 1 and Level 2 investigations undertaken by Gartner Lee Limited with respect to the proposed new pit license.

2.2 Municipality of Brighton Requirements

The Municipality of Brighton, comprising the former Township of Brighton and Town of Brighton municipalities, is the planning authority that has jurisdiction over the site. The official plan (OP) currently in use by the municipality is the Township of Brighton OP (August 2000). The municipality is geographically within Northumberland County, but the county does not have a planning function. An upper tier planning authority, the Pine Ridge Municipal Planning Agency (PRMPA), will have a review function with respect to planning applications. This agency is still in the process of preparing its first official plan. Therefore, the responsibility for municipal planning belongs to the Municipality of Brighton, using the policies contained in the Township of Brighton OP (August 2000).

> *All of the site is designated "Rural Area" in the OP (2000, Schedule A). Rural Areas generally have lower quality soils in terms of agricultural capability. The goal within the OP for Aggregate Resources is:* To ensure the provision of an adequate supply of aggregate materials and protect areas of potential aggregate extraction, while minimizing the effect of this use on the land resource and surrounding land uses. *New pit and quarry operations that permit the extraction of more than 15,000 tonnes of aggregate per year, such as this proposed pit, require an amendment to the Official Plan. An application for an OP amendment for a pit requires a study on the impact of the proposal on the natural environment, and a plan for the ultimate rehabilitation of the site.*

The site is located within the jurisdiction of the Lower Trent Conservation Authority. There are no known guidelines relevant to aggregate development developed by this conservation authority.

3. Study Area and Proposed Extraction Limits

Figure 2 (created by MHBC Planning for St. Marys/CBM) illustrates the site, and the proposed licensed area with its associated excavation set-backs. The proposed excavation area is within the license area and is defined by set-backs 30 m from:

a) all road allowances; and;
b) the residential property in the southwest corner

and 15 m from:

a) the south edge of the hydro line; and
b) properties to the east and north of the southeast portion.

Licence Area and Extraction Limits

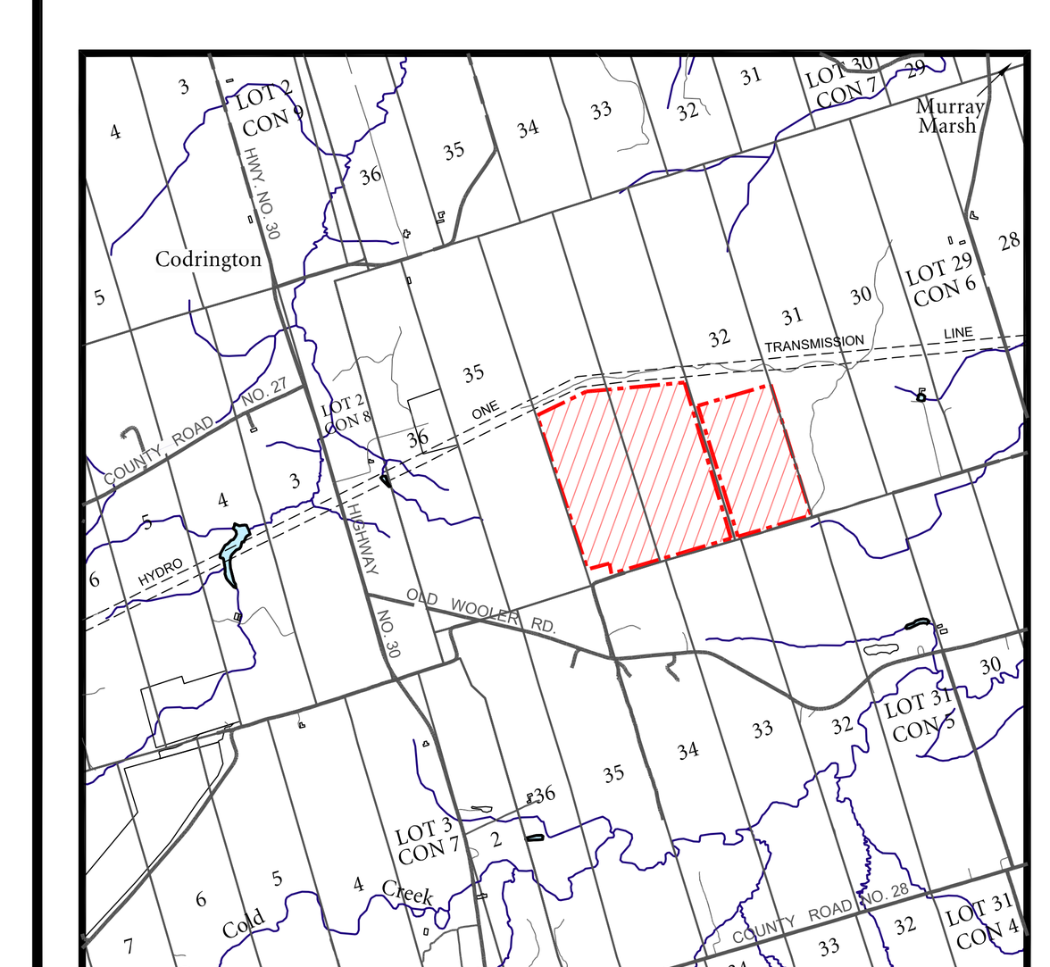
Figure 2

Legend

- Boundary of Area to be Licensed
- Limit of Extraction — ALL SETBACKS ARE DRAWN TO SCALE AND SHOW LABELLED DISTANCES.
- Direction of Surface Drainage (IF ANY)
- Hydro Easement & Transmission Tower
- Elevation, Contour
- Existing Vegetation
- Building/Structure — LOCATION AND USE FOR BUILDINGS ON SITE AND WITHIN 120m ARE SHOWN ON THIS PLAN
- Existing Fence — 1.2m POST & WIRE FARM FENCE UNLESS OTHERWISE NOTED
- Field Entrance
- Existing Water Feature — AS INDICATED
- Hydrogeological Monitoring /Borehole — BH06-1 MONITORING WELL; BH05-1 BOREHOLE; 272 PRIVATE WELL
- Surface Drainage Feature — ARROW INDICATES DIRECTION OF FLOW IF ANY
- Travelled Laneway AS INDICATED — ROAD ALLOWANCES BETWEEN LOTS 32 & 33 AND CONC. 5 & 6 CONTAIN UNPAVED TRAVELLED PORTIONS PROVIDING ACCESS TO TRANSMISSION CORRIDOR.
- Cross Sections — SEE PAGE 4 OF 4 FOR EXISTING AND REHABILITATED CROSS SECTIONS
- Archaeological Site — "[Site Name]"

Notes:

1. THIS SITE PLAN IS PREPARED UNDER THE AGGREGATE RESOURCES ACT FOR A CLASS 'A' LICENCE (CATEGORY 3).
2. TOPOGRAPHIC INFORMATION OBTAINED FROM FIRST BASE SOLUTIONS "uMap" MAPPING SERVICE. ADDITIONAL HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED ONSITE BY 43 DEGREES NORTH, SURVEY & MAPPING SOLUTIONS IN MARCH 2007, RECTIFYING JAGGER HIMS MONITORING WELLS; BH05-2, BH05-18, BH05-19, BH05-20 & BH06-1 WITH EXISTING ELEVATIONS. CONTOUR INTERVAL IS 1.0 METRE. ALL ELEVATIONS ARE GEODETIC.
3. PROPERTY BOUNDARY DESCRIPTION WAS TAKEN FROM PLAN OF SURVEY, 39R 11088 DATED JANUARY 04, 2006 PREPARED BY KERRY BOEHME O.L.S.
4. SUBJECT SITE IS ZONED "RURAL" (RU & RU-1). ZONING INFORMATION OBTAINED FROM SCHEDULE 'A' OF THE MUNICIPALITY OF BRIGHTON ZONING BY-LAW NO. 140-2002 (DEC. 16, 2002).
5. LAND USE INFORMATION COMPILED FROM (I) 2002 DIGITAL ORTHO AERIAL PHOTOGRAPHY, AND (II) FIELD SURVEYS DATED AUG. -NOV. 2005.
6. AREA TO BE LICENSED ±104.9 ha. (±259 ac.)
   AREA TO BE EXTRACTED, ± 80.1 ha. (±198 ac.)
   [WEST PARCEL, ± 25.7 ha. (±64 ac.) EAST PARCEL, ± 54.4 ha. (±134 ac.)]
7. HYDROGEOLOGICAL INFORMATION TAKEN FROM "HYDROGEOLOGICAL STUDY, ST. MARYS CEMENT INC. (CANADA), CODRINGTON PROPERTY" (SOURCE: JAGGER HIMS LIMITED, MARCH 2009) IDENTIFIES A MAY 2008 GROUNDWATER TABLE MOUND WITH AN ELEVATION OF ± 175m ABOVE SEA LEVEL (ASL) CENTRALLY LOCATED IN LOTS 33 & 32 FALLING OFF TO BELOW ± 150m ASL IN THE NORTHWEST, ± 155m ASL IN THE NORTHEAST, ± 165m ASL IN THE SOUTHEAST AND ± 160m ASL IN THE SOUTHWEST.
8. ALL MEASUREMENTS SHOWN ON THIS PLAN ARE IN METRES.



Key Plan

Subject Site

NORTH

0 1.0 2.0 kilometers

source: Ontario Base Mapping (OBM)

Scale 1:2000

50 0 50 100 metres

A.S. SANDHU IS AUTHORIZED BY THE MINISTRY OF NATURAL RESOURCES PURSUANT TO SEC. 8(4) OF THE AGGREGATE RESOURCES ACT TO PREPARE AND CERTIFY SITE PLANS.

DRAFT REVISIONS	
March 29, 2007	A.R.A. Complete May 19, 2009
February 04, 2009	
1st Draft MNR, Mar. 27/09	

AMENDMENTS: APPROVED LICENSED SITE PLAN	
DATE:	DESCRIPTION

MHBC Planning, Urban Design & Landscape Architecture
200-540 Bingemans Centre Drive,
Kitchener, ON, N2B 3X9
Telephone (519) 576-3650 Fax (519) 576-0121
www.mhbcplan.com

PROJECT NAME:

Codrington Pit

Job No.	Y321D CBM Codrington		
Dwn. By	G.H.	Chkd. By	A.S.
File No.	K:\Y321D_CBM_Hilton\A\exfeplan_1of4.dwg		

Part Lots 32 -34
Concession 6
Municipality of Brighton
(geographic township of Brighton)
County of Northumberland

ST MARYS CBM

St.Marys Cement Inc. (Canada)
55 Industrial St. Toronto, Ontario
M4G 3W9 Telephone (416) 423-1300

On the basis of a geological report for the site prepared by Jagger Hims Limited, and this natural environment report, an area in the northwest part of the site (west of the road allowance), which includes a wetland, will not be part of the extraction area. The *study area* includes the license area (or site area), plus a 120 m zone of adjacent lands.

4. Methodology

The methodology consisted of both a background review of existing documents and field investigations that were undertaken between September 2004 and May 2006, as well as a single visit in May 2007.

4.1 Background Data Review

A review of background information pertaining to the site and adjacent lands was completed. Materials reviewed include:

a) Ontario Natural Heritage Information Centre (NHIC) database (2005);
b) Official Plan for the Municipality of Brighton (August 2000);
c) Aerial Photography, 1:10,000 scale (Northway-Photomap Inc. 2001);
d) Natural Heritage Report, Campbellford/Seymour/Percy/Hastings/Quinte West – Belleville (Lower Trent Conservation 2001); and
e) Lower Trent Region Natural Areas – Volume 3: A Biological Inventory and Evaluation of 23 Natural Areas in the Lower Trent Region, 1995 (Brownell and Blaney 1996)

Both the Ontario Ministry of Natural Resources (OMNR) and the Lower Trent Conservation (LTC) were contacted to obtain additional information pertaining to the site, such as the presence of Provincially Significant Wetlands, Significant Valleylands, Significant Woodlands, drainage features and wildlife data, particularly rare species records.

4.2 Aquatic Environment

It was initially determined that field aquatic investigations were not necessary. No creeks, lakes or permanent ponds occur on the site. Following the 2005 field season, the boundaries of the site and study area expanded, and it was determined that a creek was present in the revised 120 m adjacent lands area. Observations on this creek were made May 26, 2006 and photographs were taken. Lower Trent Region Conservation Authority was contacted for any information on the portion of the creek in the study area.

4.3 Terrestrial Environment

Objectives for the field investigations included identifying any potential significant natural heritage features and areas of environmental sensitivity and/or constraint in the study area, completion of detailed vegetation communities, and botanical, ornithological and amphibian inventories. Dates were selected based on optimum periods to inventory plant species that bloom at different times of the year and to survey for birds between the main breeding bird survey window of late May to early July.

4.3.1 Vegetation

AECOM ecologists undertook field investigations for vegetation on September 24, 2004 (during the reconnaissance visit), May 24, June 16, September 21, 2005, and May 26, 2006 (the latter visit for the expanded study area). Vegetation community boundaries were determined through a review of the aerial photography (scale 1:10,000; 2001 photography) prior to the field visit. These communities were then ground-truthed for detailed mapping and vegetation community descriptions. Vegetation community descriptions were based on the Ecological Land Classification (ELC) system for Southern Ontario (Lee et al. 1998). Information collected for these units included dominant species cover, community structure, as well as level of disturbance, presence of indicator species, and other notable features.

The site visits included spring and early summer, and fall botanical inventories. Regional (i.e., Lake Ontario Lowland Physiographic Region) plant status is based on the Vascular Plants of Eastern Ontario (Draft 2.0) (Cuddy 1991). Provincial status is based on the Natural Heritage Information Centre (2004) database.

On May 29, 2007 a field visit was made to assess the health of the Butternut (*Juglans cinerea*) trees (see Appendix D).

4.3.2 Wildlife

On April 19 and June 28, 2005, evening visits to the study area were made to listen for calling frogs. All suitable habitat was visited. Locations of calling frogs were recorded and numbers noted where possible to determine. If numbers were large and impossible to count individuals, a “chorus” was recorded. Incidental observations of amphibians were recorded during visits.

On May 24, June 16, 2005 and May 26, 2006 (for expanded study area), early morning (05:45 to 10:00 a.m.) breeding bird surveys were conducted. The study area was walked on a route that would ensure that any singing bird would be heard. Each individual bird was mapped on air photos in the field indicating its approximate location. In order to check for the presence of Red-shouldered Hawk (a Species at Risk when this study was initiated, but no longer so), a tape of the species call was played in suitable habitat on April 19, 2005.

4.4 Analysis

Using the results obtained in the field and relevant background documents, GLL determined which significant features were present in the study area. Those significant features identified were brought forward to a Level 2 assessment and any impacts to these features and associated mitigation were evaluated.

5. Existing Conditions

The site occurs at the northern edge of the Deciduous Forest region, where it borders the Great Lakes – St. Lawrence Forest Region (Rowe, 1972). The site falls just within the warmer Deciduous Forest region that borders Lake Ontario, which moderates the climate. It also lies primarily within the Iroquois Plain physiographic region (Chapman and Putnam 1973). The available geological information for the Codrington area indicates that the site is located on an ice-contact or kame feature whose surface was modified by later lacustrine events in the area. South of the hydro line are well-drained deposits of silty fine sand and sandy silt layer up to 10 m thick, underlain by sand and gravel units that are more than 20 m thick. Till materials occur north of the hydro lines and may also occur below the sand and gravel deposits on the southern part of the site. The actual soil stratification has been verified by Jagger Hims Limited (2006). The bedrock is recorded to occur at the depth of about 12 m below ground surface within the low-lying area north of the site.

Codrington East Ravine Natural Area, as identified by Brownell and Blaney (1996), occurs partly on the site. This Natural Area is also referred to as an Environmentally Sensitive Area.

5.1 Aquatic Features

The beginning of an unnamed permanent creek, which runs ultimately northeastwards into Murray Marsh, occurs inside the southeast corner of the study area. The Lower Trent Conservation has no information on this creek; it is listed as unknown on their OMNR mapping. The watercourse originates in the deciduous woodland about 50 m south of the site (Southeast Quarter) and it then flow eastwards down a slope before reaching the fields to the southeast of the site. Here the creek has been straightened to follow the edges of fields.

According to Jagger Hims (V. Magmedov *Pers. comm.* 2006) it is a groundwater fed creek. All observations made in May 26, 2006 support this. When visited on this date the creek was flowing steadily at a depth of between one to seven cm in the headwater area. It starts abruptly and begins flowing immediately as would be expected in a groundwater-fed watercourse. The headwater area, and the 200 m uppermost stretch, is found within the forest, is bordered by soft organic soils (up to 5 m wide on either side of the creek) and has diverse vegetation which completely covers the ground (photos in Appendix A-1). Groundwater indicator plant species such as Marsh Marigold (*Caltha palustris*), horsetails (*Equisetum*) and Bulblet Fern (*Cystopteris bulbifera*) occur along the creek in this stretch. The width of the creek within the forest is about 20 to 30 cm wide.

To the east of the forest where the creek enters a transitional area (between the forest and field areas) the creek flows down a slope of between about 3 to 15^{O} (Appendix A-2) The depth of the creek is similar (1 to 8 cm) to that upstream and the width is approximately 40 cm. There are almost constant runs and riffles flowing over cobbles about 10 to 20 cm in size. The creek substrates are variable; either sandy or clayey. Creek-side vegetation becomes somewhat less diverse here.

Further still downstream, the creek runs between fields and is bordered frequently by high grass banks. The creek passes through several culverts before reaching Murray Marsh. Although two of these culverts are unobstructed at least one would create very difficult passage for any fish present. At one end of this culvert there is a dense blockage of debris and at the other there is a discontinuity between the creek bottom and the raised culvert.

5.2 Vegetation

5.2.1 Vegetation Communities

The Ecological Land Classification system is a nested classification that groups vegetation types into ecosites and vegetation types with common soil and generalized vegetation characteristics. Community Series are differentiated by plant form or landform (e.g., SWD – **SW**amp, **D**eciduous or RBT **R**ock **B**arren, **T**reed) which are broken down into Ecosites (e.g., SWD3 Maple Mineral Deciduous Swamp) and in turn into Vegetation Types (e.g., SWD3-4 Manitoba Maple Mineral Deciduous Swamp).

Field investigations identified sixteen different ELC Vegetation Types or Ecosites within the 105 ha site area. Most of these communities are either forest communities with dry to fresh soils or cultural communities. Cultural communities are those which are those which are maintained by or resulting from human disturbances. Hedgerows (CUH - Cultural Hedgerow) and agricultural lands (AG) were also mapped although these codes are not part of the ELC system. The vegetation communities, or units, and their corresponding boundaries are illustrated on Figure 3 and described below.

The area to the east of the road allowance dividing Lots 32 and 33 is described as the Southeast Quarter.

Forest (FO)

Approximately 40 ha (38%) of the site area is composed of forest, most of which is deciduous, although where conifers are present they are almost always White Pine (*Pinus strobus*).

FOD2-4: *Dry-Fresh Oak-Hardwood Deciduous Forest*

There are three units of Dry-Fresh Oak-Hardwood Deciduous Forest in the study area. These forest units are dominated by Red Oak (*Quercus rubra*) with lesser amount of Sugar Maple (*Acer saccharum*) and Large-toothed Aspen *(Populus grandidentata*). Scattered Red Maple (*Acer rubrum*), White Ash (*Fraxinus americanum*) and White Oak (*Quercus alba*) are also present.

One large unit, hereafter called Central Oak Woodland, lies near the centre of the site. Sugar Maple and Large-toothed Aspen are found as saplings in the understorey and herbaceous species found here include White Trillium (*Trillium grandiflorum*), Tall White Lettuce (*Prenanthes alba*), False Solomon's-seal (*Maianthemum racemosa*), and Solomon's-seal (*Polygonatum pubescens*). This unit appears to have been selectively logged approximately 10 years ago. This unit covers a local high point and sloping ground which was part of an ancient beach ridge. The forest is mid-aged to mature. It is likely that some of the most mature individuals in the forest were removed during logging. A farm access track runs through this unit.

A second, small unit, lies on the north edge of the site and has a southward extension along the Lot 32/33 road allowance. The portion along the road allowance appears to have been a former hedgerow, but is sufficiently wide (mostly about 50 m) to be considered a forest. It contains numerous mature oak trees as well as many Woodland Sunflowers (*Helianthus divaricatus*) a regionally uncommon species with prairie affinities. See Section 5.2.2 for a listing of the rare plant species found on the site.

Forest (FO)

FOC1-2	Dry-Fresh White Pine Coniferous Forest
FOM	Mixed Forest
FOM2	Dry-Fresh White Pine-Maple-Oak Mixed Forest
FOM5	Dry-Fresh White Birch-Poplar Conifer Mixed (White Pine) Forest
FOD2-4	Dry-Fresh Oak-Hardwood Deciduous Forest
FOD3-1	Dry-Fresh Poplar Deciduous Forest
FOD3-2	Dry-Fresh White Birch Deciduous Forest
FOD5-3	Dry-Fresh Sugar Maple-Oak Deciduous Forest
FOD5-5	Dry-Fresh Sugar Maple-Hickory Deciduous Forest
FOD8-1	Fresh-Moist Poplar Deciduous Forest

Wetland

SWD3-4	Manitoba Maple Mineral Deciduous Swamp
MAM2-10	Forb Mineral Meadow Marsh

Cultural (CU)

CUM1	Mineral Cultural Meadow
CUT1	Mineral Cultural Thicket
CUT1-1	Sumac Cultural Thicket
CUT1-1/4	Sumac and Gray Dogwood Cultural Thicket
CUW1	Mineral Cultural Woodland
CUP3-2	White Pine Coniferous Plantation
CUH*	Cultural Hedgerow
AG*	Agricultural

* not standard ELC terminology

Central Oak Woodland

Southeast Quarter

Ferguson Hill Road

Old Wooler Road

757000 758000 4895000 4894000

Basemapping from Ontario Ministry of Natural Resources
Orthophotography: 2002; Aerial Photography: November 2001

m
0 50 100 200
1:6,500

UTM Zone 17N, NAD 83

Legend

- Site Area
- 120 m Zone (Study Area)
- Butternut Tree (Endangered)
- Vegetation Community
- Stream

Level 1 and 2, Natural Environment Assessment - Codrington Property

Vegetation Communities

March 2009
Project 40642

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Figure 3

Map Document: (N:\Projects\2004\40642\2008\Final\GISSpatial\MXDs\ReportMXDs\40642VegetationCommunities-Fig3.mxd)
3/25/2009 -- 3:59:49 PM

A third large unit is situated primarily outside of the site area but it is also present along the south edge of the Southeast Quarter of the site. The shrub layer here contains Round-leaved Dogwood (*Cornus rugosa*), two viburnum species (*Viburnum acerifolium* and *V. rafinesquianum*), Chokecherry (*Prunus virginiana*) and young Sugar Maple and Ironwood (*Ostrya virginiana*) saplings. Herbaceous plants include Wild Sarsaparilla (*Aralia nudicaulis*), Large-leaved Aster (*Aster macrophylla*), and False Solomon's Seal. This unit is perhaps the least disturbed of the three.

FOD3-1: *Dry-Fresh Poplar Deciduous Forest*

The Dry-Fresh Poplar Deciduous Forest units on the site are young forests that are dominated by either Large-toothed Aspen or Trembling Aspen (*Populus tremuloides*). A smaller number of other upland deciduous species, such as Red and White Oak, Sugar Maple and ash are also scattered in places through the units. Most of these poplar forests are within the Southeast Quarter.

The understorey vegetation is fairly dense in FOD3-1a and FOD3-1b as the forest is in transition between open forest to closed-canopy forest. Riverbank Grape (*Vitis riparia*) and Poison Ivy (*Rhus radicans*) are among the common species growing on the ground. The FOD3-1b is situated primarily on a sloping ancient beach ridge. FOD3-1c is the oldest of these units and it is in transition to a an oak-maple forest (FOD2). Slightly younger is FOD3-1d which contains about 20% White Pine. This unit is in transition to a mixed forest of White Pine, oak and maple. Ground cover species in FOD3-1c and FOD3-1d include: Poison Ivy, (*Rhus radicans*), False Solomon's-seal, Wild Sarsaparilla, Bracken (*Pteridium aquilinum*), Fly Honeysuckle (*Lonicera canadensis*), Serviceberry (*Amelanchier*), Canada Mayflower (*Maianthemum canadense*) and others. Many of these are similar to herbaceous species found in the more mature oak woodland (FOD2-4) units.

FOD5-3: *Dry-Fresh Sugar Maple-Oak Deciduous Forest*

This unit in the west side of the site is part of the continuation of the Central Oak woodland, but the western portion has a higher portion of Sugar Maples, a lower portion of oaks and no Large-toothed Aspens, otherwise it is very similar to the oak woodland (FOD2-4) units. Ground vegetation is composed of similar species and includes young Sugar Maples, and White Ash, Maple-leaved Viburnum (*Viburnum acerifolium*) and, Downy Arrow-wood (*V. rafinesquianum*) Large-leaved Aster, White Trillium, Mayapple (*Podophyllum peltatum*) and others. Where this forest slopes steeply to the southwest a few White Pines are present.

FOD8-1: *Fresh-Moist Poplar Deciduous Forest*

A small relatively moist pocket of young trees and shrubs occurs within a field in the northwestern portion of the site. It is composed of young Trembling Aspen, White Elm as well as other deciduous tree and shrub species.

FOM2: *Dry-Fresh White Pine-Maple-Oak Mixed Forest*

One portion of the forests in the Southeast Quarter is a young forest that is similar to FOD3-1c (young Trembling Aspen and Large-toothed Aspen), but it has a slightly higher portion of White Pine and thus it is defined as a mixed forest. There are numerous young deciduous saplings in the understorey.

FOM5: Dry-Fresh White-Birch Poplar Conifer Mixed Forest

Along the eastern edge of the Southeast Quarter is a young mixed forest of White Pine (*Pinus strobus*), White Birch, Trembling Aspen and Red Oak. A few scattered larger trees occur such as oak (both Red and White) and Sugar Maple. There are numerous young White Pine saplings in the understorey, along with young Ironwood and White Ash trees. The ground layer is not very diverse, but Poison Ivy and Canada Mayflower occur at this level. An old stone-pile fence line runs through the unit and there are occasional gaps in the canopy.

FOM: Mixed Forest

A small piece of disturbed forest with low canopy cover between the Central Oak Woodland and hydro lines is within a patch of moist soils and contains a mixture of tree species such as White Pine, Trembling Aspen, and White Elm. Sensitive Fern (*Onoclea sensiblis*) is growing in the centre of the patch where moist levels are highest.

FOC1-2: *Dry-Fresh White Pine Coniferous Forest*

In the 120 m zone on the east side, there is a small patch of young White Pine forest that appears to have naturally regenerated.

Cultural (CU)

The Southeast Quarter and along the hydro line are the two main areas containing cultural vegetation communities. Cultural communities together comprise 22 ha (21%) of the site area. In addition, 41 ha (39%) is under agricultural use.

The Southeast Quarter appears to have been used for agriculture or grazing, but was abandoned some time ago. Thus, the areas in between the former hedgerows and forests are in various states of successional development varying from meadows, thickets, to young forests (e.g., FOD3-1 above). Red Oak, Staghorn Sumac (*Rhus typhina*), and Downy Arrow-wood (*Vibrunum rafinesquianum*) are all common plant species of the Southeast Quarter, reflecting the dryness of the soils. At least two vegetation communities in the Southeast Quarter contain the regionally uncommon Woodland Sunflower (FOD2-4 and CUT1-1/4).

CUM1: Mineral Cultural Meadow

Several areas of cultural meadow occur on the site. These areas are either the most recently disturbed or are the furthest from a source of shrub and tree seeds. Species found here include grasses, such as Timothy (*Phleum pratense*), and forbs such as Bird-foot Trefoil (*Lotus corniculatus*) Milkweed (*Asclepias syriaca*), Viper's Bugloss (*Echium vulgare*) and Heath Aster (*Aster ericoides*). There is one large patch of the non-native Crown Vetch *(Coronilla varia*) in the Southeast Quarter.

CUT1: Mineral Cultural Thicket

Roughly 13 ha (12%) of the site is cultural thicket of one type or another. Some of these thickets are not dominated by any one shrub species, such as the thicket found under and along the hydro line in the 120 m zone. This latter thicket contains numerous plant species, although most are very common species in

southern Ontario. Dominant shrub species along the hydro line are Gray Dogwood (*Cornus foemina*), Nannyberry (*Viburnum lentago*), Red Raspberry (*Rubus idaeus*), and Apple trees (*Malus pumila*), although other species are present. Shrub cover here is about 25 to 35%. The numerous herbaceous species occurring here are those typical of southern Ontario thickets and meadows. The ground slopes fairly steeply upward at the west end of the hydro lines.

At the east end of the hydro lines (within the 120 m zone) cultural thicket habitat continues. In this location the shrub density is particularly high (> 50%) and shrub species include 4 m high hawthorns as well as young trees. The young trees are mainly deciduous species, but include White Pine and Red Cedar (*Juniperus virginiana*).

On the properties to the east of the site there are large areas of cultural thicket.

CUT1-1: *Sumac Cultural Thicket*

Most of the thickets in the Southeast Quarter are Sumac Cultural Thickets. Staghorn Sumac is a common shrub that grows in dry sites, and here, as is typical, it forms large clusters.

CUT1-1/4: *Sumac and Gray Dogwood Cultural Thicket*

The vegetation community described as Sumac and Gray Dogwood is dominated by both shrub species and has therefore been described as a mix of CUT1-1 (sumac) and CUT1-4 (Gray Dogwood). It is on an east-facing slope (an ancient beach ridge) and contains a denser and more varied shrub layer (roughly 75%) than the cultural thicket to the immediate east. There are several forbs with dry prairie affinities: New Jersey Tea (*Ceanothus americanus*), Woodland Sunflower, and Sky-blue Aster (*Aster oolantengiensis*).

CUW1: Mineral Cultural Woodland

Two small areas of Cultural Woodland occur on the site. Basswood (*Tilia americana*), ash, Sugar Maple and American Elm (*Ulmus americanus*) are among the tree species found on Cultural Woodland that is a strip of trees along the south edge of the hydro line. Another Cultural Woodland, that is within the Southeast Quarter, is an unusual mix of large mature White Oak (*Quercus alba*) and Ironwood. Some of the oaks are about 1 m in diameter. It is possible that this unit was used for grazing in the past, and the oaks were present during this period. Woody species in the shrub layer include Round-leaved Dogwood (*Cornus rugosa*), Red Raspberry (*Rubus idaeus*) and young White Ash (*Fraxinus americanus*).

CUH: Cultural Hedgerow

Several hedgerows divide the agricultural fields. Most of the hedgerows are wide (10 to 25 m) and densely vegetated, with a variety of deciduous shrubs and trees (including Sugar Maple, White Ash, and Staghorn Sumac). Along the hedgerow that follows the south limit of the site, there are several Butternut trees. See Section 5.2.2.1 for further details on this species.

Wetland

There is only one wetland area on the site. It is small and situated immediately to the south of the hydro line. In the centre of the wetland is a meadow marsh surrounded by a narrow edge of shrubs and then a ring of treed swamp. These units are botanically speaking fairly disturbed as several of the common species found here are considered weedy species.

Marsh (MA)

MAM2-10: *Forb Mineral Meadow Marsh*

This small, roughly 1 ha, meadow marsh unit is wet in the spring but dry by the fall. In the spring the marsh is at least 30 cm deep and is partly open water. In the fall the unit is covered with vegetation dominated by species such as Purple Loosestrife (*Lythrum salicaria*), Ragweed (*Ambrosia artemisifolia*), Tall Beggarsticks (*Bidens vulgata*). The first two species are considered weedy, and the first is an invasive species. An invasive species is one that has 'moved into an a habitat and reproduced so aggressively that it has displaced some of the original components of the vegetative community' (White, Haber and Keddy 1993).

Swamp (SW)

SWD3-4 *Manitoba Maple Mineral Deciduous Swamp*

A narrow band of Manitoba Maple swamp surrounds the marsh described above. Trees growing here include Manitoba Maple (*Acer negundo*), willow, and Cottonwood (*Populus deltoides*). One or two of these trees are old individuals, with a 100 cm diameter at breast height (dbh). Shrub level plant species found here are mainly small Manitoba Maple, Red-osier Dogwood (*Cornus stoloniferas*) and Common Buckthorn (*Rhamnus cathartica*). The outer edge of the unit is drier and contains some upland herbaceous plant species.

5.2.2 Flora

One hundred and thirty species of vascular plants were identified during the botanical inventories in the study area (Appendix B). About 20% of these species are non-native to Ontario. The forested areas on site have experienced some disturbance (past logging, partial formation by anthropogenic disturbance), but is not subject to regular disturbance (such as informal people trails, ATV or mountain bike use) and thus have a relatively high floristic quality. The FOD2-4 units are the higher quality units on the site. Only one community, the wetland, contains prevalent invasive species (Purple Loosestrife). None of the upland communities contain prevalent invasive species.

The botanical survey completed by Gartner Lee ecologists resulted in the identification of two regionally uncommon, one regionally rare, and one Endangered vascular plant species. 'Region' refers to the physiographic Lake Ontario Lowland region of eastern Ontario as described by Cuddy (1991). A summary of these species and their associated status is provided in Table 1 below.

Table 1. Significant Plant Species Recorded from Study Area

Species	Status	Location and Abundance
Butternut *Juglans cinerea*	Endangered[c], S3?[b] Common[a]	• Seven individuals: Hedgerow and forests along south border
Sky-blue Aster *Aster oolentangiensis*	Regionally Rare[a]	• One individual in Southeast Quarter Thicket
Woodland Sunflower *Helianthus divaricatus*	Regionally Uncommon[a]	• At least 50 individuals in the western side of Southeast Quarter, plus a few in Central Oak Woodlands
Cleavers *Galium aparine*	Regionally Uncommon[a]	• Central Oak Woodland and drier wetland edge

Note: a. Cuddy 1991
b. Oldham 1999, NHIC website
c. as designated federally by the Committee on the Status of Endangered Wildlife in Canada and provincially by the Ontario Ministry of Natural Resources

No additional rare species have been recorded within the NHIC database. Lower Trent Conservation, which was contacted for natural heritage information, had no records of rare species for the study area. The MNR noted that Ginseng (*Panax quinquefolius*), an Endangered species both nationally and provincially, has been recorded about 300 m outside of Lots 32, 33 and 34. (i.e., outside the site). This record may be the same Ginseng record from within the Codrington East Ravine Natural Area (Brownell and Blaney 1996). No Ginseng was observed in GLL field investigations in the study area.

5.2.2.1 Species at Risk

GLL recorded one plant "Species at Risk", the Butternut (*Juglans cinerea*), in the study area. Species at Risk is the general term used to refer to those species that are designated as Endangered, Threatened or Special Concern by either the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or by the Ministry of Natural Resources' Committee on the Status of Species at Risk in Ontario (COSSARO).

Seven Butternuts were observed in the study area. Six are along the hedgerows and forests that form the southern border of the site. These six trees varied in size. There are two saplings, one young tree of about 13 cm dbh, and three mid-aged trees with multiple trunks of about 25 cm dbh each, which are about 12 to 14 m in height. In 2005, no individuals appear to show clear symptoms of the lethal Butternut Canker (but see Section 8.1). The rapid spread of this disease is the reason that the species was given an Endangered status. A few of the lower branches of some trees are dead, but this may be due to natural shade die-off or possibly other non-lethal diseases. A sixth individual was observed along an old stone fence line in the meadow and thicket area to the east of the site area. This individual is a young tree of about 8 cm dbh and it appears to be in good health.

5.2.2.2 Regionally Rare and Uncommon Species

Sky-blue Aster (*Aster oolentangiensis*), considered regionally rare by Cuddy (1991) was observed in the thickets (CUT1-1/4) in the Southeast Quarter. According to Semple *et al.* (2002), this species is locally common in relatively dry prairie-like habitats within southern Ontario.

Woodland Sunflower (regionally uncommon, Cuddy 1991) is also a plant with prairie affinities. Numerous Woodland Sunflowers were found in several parts of the Southeast Quarter (CUT1-1/4 thicket and adjacent old oak hedgerow (FOD2-4) and a few were observed in a clearing in the Central Oak Woodlands. This species transplants well.

Cleavers (*Galium aparine*) (regionally uncommon, Cuddy 1991) was observed in the Central Oak Woodland and in the drier edge of the wetland (SWD3-4). This woodland and thicket flower species is easily overlooked and is probably more common than its status suggests.

Brownell and Blaney (1996) observed two plant species that are rare in eastern Ontario and three that are rare regionally (Lake Ontario Lowlands) in the Codrington East Ravine Natural Area. None of these species were observed by GLL.

5.3 Wildlife

5.3.1 Breeding Birds

Fifty species of breeding birds were recorded during the bird surveys (Appendix C). All of these were presumed to be breeding on the site.

One of the species observed, Golden-winged Warbler (*Vermivora chrysoptera*) was designated as Threatened by the Committee on the Status of Endangered Wildlife in Canada in May 2006, and Special Concern by the provincial Committee on the Status of Species in Ontario in mid 2007. Two Golden-winged Warblers were observed in the centre of the Southeast Quarter, and an additional five were observed in the study area in the hydro lines, and to the east and south of the site area in cultural thickets (Figure 4). The number of Golden-winged Warblers may be lower as one of these birds could have been a late migrant and two were heard but not seen (sometimes the Blue-winged Warbler (*Vermivora pinus*) sings the usual Golden-winged Warbler song and thus seeing the species is preferable). The Golden-winged Warbler species breeds in habitats containing deciduous shrubs and small trees. The Golden-winged Warbler is not covered by the federal Species at Risk Act (SARA) because the property is private. Under the new (2007) provincial Endangered Species Act legislation a management plan is to be written for the species, but the species and its habitat is not protected by the Act, as these protections only apply to provincially endangered and threatened species. It could however be recognized under Significant Wildlife Habitat. The policy implications are discussed under section 6.8.3. No other birds recorded are Species At Risk.

There is no recognized breeding bird status list for Northumberland County. A bird checklist for Northumberland County (Goodwin and Furino, undated) does not provide a status (i.e., degree of rarity) for each species but does indicate species for which there have been only ten or fewer records. None of the species recorded on the site are in this category. The Ontario Breeding Bird Atlas (Bird Studies Canada *et al.* web access November 2005) lists the frequency of occurrence of all species within the Northumberland region. Most of the bird species recorded on the site were recorded in at least 80% of the 39, 10 km by 10 km squares within the Northumberland region. Only two species found on the site have been recorded in a relatively low percentages in Northumberland. These are Blue-winged Warbler (*Vermivora pinus*) (38% of

squares) and Golden-winged Warbler (38%). None of the species found occur in less than 25% of the atlas squares. Therefore based on this and our professional experience, we consider none of the species recorded to be regionally rare (despite the Golden-winged Warbler's national and provincial designation).

5.3.1.1 Forest Bird Community

Over half of the bird species recorded are forest-associated species and the forest bird community is therefore well developed. This is not surprising as over a third of the study area is forested. The number of area-sensitive forest birds can be used to give some indication of the quality of the forest being studied. Area-sensitive species are those which either require relatively large patches of habitat within which to breed and/or which breed in higher densities in more extensive areas. OMNR (2000) is used as a reference for area-sensitive species. Based on professional experience, GLL have added one species (Ruffed Grouse (*Bonasa umbellus*)) recorded in the study area to this list.

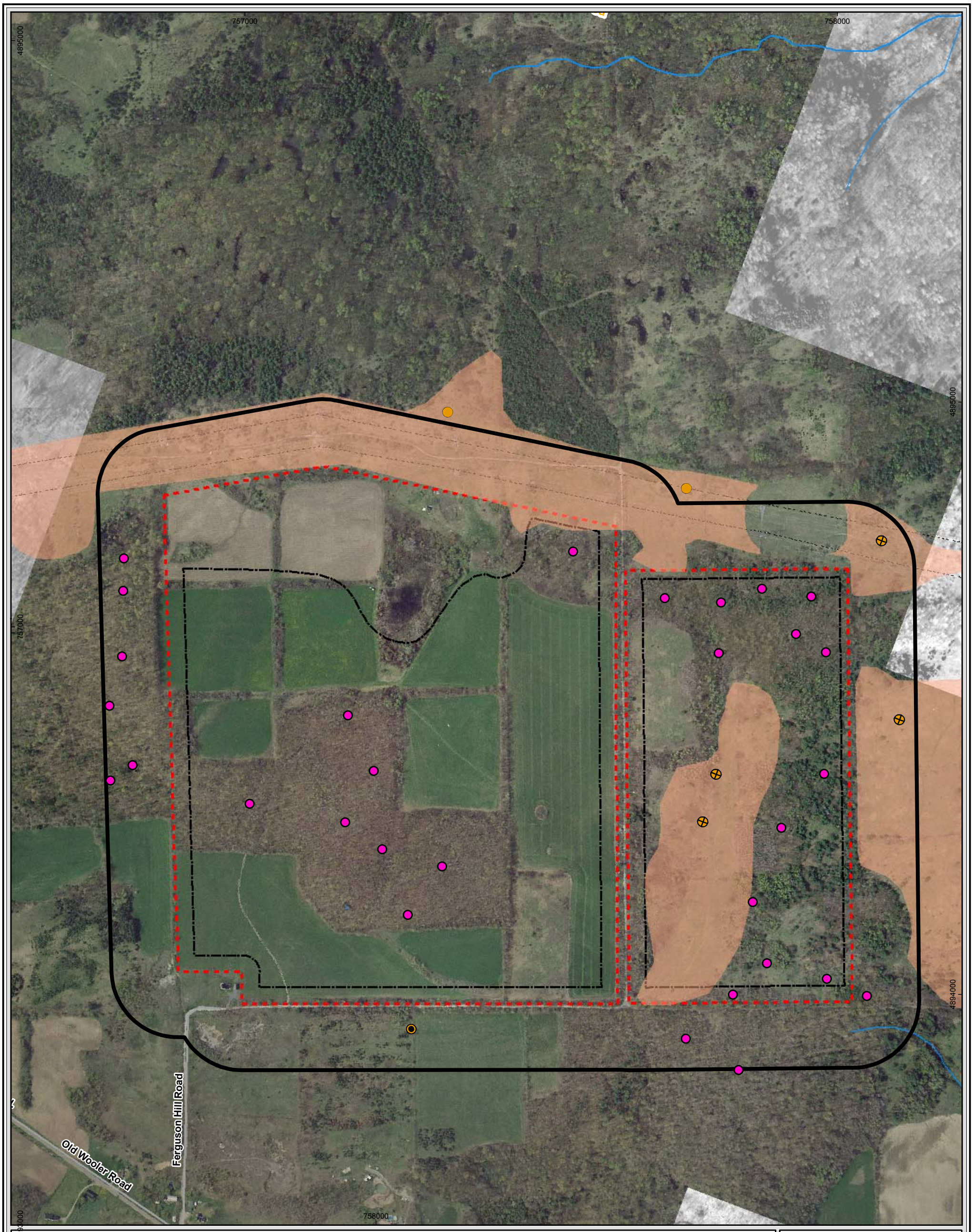
Twenty-eight individuals of nine area-sensitive forest species were recorded (Figure 4). Almost half of these individuals were Ovenbirds (*Seiurus aurocapillus*), with smaller numbers of the other species recorded (e.g., six Veery (*Catharus fuscescens*) and two Scarlet Tananger (*Piranga olivacea*). Area-sensitive forest species were found in two general areas: 1) in the Central Oak Woodland, and 2) in the wooded portion of the Southeast Quarter. This suggests that both of these areas contain fairly high quality habitat for birds and probably for other wildlife, and that there is contagion from adjacent higher quality habitat.

5.3.1.2 Thicket Bird Community

There is a diverse bird community associated with thickets observed in three locations in the study area: 1) along the hydro line, 2) in the centre of the Southeast Quarter (Figure 4), and 3) to the east of the site. These habitats are characterized by species, such as: Black-billed Cuckoo (*Coccyzus erythropthalmus*), Eastern Kingbird (*Tyrannus tyrannus*), Gray Catbird (*Dumetella carolinensis*), Blue-winged Warbler, Golden-winged Warbler, Nashville Warbler (*Vermivora ruficapilla*), Eastern Towhee (*Pipilio erythrophthalmus*) and Field Sparrow (*Spizella pusilla*). All of these species were recorded on the site, with multiple pairs of several of these species recorded indicating the high quality of this habitat. No thicket species have been given area-sensitive status by OMNR, probably because this aspect of the group has not been well studied.

5.3.1.3 ther Bird Communities

The small wetland does not support many wetland bird species. Mallard (*Anas platyrhynchos*), Wood Duck (*Aix sponsa*), Yellow Warbler (*Dendroica petechia*), Common Yellowthroat (*Geothlyphis trichas*), and Red-winged Blackbird (*Agelaius phoeniceus*) are the main wetland species that breed here. Other species recorded in the wetland are those that occur in a variety of edge habitats. The remaining few species recorded on the site that do not fit into any of the categories above, are either common disturbance tolerant edge species, or field species. Two field species were recorded in the southwest portion of the site. This field is either in a fallow or cultivated state depending on the year.



Basemapping from Ontario Ministry of Natural Resources
Orthophotography: 2002; Aerial Photography: November 2001

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UTM Zone 17N, NAD 83

Legend

- Limit of Extraction
- Site Area

Golden-winged Warbler

- Threatened Nationally, Special Concern Provincially
- Possible Migrant
- Not Seen

- Area-sensitive Forest Bird
- Diverse Thicket Bird Community
- Transmission Line
- Major Road
- Local Road

Level 1 and 2, Natural Environment Assessment
- Codrington Property

Wildlife

March 2009
Project 40642

AECOM

Figure 4

Map Document: (N:\Projects\2004\40642\2008\Final\GISSpatial\MXDs\ReportMXDs\40642Wildlife-Fig4.mxd)
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5.3.2 Amphibians

Amphibians can be a particularly important part of the ecosystem partly because of their relatively large biomass. As they concentrate in preferred breeding areas, these sites are often important for conservation purposes. An entire local population can be eliminated if one key breeding area is disrupted.

Three species of amphibians were recorded in the study area (Table 2). All of these species are common in Ontario and in the southeastern portion of the province where the site occurs (Oldham and Weller 2000).

Table 2. Presence of Breeding Amphibians in the Study Area

Species		Location and Abundance	
Common Name	**Scientific Name**	**Wetland (MAM2)**	**Other Locations in License Area and in 120 m Zone**
Spring Peeper	*Pseudacris crucifer*	Small chorus	None
Gray Treefrog	*Hyla versicolor*	Two calling	None
Wood Frog	*Rana sylvatica*	Two calling	None

The wetland (MAM2 on Figure 3) contained three species of breeding amphibians, however only one of these, the Spring Peeper (*Pseudacris crucifer*), was present in any numbers (Table 2). No other area south of the hydro line contained breeding habitat for amphibians. This is due to the lack of wetlands or ponds.

All of the species recorded are associated with woodlands during the non-breeding season. Although less localized than breeding habitats, non-breeding habitats are important in the life cycle of amphibians. During the non-breeding season, the individuals from the wetland are probably found mainly in the Central Oak Woodland, but also in the nearby FOD3-1 and CUW treed areas, as well as the woods to the north of the hydro line.

5.3.3 Mammals and Reptiles

In the settled landscapes of southern and eastern Ontario, the mammal species are mostly those that have benefited from agricultural expansion and other human activities. Many of the sensitive species have been extirpated. Incidental observations of mammals were recorded during all site visits by Gartner Lee ecologists. Five species were observed in the study area: Gray Squirrel (*Sciurus carolinensis*), Red Squirrel (*Tamiasciurus hudsonicus),* Eastern Chipmunk (*Tamius striatus*), Raccoon (*Procyon lotor)* and White-tailed Deer (*Odocoileus virginianus*). All are abundant and widespread southern Ontario species. It is likely that a variety of other mammal species are present on the site. However, based on the habitat present, it is unlikely that any species of conservation concern is present. Other species expected to be found include the Deer Mouse *(Peromyscus maniculatus)*, White-footed Mouse *(Peromyscus leucopus)*, Woodland Jumping Mouse *(Napaeozapus insignis),* Northern Short-tailed Shrew *(Blarina brevicauda),* Hairy-tailed Mole (*Parascalops breweri*) and the Meadow Vole (*Microtus pennsylvanicus*).

During field visits, no reptiles were observed on the subject lands. There is an OMNR record of a Northern Map Turtle (*Graptemys geographica*) from the general vicinity of the site (but not on the site). This species is Special Concern and provincially rare (S3) and is found in large bodies of water. Since suitable turtle habitat is not present in the study area, this species and other turtle species are not expected to occur here.

There is habitat on the subject lands for the following common snake species of Ontario: Eastern Gartersnake (*Thamnophis sirtalis sirtalis),* Smooth Greensnake *(Opheodrys vernalis),* Northern Red-bellied Snake (*Storeria occipitomaculata occipitomaculata),* and the Northern Brownsnake *(Storeria dekayi dekayi).* Records of Eastern Ribbonsnake (*Thamnophis sauritus*) have been reported from the general vicinity of the site (but not on the site) (OMNR records). This species which is Special Concern and provincially rare (S3) is usually associated with wetlands. The wetland in the study area is poor quality habitat for this species and the species was not observed during the field investigations.

5.3.4 Winter Wildlife Habitat

The winter wildlife habitat in south and central Ontario provides cover and food. Conifer or mixed forest generally provide better winter cover than deciduous, therefore the mixed forest in the Southeast Quarter likely provides the most important winter forest cover. The meadow and thickets probably provide food for some small mammals and wintering songbirds. Overall, the winter habitat values are unlikely to be important in a region of fairly high forest cover.

6. Natural Environment Level 1 Screening

6.1 Policy Context

The study area consists of a mixture of agricultural lands, forests, thickets, fields and a small wetland. To determine whether or not “significant features” are present in the study area, as required under the Aggregate Resources of Ontario, Provincial Standards, the following technical documents were reviewed in combination with field investigations:

1. The Natural Heritage Reference Manual (OMNR 1999).
2. Natural Heritage Report, Campbellford/Seymour/Percy/Hastings/Quinte West – Belleville (Lower Trent Conservation 2001).
3. Lower Trent Region Natural Areas – Volume 3: A Biological Inventory and Evaluation of 23 Natural Areas in the Lower Trent Region, 1995 (Brownell and Blaney 1996).

The features listed in the Provincial Standards are:

a) significant wetlands;
b) significant portions of the habitat of endangered and threatened species;
c) fish habitat;

d) significant woodlands;
e) significant valleylands;
f) significant Areas of Natural and Scientific Interest (ANSIs); and
g) significant wildlife habitat.

For definitions of these terms the Provincial Standards states that reference should be made to the Provincial Policy Statement (PPS) (OMMAH 2005). The following section provides an overview of the above mentioned natural heritage features and discusses the relevance of each to the subject lands.

6.2 Significant Wetlands

The designation of wetlands, as either locally or provincially significant, is completed through a standardized assessment known as the Ontario Wetland Evaluation System. The Ontario Ministry of Natural Resources (OMNR) is generally responsible for the evaluation of wetlands, although evaluations are provided by other agencies, such as local conservation authorities. The final designation of a wetland as provincially or non-provincially significant is ultimately the responsibility of the OMNR.

No evaluated wetlands occur on the site or within 120 m of the area to which the license application applies.

6.3 Significant Portions of the Habitat of Endangered and Threatened Species

The Provincial Standards for the Aggregate Resources of Ontario requires that significant portions of the habitat of endangered and threatened species be identified on the site or within 120 m of the site. The Aggregate Resources Act, when referring to Endangered species is informed by the provincial status as defined under the PPS (2005). The definitions of an Endangered species in the PPS are those that are "*listed or categorized as an 'Endangered Species' on the Ontario Ministry of Natural Resources' official species at species at risk list, as updated and amended from time to time*". This list includes Butternut. As noted in Section 5.2.2.1 there are seven Butternut trees in the study area, six of which are on site, however none of these are situated in the extraction area.

In November 2003, COSEWIC designated Butternut an Endangered species, and COSSARO followed with the same designation in September 2004[1]. Although the Butternut is relatively common south of the Canadian Shield, (note that Cuddy lists the species as common in 1991) the species was designated Endangered because a lethal disease, the Butternut Canker, is rapidly spreading through North America. The Butternut is listed provincially as 'S3?' (Provincially rare to uncommon, status uncertain) by the provincial Natural Heritage Information Centre.

1. *Note that the federal* Species at Risk Act *(SARA) does not apply here as the land is privately owned. Also the Butternut is not protected under the provincial Endangered Species Act because it is a 'Not Regulated' Endangered* species.

Significant portions of the habitat are defined in the PPS as "*the habitat, as approved by the OMNR, that is necessary for the maintenance, survival and/or the recovery of naturally occurring. endangered species… and where those areas of occurrence are occupied or habitually occupied by the species during all or any part(s) of its life cycle*". OMNR has not approved any Butternut habitat that meets this definition. Accordingly, significant portions of the habitat of Endangered and threatened species does not exist in the study area. The current intent of the Provincial Butternut Working Group is to maximize potential seed production in the hope that disease-resistant individuals will be found. The lack of significant habitat notwithstanding, the impact of pit operations on the individual trees is discussed in the Level 2 Assessment.

Golden-winged Warbler is not designated as Threatened or Endangered by the province.

6.4 Fish Habitat

The designation of fish habitat can be completed by agencies such as the OMNR or local conservation authorities, although the federal Department of Fisheries and Oceans (DFO) is ultimately responsible for fish habitat and its designation. Fish habitat is protected under the *Federal Fisheries Act*. There are no lakes, permanent ponds, creeks or other drainage features in the site area. The only pond (MAM2-10) present does not contain water year round and is not connected to any drainage feature. Thus there is no fish habitat on the site.

There is however fish habitat within the 120 m zone. The creek that originates in the southeast corner of the study area is a (likely permanent) groundwater-fed creek that flows into Murray Marsh, and from there into the Trent River. Although it is not known if there are fish in the headwater section of the creek, this watercourse is still very likely to be to be considered fish habitat by DFO because it contributes water on a regular basis to habitat downstream which likely does contain fish. Thus we have carried this feature forward to a Level 2 Assessment.

6.5 Significant Woodlands

Evaluation of woodlands to identify significance in the context of the Provincial Policy is aimed at recognizing those forest functions that are important to preserve on a provincial scale. (Note that within this discussion, the terms woodland and forest are used interchangeably, although this is not the case when applying Ecological Land Classification to vegetation units.) The relative importance of forest functions changes across the province where percent forest cover ranges from 2% to >40%. The dynamics of how the forest fragments relate to one another change with the nature of the matrix among them, and the separation distance between discrete patches of forest. Therefore, in spite of the level of significance being provincial, the application of the policy is regional in nature and it is the responsibility of the local planning authority to determine woodlands significant within their jurisdiction to which provincial policy would apply, and to bring their official plans into conformity with that designation.

The evaluation of significant forests by the local planning authority or by the local conservation authority who provide advice to the planning authority has been undertaken in very few areas of Ontario (e.g., Halton, Oxford, York, Lower Trent watershed, City of London, Ottawa, Durham). It is difficult at a site specific scale to recommend candidates due to the lack of the landscape scale evaluation required to appropriately understand the critical forest functions. The percent forest cover is helpful in guiding recommendations, but the scale at which this metric is calculated is arbitrary. The planning authority is most interested in their political jurisdiction, but the municipal boundary usually transcends watershed boundaries, physiognomic boundaries (e.g., landforms or bedrock geology) and sometimes boundaries imposed due to climatic factors. As forest functions change according to soil conditions, topography, relationship to surface and groundwater resources, and patterns on the landscape (i.e., size, shape, relative distance among patches), the evaluation process must become highly localized to ensure that the regional variables that contribute to provincial significance are incorporated into the evaluation approach.

With respect to the Codrington site, Significant Woodlands in the context of the Provincial Policy have not been identified, nor have any forest features been identified in the Township of Brighton Official Plan. Lower Trent Conservation (LTC) has identified candidate Significant Woodlands within parts of their watershed, however this work does not extend to the Municipality of Brighton (LTC 2001). Therefore, there is no policy that applies to this landscape with respect to the protection of woodland features and functions. It is relevant to understand the nature of the woodland attributes on the site and how they compare to the local (LTC) and provincial guidelines (MNR) (Table 3).

There are numerous references that indicate the threshold of forest cover necessary to maintain ecosystem services lies between 30 and 40%. Below this figure, water quality and quantity are affected, air quality is compromised and declines in habitat quality for fish and other wildlife can be detected. Therefore, as an overall goal for any jurisdiction, 30% is the *minimum* target for forest cover, however American Forests (American Forests 2006) recommends 40% as a minimum in metropolitan areas to maintain air quality control functions.

Forest cover in Northumberland County was estimated at 24.4% by Riley and Mohr (1994) and LTC estimates a forest cover of 30.6% in an area that covers much of their jurisdiction plus a portion of the Quinte conservation authority area (LTC 2001). The former figure is likely an underestimate as forest cover continues to increase in Ontario as farmers allow vacant farmland to lie fallow and young forests establish. Riley and Mohr recommended targets for the sizes of forests to be maintained relative to forest cover that increases exponentially with increasing forest cover. For this landscape, 40 ha is recommended, but this is only a recommendation and a regional evaluation of forest function would clarify an appropriate threshold for the Municipality of Brighton and/or this watershed and/or this landform. On this landscape, the minimum patch size would lie somewhere between 15 and 50 ha (Riley and Mohr 1999, FON Draft Guidelines 2002).

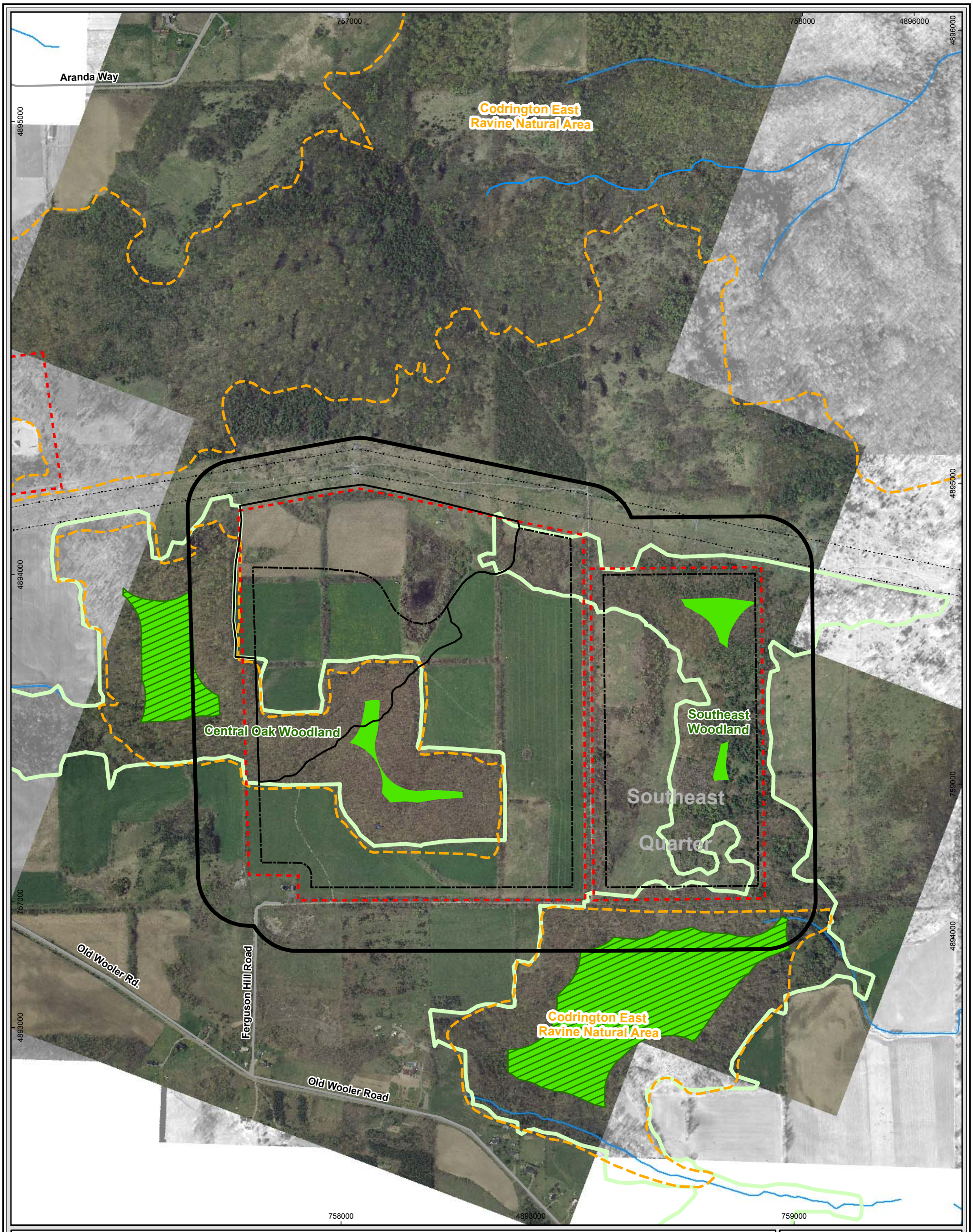
Figure 5 delineates the two woodlands on the site that have potential to be candidate significant woodlands. The woodlands are:

a) the central oak woodland (FOD2-4 and FOD5-3); and,
b) the southeast woodland (a mixture of several forest ELC communities).

Table 3. Comparison of Woodland Attributes to Significant Woodland Criteria

General Criteria	LTC (2001) Criteria	MNR (1999) Criteria	CRITERIA MET???		
			Central Oak Woodland (FOD2-4)	Southeast Woodland (FOD2-4, FOD3-1, FOM5 and CUW)	Summary
Patch Size	▶ >40 ha	▶ >40 ha	▶ 42 ha in total; 15 ha on property, 27 ha off-site1	▶ 76 ha in total; 20 ha on property, 56 ha off-site	▶ No protection for portion of woodland off property (see discussion below)
Interior Habitat	▶ Patch ≥ 300 m wide	▶ Patch ≥ 300 m wide preferred; importance increases with total interior	▶ Connected to 4 ha of interior habitat off-site (<300 m wide on-site)	▶ Connected to 11 ha of interior habitat off-site; on site forest is narrow (i.e., <300 m wide on-site)	▶ Interior habitat occurs off-site; no protection for woodland
Hydrological Value	▶ >1 ha adjacent to a stream	▶ Close to or adjacent to discharge, recharge or headwater2	▶ No watercourses/headwater ▶ Recharge function not identified	▶ No watercourses/headwater on -site; ▶ Recharge function not identified	▶ Not on-site
Habitat Diversity/ Ecological Functions	▶ Includes/adjacent to other identified features (PSW, ANSI, ESA3)	▶ Woodlands with complex habitats; higher diversity are more significant	▶ Within Codrington East Ravine Natural Area/ESA (CERNA)	▶ Off-site forest is within Codrington East Ravine Natural Area/ESA	▶ Logging and pasturing has disturbed the woodlands; functions as buffer to adjacent higher quality forests: key criteria for on-site area inclusion within CERNA not identified
Uncommon Features (e.g., age)	▶ Old growth (trees >100 years)	▶ Unique composition, age or site quality represented by <5% of planning area	▶ No old growth or uncommon vegetation community	▶ No old growth or uncommon vegetation community	▶ Not significant
Other Functions (i.e., linkage)	▶ No criterion	▶ Woodlands that may maintain linkage among patches	▶ High forest cover provides many linkages on this landscape	▶ Does not provide a unique linkage between Cold Creek and Murray Marsh	▶ Not significant
Economic and Social Values	▶ No criterion	▶ Woodlands subject to long term forest management agreements	▶ Former “Smartwood Certified” forest	▶ No	▶ Not significant

Note: 1. Site refers to license area.
2. This criterion describes the total land cover therefore is interpreted to mean hydrologic features of elevated importance.
3. PSW = Provincially Significant Wetland, ANSI = Life Science Area of Natural and Scientific Interest, ESA = Environmentally Significant or Sensitive Area.



Basemapping from Ontario Ministry of Natural Resources
Orthophotography: 2002; Aerial Photography: November 2001

N
W
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S

m
0 50 100 200
1:8,500

UTM Zone 17N, NAD 83

Legend

- Limit of Extraction
- Site Area
- Exterior Boundary, Potential Significant Woodland
- Interior Woodland
- Woodland
- ESA
- Central Oak Woodland Restoration Area
- Transmission Line
- Major Road
- Local Road

Level 1 and 2, Natural Environment Assessment
- Codrington Property

Woodlands

March 2009
Project 40642

AECOM

Figure 5

Map Document: (N:\Projects\2004\40642\2008\Final\GISSpatial\MXDs\ReportMXDs\40642SignificantCandidateWoodland-Fig5.mxd)
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In order to determine size, a break in the woodland cover was defined to be a break in the canopy cover of 20 m or more by gaps, roads or hydro corridors. Table 3 compares the attributes of these woodlands to the criteria provided by MNR and LTC.

As discussed above, it is the total forest cover that is most important with respect to maintaining important woodland function on the landscape, and the identification of enhanced functions helps to guide where opportunities exist to maintain forest function while permitting other uses to proceed. Table 3 indicates that both forests achieve a size that is important, but that the shape of the forest on the site and the effects of recent disturbance does not provide these enhanced functions. The woodland features on the site do not in themselves meet any of these criteria; it is only when they are connected to the more important functions off-site that they appear to be more important by association. Additionally, in the absence of robust protection for the adjacent woodlands, these functions could be removed at any time by the adjacent landowners, leaving the on-site woodlands without functions worthy of protection. Conversely, the aggregate extraction does not represent a permanent removal of forest from the site, and opportunities to maintain and/or restore forest function will be explored in the mitigation section of this report.

Therefore, it is concluded that these two woodland areas do not meet the criteria for candidate Significant Woodlands *in the site area*. It is only when the adjacent, unprotected woodlands are included in the evaluation that they *could be* considered worthy of designation by the municipality and subsequent protection under the PPS. It is recommended that although the woodlands in the site area are *not considered to be significant under the Aggregate Resources Act*, that they be carried forward to a Level 2 Assessment, a) because the adjacent woodland in the 120 m zone are more likely to be considered significant by the municipality if studied and b) so that the attributes and functions within the license area woodlands are included in the restoration plan following extraction.

6.6 Significant Valleylands

The designation of Significant Valleylands is the responsibility of the planning authority. Criteria recommended by the province for significant valleyland designation include prominence as a distinctive landform, extent of naturalness, importance of its ecological functions, restoration potential, and historical and cultural values.

Significant Valleylands have not been designated by the planning authority on or within 120 m of the license area. Based on GLL's knowledge of the study area a designation of Significant Valleylands would not apply as there is nothing that could reasonably be defined as a valley in the site area. The only slopes in this part of the site are created by old beach ridges. Although a portion of the Codrington East Ravine Natural Area is on the site, the main ravine associated with the Natural Area is over half a kilometre to the north of the site (another ravine may be a similar distance to the south of the site).

6.7 Provincially Significant Areas of Natural and Scientific Interest

Areas of Natural and Scientific Interest (ANSIs) are lands supporting representative earth or life science features identified by the OMNR. There are no provincially significant ANSIs on or within 120 m of the site.

6.8 Significant Wildlife Habitat

Significance of Wildlife Habitat is difficult to appropriately determine at the site-specific level, as the assessment must incorporate information from a wide geographic area and consider other factors such as regional resource patterns and landscape effects. Under the Provincial Policy Statement, the planning authorities have the responsibility to identify Significant Wildlife Habitat (SWH). In this case the Municipality of Brighton has not designated Significant Wildlife Habitat. The LTC has identified some types of SWH such as colonial bird nesting sites and rare vegetation communities in the former or existing Campbellford, Seymour, Percy, Hastings, Quinte West and Belleville areas (LTC 2001). They have also included all Environmentally Sensitive Areas (ESAs) as SWH, although ESAs are not specifically listed in the Significant Wildlife Habitat Technical Guide. Although, the Codrington study area is just outside the area covered by the LTC (2001) report listed above, the LTC have nonetheless mapped the Codrington East Ravine Natural Area as Significant Wildlife Habitat because it is an ESA.

Similar to the determinations of Significant Woodland above, the following paragraphs provide GLL's assessment of existing conditions against the four component parts of Significant Wildlife Habitat as described by OMNR (2000) in the Significant Wildlife Habitat Technical Guide.

These four principal components are:

1. Seasonal Concentrations of Animals;
2. Rare Vegetation Communities or Specialised Habitats for Wildlife;
3. Habitats of Species of Conservation Concern; and
4. Animal Movement Corridors.

6.8.1 Seasonal Concentrations of Animals

Some species of animals gather together from geographically wide areas at certain times of year. This could be to hibernate or to bask (e.g., some reptiles), over-winter (e.g., deer yards and bat hibernacula) migrate (e.g., shorebird migratory stop-over areas) or to breed (e.g., bird colonies). Maintenance of the habitat features that result in these concentrations can be critical in sustaining local or sometimes even regional populations of wildlife.

There are no known features in the study area that fit this criterion. For example, there are no significant wetland areas that water birds could use in migration and there are no bird colonies on the site. Concentrations of breeding amphibians could be considered a seasonal concentration, but as they are specifically listed under the next criteria, they have been dealt with under Specialized Habitats for Wildlife. Therefore there is no SWH of this type in the study area.

6.8.2 Rare Vegetation Communities and Specialized Habitats for Wildlife

Rare vegetation communities refer to the maintenance of biodiversity and of rare plant communities (rather than individual rare species) that are identified by the province. Specialized habitats for wildlife can include habitat for species of breeding birds that are associated with large blocks of habitat (i.e., habitat for area-sensitive birds), old-growth forests, moose calving areas, turtle nesting habitat, amphibian woodland breeding ponds, cliffs and a variety of other specialized habitats.

There are no rare vegetation communities in the study area. Although there are a few prairie-affinity plant species in the Southeast Quarter, these communities do not have sufficient characteristics of prairie habitats to be considered such. Prairie vegetation communities are rare in Ontario.

The wetland south of the hydro line is not considered candidate SWH for amphibian woodland breeding ponds as the numbers of breeding frogs here is very low, particularly when considered at a regional level.

There is habitat for area-sensitive forest birds which could qualify as candidate Specialized Habitat for Wildlife. Three general forested areas contain habitat for forest area-sensitive bird species, 1) Central Oak Woodland, 2) parts of the Southeast Quarter (in the site area) and 3) forests to the south of the Southeast Quarter (primarily in the 120 m zone and beyond). In this part of the province, with a relatively high forest cover, almost any forest over about 20 ha will likely contain at least a few area-sensitive forest birds. The first two areas (Central Oak Woodland and parts of the Southeast Quarter) may not contain sufficient numbers of area-sensitive forest birds to qualify for candidate SWH in this region, if they were compared to others on a region-wide basis. Also, the Central Oak Woodland, at least within the site, contained only one area-sensitive species (Ovenbird) that was present in numbers greater than one pair. The forests to the south of the Southeast Quarter appear to contain a slightly higher diversity of species, and might be more likely to qualify. It is difficult to discern which areas might qualify as Significant Wildlife Habitat within this planning jurisdiction because there is no standard against which to compare these values. In order to ensure that the intent of the Act is met, a conservative approach has been taken, and it is recommended that all three areas be carried forward as candidate Significant Wildlife Habitat to the Level 2 Assessment.

There are no other types of candidate specialized habitats for wildlife known in the study area.

6.8.3 Habitats of Species of Conservation Concern

This category includes habitats for species that may be locally rare or in decline, but that have not reached the level of rarity that is normally associated with Endangered or Threatened designations. The Significant Wildlife Habitat Technical Guide (OMNR 2000) suggests that the highest priority for protection be provided to habitats of the rarest species (on a scale of global through to local municipality); and that habitats that support large populations of a species of concern should be considered significant. An additional eight criteria under the Species of Concern category are found in Appendix Q (MNR, 2000), and within these criteria are nested another 28 guidelines. The determination of Significant Wildlife Habitat under this category (and under other categories) is a comparative process that must extend across the jurisdiction of the planning authority to be considered definitive.

The significance of the Endangered Butternut has already been described under section 6.3 and the SWH category is not intended to include provincially threatened or endangered species. The regionally uncommon plant, Cleavers is not likely to be considered of conservation concern by the planning authority as it is our professional opinion that it is probably more common than its status suggests. The Sky Blue Aster and Woodland Sunflower, which may be regionally rare and uncommon respectively, could be considered of conservation concern as these species might fall under the Significant Wildlife Habitat criteria (OMNR 2000) of '*species that are rare within the planning area, even though they may not be provincially rare*'. The work that identified these species may be out of date with respect to status and therefore it is recommended that this not be used as a criterion under this category. In addition, Woodland Sunflower in particular and Sky-blue Aster are vigorous plants that transplant well and can be included in the restoration plan.

Golden-winged Warbler is a species that could be considered as a Species of Conservation Concern under SWH as it is a '*species identified as nationally endangered or threatened by COSEWIC, which* is *not protected in regulation under Ontario's* Endangered Species Act'. This species is relatively common in Ontario and Northumberland County but has relatively recently been designated a Species-at-risk because of population declines associated with interbreeding with a closely related species, the Blue-winged Warbler. As there are large portions of suitable habitat for this species in areas adjacent to the site (in the hydro corridor, and to the east) and likely additional areas to the north and south outside of the study area, we have not considered the Southeast Quarter thicket habitat to be a significant for the Golden-winged Warbler.

Therefore the Species of Conservation Concern category of SWH does not apply to this site.

6.8.4 Animal Movement Corridors

Landscape connectivity (which includes the concept of "wildlife corridors") has become recognized as an important part of natural heritage planning. Animal movement corridors are defined by OMNR (2000) as "*elongated naturally vegetated parts of the landscape used by animals to move from one habitat to another*". Although there is not unanimous scientific support for corridors, it is generally accepted that a wide range of benefits can be attributed to the maintenance or re-connection of the natural landscape. These benefits include: increased local species richness and biodiversity, more immigration and movement opportunities for individuals between core natural areas, and greater likelihood of exchange of genetic material between populations.

The SWH Technical Guide states that animal movement corridors should be identified after the natural heritage features are identified in the region. This initial step has not been undertaken by the planning authority in this municipality. Also, animal movement corridors vary in size from hedgerows to kilometre-wide features. In the relatively forested part of the province north of Brighton, woodland areas are relatively well-connected, and thus none of the forests on the site are highly isolated. Thus important forest corridors are not easily distinguished.

However, an examination of topographic maps, satellite photos, and the natural areas document shows that there are some larger natural areas that one might connect with corridors. These natural areas are: Murray Marsh PSW and ANSI (to the northeast), woods around Cold Creek (to the south) and Cramahe Hill Complex Natural Area (to the west) (Figure 6). Therefore, the woodlands of the Southeast Quarter could be considered an animal movement corridor (connecting Murray Marsh and Cold Creek), as could the woodlands to the north of the site area (connecting Murray Marsh and Cramahe Hill). There is an alternative to the first of these animal movement corridors that is situated about 100 to 200 m to the east of the site, and so the first of these potential corridors is not the only option open to wildlife. As these corridors are not a critical attribute of the site we have not considered either of these as candidate SWH.

7. Natural Environment Level 1 Conclusions

Table 4 summarizes the occurrence of natural environment features on, and within 120 m, of the proposed license area.

Table 4. Summary of Level 1 Screening

Natural Environment Feature	Presence in Site Area	Presence in 120 m Adjacent Lands Zone	Carried Forward to Level 2 Assessment
Significant Wetland	None	None	No
Significant Portions of the Habitat of Endangered or Threatened Species	Significant portions of Habitat of Butternut not identified, but species present	Significant portions of Habitat of Butternut not identified, but species present	Impacts discussed
Fish Habitat	None	Yes	Yes
Significant Woodlands	None	Two Candidate Significant Woodlands	Yes
Significant Valleylands	None	None	No
Significant Wildlife Habitat	Candidate Significant Wildlife Habitat Areas	Candidate Significant Wildlife Habitat Areas	Yes
Provincial Areas of Natural and Scientific Interest	None	None	No

Based on the Level 1 screening, a Level 2 Assessment is required for one type of feature in the site area: candidate Significant Wildlife Habitat, as well as for three types of features within the adjacent lands: Fish Habitat, candidate Significant Woodlands and candidate Significant Wildlife Habitat. Significant Portions of the Habitat of Endangered or Threatened Species is discussed although it is not technically required.

8. Natural Environment Level 2 Assessment – Impacts and Mitigation

The results of the Level 1 analysis revealed that Candidate Significant Wildlife Habitat is present on site and that Fish Habitat, candidate Significant Woodland and candidate Significant Wildlife Habitat are present within 120 m of the site. According to the Provincial Standards, a Natural Environment Level 2 assessment is required in cases where the Level 1 analysis identifies any significant natural environment features on and/or within 120 m of the site. Individual occurrences of the Butternut, an Endangered tree species, are also discussed.

8.1 Endangered Species

Six Endangered Butternuts were observed on the site and an additional tree was observed outside of this area, but in the study area. The first six are along the south border of the site area and are within the regulatory 30 m excavation setback that is a requirement of the Aggregate Resources Act. Thus these trees would not be removed as part of the excavation. Furthermore, on May 29, 2007 a health assessment was conducted of the on-site Butternuts was conducted. One tree showed minor evidence of the Butternut canker, while the remainder of trees were healthy. The detailed results of this survey are in Appendix D. Thus it is worth the retention of these trees.

Murray Marsh Provincially Significant Wetland and Area of Natural and Scientific Interest

Cramahe Hill Complex Natural Area

LEGEND

CBM Hilton Site

Notes: Map-Natural Resources Canada Edition 7, 2000

SCALES

0 1km

Scale 1:1000

Landscape Context

License Area and Extraction Limits - Codrington

Designed By:	RFC	Drawn By:	SBB
Checked By:	RFC	Approved By:	RFC
Date Issued:	February 2009	Project No.:	40-642

AECOM

FIGURE 6

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Their roots can also be protected within this buffer, given that consideration is given to the placement of noise berms and protective fencing. The six Butternuts along the south edge of the property, are situated relatively close to the approximately 16 m wide noise berms that will be placed within the setback. If the berms are situated as close to the north edge of the extraction limit as possible, then the remaining distance in the setback is 14 m. Consideration will also be given to placing narrower berms where Butternuts occur.

City of Toronto recommends a tree protection zone (for construction) of 2.4 m around a tree with a diameter at breast height (dbh) of 11 to 40 cm (as the largest of the subject trees are), although they also state that roots go as far as two to three times the dripline distance (City of Toronto 2002). Dripline is the outer edge of the tree canopy. In our case, the dripline of the largest trees is about 6 m, and two times this distance is 12 m. Thus the Butternuts should be unaffected to minimally affected. Tree protection zone fencing should be placed at about 12 m distance from the trunks.

The seventh Butternut is about 70 m to the east of the extraction area and is thus further away than the other Butternuts and would be unaffected by excavation.

8.2 Fish Habitat

The fish habitat that occurs in the southeast corner of the study area in a headwater creek is outside the excavation zone. It is situated about 80 m from the proposed excavation area. As the creek is sustained through groundwater contributions, the water levels in the creek will be unaffected as the proposed pit is an above-groundwater pit.

8.3 Significant Woodlands

Although the woodlands in the site area do not provide provincially significant function, they are connected to woodlands of higher importance in the 120 m adjacent lands zone. A portion of the these woodlands, as shown in Figure 5, would be affected by the proposed excavations.

About 15.5 ha of the Central Oak Woodland would be removed for part of the life of the excavation operation. This will reduce the woodland to 27 ha, however almost all of the existing interior habitat will remain to the west of the site. Thus, temporarily while that part of the pit is excavated, the Central Oak Woodland will lose some of its function by virtue of losing area, much of the function of the overall woodland will remain, assuming unchanged conditions off the site. After excavation is finished, re-forestation can eventually return the woodland to a similar or larger size (see section 8.5 for more details).

The Southeast Woodland would be similarly affected. About 20 ha would be removed under the proposed extraction limits, leaving a 56 ha woodland overall. All of the interior habitat (and all of the Codrington East Ravine Natural Area) would remain as both of these features are off-site in this location. The small creek south of the site within the woodland area and its associated headwater function, would be unaffected since the proposed pit is an above-water pit. Thus, a minority of function would be lost by the removal of the young and fairly linear portions of this woodland which occur within the excavation area. As with the Central Oak Woodland, rehabilitation of some of the site to forest can ultimately return the woodland to its original size or larger.

8.4 Significant Wildlife Habitat

Three areas of candidate Significant Wildlife Habitat were identified in section 6.8.2, all due to the presence of breeding area-sensitive forest birds. These areas were: 1) Central Oak Woodland; 2) southeast woodlands within the site; and 3) southeast woodlands south of the site boundary. The latter two areas are continuous with one another, but were separated due to possible different levels of function. For the life of the pit, the area-sensitive forest bird species that breed in these areas would not be present under the proposed excavation. In the case of the Central Oak Woodland about seven pairs of area-sensitive breeding birds would loose their breeding habitat. In the case of the Southeast Woodland birds on the site, approximately 14 area-sensitive species would be in a similar situation. Similar habitat is present and common in the region, so opportunity exists for these displaced birds to breed elsewhere. As with Significant Woodlands, similar habitat can be returned to the site to replace that which was removed and similar area-sensitive forest birds would breed in these forests once sufficiently mature.

The number of area-sensitive forest birds present in the woodlands to the south of the site is not known as this area is mostly off the site and was only minimally surveyed, although it is likely to contain in the order of 15 to 20 pairs of area-sensitive forest birds. As none of this forest is within the excavation area, all of the habitat will remain and the effects will be negligible. Minor effects are possible as noise from the pit will be immediately adjacent to the woodlands. It is possible that one or two individuals will be unproductive or will not breed close to the pit for this reason. Woodland birds are known to breed in reduced density several hundred metres or more away from vehicular road traffic noise (Reijnen *et al.* 1995) and find mates less successfully in noisier industrial areas (CBC 2006). This effect however, if present in association with pits, will only occur when the excavation activities are close the southeast end of the site, and when the pit is in operation.

Therefore, the most important attributes of the candidate Significant Wildlife Habitat areas is to the south and west of the license area. On-site Significant Wildlife Habitat attributes can be mitigated.

8.5 Summary of Preventative, Mitigation and Remediation Recommendations

Mitigation and remedial recommendations are directed at the woodlands on the site and their association with woodlands in the 120 m zone. Associated candidate Significant Wildlife Habitat issues are also addressed. There are no to negligible anticipated impacts to the Endangered Butternuts (see Section 8.1) nor to the Fish Habitat in the 120 m zone.

The main goal of the recommendations is to minimize the effects of forest removals, and to return the site after extraction to land use proportions which maintain and enhance the function of the natural habitat which is currently existing. These goals will be met by:

a) Preservation;
b) Reforestation;

c) Regeneration;
d) Best Management Practices; and
e) Maintaining Existing Land Uses.

8.5.1 Preservation

Roughly 10 ha of the site along the northwest edge will be retained in a natural or restored state (as shown in Figure 2). This area will contain the wetland, small patches of deciduous forest (FOD8-1, CUW and FOD3-1) on either side of the wetland, hedgerows as well as some agricultural lands that will be reforested early in the life of the pit. The reforestation of the agricultural lands could occur with salvaged vegetation from the woodland area which will be removed for extraction purposes, or it could be re-planted with nursery stock.

If salvaging is used it would mean that the existing seed bank, ground cover, shrubs and small trees on site would be moved from the woodlands on site and placed in the agricultural area to be reforested. This means that an ideal mix of species, already suited to the area will become established here. Whether salvage planted or re-planted, a young to medium-aged forest will cover about 10 ha and will be joined to the off-site portion of the Central Oak Woodland meaning that some improvements occur early in the life of the pit. Note that a haul route will likely be created through this area, which will be restored at the end of the pit life along with the remainder of the site.

8.5.2 Reforestation

There is an opportunity, through pit excavation and planned woodland rehabilitation, to ultimately enhance the function of the woodlands by changing the shape and size of the forest once excavation is concluded. The location and area of woodland rehabilitation efforts is key. For the rehabilitation of the approximately 15 ha removed portion of Central Oak Woodland, planting would occur in the northwest of the site such that the woodland could be returned to larger than its original size, with a significantly increased quantity of interior woodland (as shown in Figure 5 and Figure 7). Interior woodland is that 100 m from the edge, and 300 m wide. If a triangular area of 29 ha was rehabilitated to a woodland state, then the new woodland size would be 54 ha, in comparison to the 42 ha existing currently. At the same time, this new woodland (on and off-site) would contain about 22 ha of interior woodland, an area with potentially much more function than the current 4 ha. The woodland would also be connected to the small wetland, which would enhance the wildlife function of both features.

Parts of this 29 ha rehabilitation area are the preservation area mentioned above, and thus some reforestation will occur during and some after extraction.

8.5.2.1 Guidelines for Reforestation

The goal of the reforestation is to return the planted woodlands to forest with: a native tree species composition; a variable age structure; and with improved shape for wildlife habitat (i.e., more interior habitat, as discussed above and in this section). A detailed planting plan will be created by a professional biologist. The reforestation will also require supervision and monitoring by a professional with expertise in native restoration.

Meadow and thicket habitat addition to larger block of similar habitat along hydro line

Wetland remains on site

Large block of meadow and thicket provides habitat for diversity of thicket birds

Returns woodland to site and enhances size and interior of Central Oak Woodland patch

Central Oak Woodland

Southeast Woodland

Southeast Quarter

Returns woodland to site, enhances interior of woodland, and re-establishes connectivity between woodlands to south and northeast

Ferguson Hill Road

Old Wooler Road

757000 757500 758000 758500 759000

4895000 4894500 4894000 4893500

Basemapping from Ontario Ministry of Natural Resources
Orthophotography: 2002; Aerial Photography: November 2001

N W E S

m
0 50 100 200
1:6,500

UTM Zone 17N, NAD 83

Legend

- Pasture
- Meadow/Thicket Habitat
- Forested
- Interior Woodland
- Limit of Extraction
- Central Oak Woodland Restoration Area
- Transmission Line
- Major Road
- Local Road
- Site Area

Level 1 and 2, Natural Environment Assessment - Codrington Property

Rehabilitated Landscape

March 2009
Project 40642

AECOM

Figure 7

Map Document: (N:\Projects\2004\40642\2008\Final\GISSpatial\MXDs\ReportMXDs\40642SRehabilitatedLandscape-Fig7.mxd)
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For site preparation, grading will occur, if necessary in order to eliminate any temporary cover crops. Areas where forest rehabilitation is to occur should ideally have a similar drainage regime and topsoil type as occur currently on site. Topsoils are mostly well-drained silty fine sands, sandy silts and sands. If available, replacement with native topsoils from the site before trees and shrubs are planted should occur. Imported topsoil should not be used due to problems associated with seeds of invasive species potentially occurring.

Reforestation, pre, during and post-extraction, would occur with native tree species similar to those on the site now, or with other native species suitable to the site conditions and found in the watershed. The following is a list of tree species to be planted with the approximate percentages of each species:

a) Red Oak (*Quercus rubra*) 35%
b) Largetooth Aspen (*Populus grandidenta*) 20%
c) Sugar Maple (*Acer saccharum*) 10%
d) White Oak (*Quercus alba*) 10%
e) White Pine (*Pinus strobus*) 10%
f) Red Maple (*Acer rubrum*) 10%
g) Black Cherry (*Prunus serotina*) 5%

All species are deciduous species with the exception of White Pine which is included to replicate current conditions. Trees would be planted in clusters, for two reasons. It is a practical way to cover a large area, and it also leads to the development of a multi-aged stand, as the older planted trees eventually spread and lead to younger trees in the in-between areas. Trees would also be planted in a variety of sizes (see Appendix E). This means that the stock will range in age from about 2 years to 10 years old. Large-tooth Aspen and Black Cherry are good candidates for younger planting stock. Red Oak and White Pine are good species to plant in both smaller and larger sizes. White Oak should be planted, along with other species, on the steeper pit walls as this species is most tolerant of very dry conditions. Butternut seedlings should also be planted if by the time of rehabilitation there is stock that is resistant to Butternut Canker and it is recommended practice. Precise numbers and sizes and spacing will be determined when creating a detailed planting plan and determining plant availability.

Bitternut Hickory (*Carya cordiformis*) and American Beech (*Fagus americana*) do not transplant well and thus are two species which should be regenerated using nuts. The nuts of these species could be planted, if available, over parts of the forest restoration area in the fall at a density simulating natural conditions if available. If the nuts are not buried, then many would be eaten by squirrels and other mammals. Native upland shrub species such as Chokecherry (*Prunus virginianus*), Rough-leaved Dogwood (*Cornus rugosa*), Maple-leaved Viburnum (*Viburnum acerifolium*) and Downy Arrow-wood (*Viburnum rafinesquianum*) should also be planted. The latter three species require some shade and so these species can be planted in the partial shade of the largest trees planted, but the numbers of these shrubs feasible to plant will be relatively small due to lack of shade.

Additional details of planting and maintenance of the planted trees and shrubs are listed in Appendix E.

Planted trees would be expected to form a forest canopy, in the form of a young forest, in about 20 years after planting. A more mature forest structure, similar to that currently in the Central Oak Woodland, would be expected after about 50 years post planting.

An additional piece of woodland rehabilitation, about 11 ha in size, could occur within the Southeast Quarter in one block. If located as shown both along the southern edge of this section, and along the east edge of the site it would enhance both interior area and linkage functions respectively (Figure 7). It would be planted with similar species and in a similar fashion as above.

8.5.3 Regeneration

The remainder of the Southeast Quarter area, and another part of the main block (together about 20 ha) would be left to return to meadow and thicket habitat similar to that on the site (Figure 7). Some of this area could also be seeded with meadow plants and planted with shrubs. This large block of meadow and thicket area would be connected to the thickets along the hydro line and would together support a diverse community of thicket wildlife such as exists on-site now. Two snake hibernacula can be built in this area which will have the potential to enhance reptile presence. Ultimately this area too would naturally become forested, but it would likely remain in a meadow/thicket state for about half a century.

8.5.4 Best Management Practices

In addition, the following natural environment recommendations are provided for incorporation into the Site Plan:

a) implementation under the supervision of a qualified ecologist of the specialized Preservation/Reforestation/Regeneration plan as explained in this report in section 8.5.1 and 8.5.3 and as listed in Appendix E;
b) tree protection fencing to be placed at a distance of 12 m from trunks of butternut trees in the south setback by a qualified ecologist prior to berm construction (as discussed in section 8.1). No disturbance will be permitted within the tree protection zone
c) edges of candidate Significant Woodland which are not to be excavated (i.e., along the buffers) shall be planted with conifers (e.g., native spruce species) which will help to minimize dust and noise disturbance into the woodlands;
d) topsoil and overburden shall be stripped and stored separately where sufficient soil horizons exist. Topsoil and overburden may be stored in berms; used during progressive rehabilitation; and/or stored in temporary berms/stockpiles at the perimeter of the area to be extracted until needed for rehabilitation;
e) surface drainage from any disturbed areas shall be directed into the pit excavation. Silt fencing, straw bales, ditches etc, shall be used as required to prevent sedimentation from leaving the site, until vegetation is established; and
f) all berms shall be graded to a maximum of 1.5:1 slopes. Berms, overburden stockpiles, and all areas progressively rehabilitated shall be vegetated with a perennial native grass mixture planted in the fall or spring season and shall be maintained and reseeded until self sustaining cover is established.

8.5.5 Maintain Existing Land Uses

Agricultural uses could be returned to the remaining area in between the natural areas in a quantity similar to existing conditions (approximately 39%). Also, following the recommended plan above would lead to a site with a similar proportion of natural land use as now. These proportions are currently approximately 38% forested, 21% cultural vegetation communities (thicket, meadow and hedgerow) and 2% wetland. At the same time the wildlife habitat conditions would ultimately be improved due to a changed woodland configuration.

9. Conclusions

The Level 1 Natural Environment Assessment concluded that candidate Significant Wildlife Habitat was found within the license area proposed by CBM Aggregates for a Class “A” Pit Above Water. In addition, Fish Habitat and candidate Significant Woodlands are present within the 120 m zone. There are no impacts to the Fish Habitat under the proposal. Impacts to the candidate Significant Woodlands and candidate Significant Wildlife Habitat which are primarily related to the removal of part of the woodlands can be remediated through rehabilitation. This would involve woodland replacement such that the woodlands replaced are similar or are higher quality woodlands than those currently present. At the same time, there would be no long-term loss of ecological function to the wildlife habitat due to woodland and thicket replacement.

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Appendix A

Photographs of Creek

(app ti pgs)

Photograph 26 ↑

Photograph 36 ↑

Photograph 40. ↑

Photograph 43. ↑

Appendix B

Plant Species List

(app ti pgs)

Appendix B. Plant Species Recorded on Codrington Property

AECOM

Family / Species	Common Name	Status[1]	Location			
			Central Oak Woodland	Wetland	Southeast Quarter	Other Open Areas*
PTERIDOPHYTA	***FERNS AND ALLIES***					
DRYOPTERIDACEAE	**WOOD FERN FAMILY**					
Onoclea sensibilis L.	Sensitive Fern			X		
DENNSTAEDTIACEAE	**BRACKEN FAMILY**					
Pteridium aquilinum (L.) Kuhn	Eastern Bracken		X		X	
GYMNOSPERMAE	***CONIFERS***					
CUPRESSACEAE	**CYPRESS FAMILY**					
Juniperus communis L.	Common Juniper				X	
Juniperus virginiana L.	Red Cedar				X	X
PINACEAE	**PINE FAMILY**					
Pinus strobus L.	White Pine		X		X	X
Tsuga canadensis (L.)Carr.	Eastern Hemlock		X			
LILIOPSIDA	***MONOCOTS***					
CYPERACEAE	**SEDGE FAMILY**					
Carex sp.	Sedge				X	
Carex formosa	Handsome Sedge	S3S4, R				
Carex pensylvanica Lam.	Pensylvanica Sedge				X	
Carex retrorsa Schw.	Retrorse Sedge			X		
Scirpus cyperinus (L.) Kunth	Wool-grass			X		
LILIACEAE	**LILY FAMILY**					
Asparagus officinalis L.	Garden Asparagus	+			X	
Erythronium americanum Ker	Yellow Trout Lily		X			
Maianthemum canadense Desf.	Canada MayFlower		X	X	X	
Maianthemum racemosum (L.) Link	False Solomon's-seal		X		X	
Maianthemum stellatum (L.) Link	Starry False Solomon's-seal			X	X	
Polygonatum pubescens (Willd.) Pursh	Solomon's-seal		C		X	
Smilax herbacea L.	Carrion-flower				X	
Trillium grandiflorum (Michx.) Salisb.	White Trillium		C			
Uvularia grandiflora Sm.	Large Bellwort		X			
POACEAE	**GRASS FAMILY**					
Agropyron repens (L.)	Quack Grass	+				X
Oryzopsis asperifolia Michx.	Rough-leaved Mountain-rice		X			
Phalaris arundinacea L.	Reed Canary Grass			X		
Phleum pratense L.	Timothy	+			C	
Setaria sp.	Foxtail	+				
MAGNOLIOPSIDA	***DICOTS***					
ACERACEAE	**MAPLE FAMILY**					
Acer negundo L.	Manitoba Maple			X	X	
Acer rubrum L.	Red Maple		X		X	
Acer saccharum Marsh.	Sugar Maple		C		X	
ANACARDIACEAE	**CASHEW FAMILY**					
Rhus radicans L.	Poison-ivy			X	C	X
Rhus typhina L.	Staghorn Sumac				C	X
APIACEAE	**CARROT FAMILY**					
Daucus carota L.	Wild Carrot, Queen Anne's Lace	+			X	X
APOCYNACEAE	**DOGBANE FAMILY**					
Apocynum androsaemifolium L.	Spreading Dogbane				X	
ARALIACEAE	**GINSENG FAMILY**					
Aralia nudicaulis L.	Wild Sarsaparilla		X			
ASCLEPIADACEAE	**MILKWEED FAMILY**					
Asclepias syriaca L.	Common Milkweed				X	X
Vincetoxicum rossicum (Kleopov) Borh.	Dog-strangling Vine	+				X

Appendix B. Plant Species Recorded on Codrington Property

AECOM

Family / Species	Common Name	Status[1]	Location			
			Central Oak Woodland	Wetland	Southeast Quarter	Other Open Areas*
ASTERACEAE	**ASTER FAMILY**					
Achillea millefolium L.	Yarrow	+				X
Ambrosia artemisiifolia L.	Common Ragweed			X		
Antennaria neglecta Greene	Pussytoes		X		X	
Arctium minus (Hill) Bernh.	Common Burdock	+			X	
Aster oolantengiensis Lindl.	Sky-blue Aster	R			X	
Aster eriocoides L.	Heath Aster				X	
Aster macrophyllus L.	Large-leaved Aster		X		X	
Aster novae-angliae L.	New England Aster				X	
Bidens vulgata Greene	Tall Beggarticks			X		
Chrysanthemum leucanthemum L.	Ox-eye Daisy	+				X
Erigeron philadelphicus L.	Philadelphia Fleabane					X
Helianthus divaricatus L.	Woodland Sunflower	U	X		X	
Hieracium sp.	Hawkweed				X	
Prenanthes altissima L.	Tall White Lettuce		C			
Solidago altissima L.	Tall Goldenrod				X	
Solidago caesia L.	Blue-stem Goldenrod		X			
Solidago nemoralis Ait.	Gray Goldenrod				X	
Taraxacum officinale Weber	Dandelion	+	X	X	X	X
Tragopogon pratensis L.	Meadow Goat's-beard	+				X
BERBERIDACEAE	**BARBERRY FAMILY**					
Caulophyllum thalictroides (L.) Michx.	Blue Cohosh				X	
Podophyllum peltatum L.	May-apple		X	X	X	X
BETULACEAE	**BIRCH FAMILY**					
Betula papyrifera Marsh.	Paper Birch		X		X	
Corylus cornuta Marsh.	Beaked Hazelnut				X	
Ostrya virginiana	Hop Hornbeam or Ironwood		X		X	
BORAGINACEAE	**BORAGE FAMILY**					
Echium vulgare L.	Viper's-bugloss	+				X
CAPRIFOLIACEAE	**HONEYSUCKLE FAMILY**					
Diervilla lonicera Mill.	Bush-honeysuckle		X			
Lonicera canadensis Marsh.	Fly Honeysuckle		X		X	
Lonicera dioica L.	Wild Honeysuckle		X			
Viburnum acerifolium L.	Maple-leaved Viburnum		X			
Viburnum lentago L.	Nannyberry			X		X
Viburnum rafinesquianum Schultes	Downy Arrow-wood		X		C	
CARYOPHYLLACEAE	**PINK FAMILY**					
Silene vulgaris (Moench) Garcke	Bladder Campion	+				X
CORNACEAE	**DOGWOOD FAMILY**					
Cornus alternifolia L.f.	Alternate-leaved Dogwood				X	
Cornus foemina Mill.	Grey Dogwood				X	X
Cornus rugosa Lam.	Round-leaved Dogwood		X		X	
Cornus stolonifera Michx.	Red-osier Dogwood			X		X
CUCURBITACEAE	**GOURD FAMILY**					
Echinocystis lobata (Michx.) T. & G.	Wild Cucumber			X		
FAGACECAE	**BEECH FAMILY**					
Fagus grandifolia Ehrh.	American Beech		X			
Quercus alba L.	White Oak		X		X	X
Quercus rubra L.	Red Oak		C		X	X
FABACEAE	**PEA FAMILY**					
Coronilla varia L.	Crown Vetch	+			X	
Desmodium canadense (L.) DC.	Showy Tick-trefoil		X			
Desmodium glutinosum (Muhl.) Wood	Pointed-leaved Tick-trefoil		X			

Appendix B. Plant Species Recorded on Codrington Property

AECOM

Family / Species	Common Name	Status[1]	Location			
			Central Oak Woodland	Wetland	Southeast Quarter	Other Open Areas*
Lotus corniculatus L.	Bird-foot Trefoil	+				X
Medicago sativa L.	Alfalfa	+				X
Melilotus alba Medic.	White Sweet-clover	+			X	
Melilotus sp.	Sweet-clover	+				X
Trifolium pratense L.	Red Clover	+			X	X
GERANIACEAE	**GERANIUM FAMILY**					
Geranium robertianum L.	Herb Robert	+			X	
GROSSULARIACEAE	**GOOSEBERRY FAMILY**					
Ribes cynosbati L.	Prickly Gooseberry		X		X	
Ribes glandulosum Grauer	Skunk Currant			X		
HYDROPHYLLACEAE	**WATERLEAF FAMILY**					
Hydrophyllum virginianum L.	Virginia Waterleaf		X			
HYPERICACEAE	**ST. JOHN'S-WORT FAMILY**					
Hypericum perforatum L.	Common St. John's-wort	+			X	
JUGLANDACEAE	**WALNUT FAMILY**					
Juglans cinerea L.	Butternut	END, C			X	X
LAMIACEAE	**MINT FAMILY**					
Mentha X piperita L.	Peppermint	+		X		
Monarda fistulosa L.	Wild Bergamot		X		X	
LYTHRACEAE	**LOOSESTRIFE FAMILY**					
Lythrum salicaria L.	Purple Loosestrife	+		X		X
OLEACEAE	**OLIVE FAMILY**					
Fraxinus americana L.	White Ash		X		X	X
ONAGRACEAE	**EVENING-PRIMROSE FAMILY**					
Circaea lutetiana L.	Enchanter's Nightshade			X		
PLANTAGINACEAE	**PLANTAIN FAMILY**					
Plantago lanceolata L.	English Plantain	+				X
PRIMULACEAE	**PRIMROSE FAMILY**					
Trientalis borealis Raf.	Star-flower		X			
RANUNCULACEAE	**BUTTERCUP FAMILY**					
Actaea sp.	Baneberry					
Anemone americana (DC.) H. Hara	Round-lobed Hepatica		X			
Aquilegia canadensis L.	Wild Columbine		X		X	
Clematis virginiana L.	Virgin's-bower			X		
Ranunculus sp.	Buttercup			X		X
Thalictrum dioicum L.	Early Meadow Rue		X			
RHAMNACEAE	**BUCKTHORN FAMILY**					
Ceanothus americanus L.	New Jersey Tea				X	
Rhamnus cathartica L.	Common Buckthorn	+		X	X	
ROSACEAE	**ROSE FAMILY**					
Amelanchier sp.	Serviceberry		X		C	
Crataegus sp.	Hawthorn sp.				X	X
Fragaria virginiana Dcne.	Common Strawberry					X
Malus pumila Miller	Apple				X	X
Potentilla norvegica L.	Rough Cinquefoil				X	
Prunus serotina Ehrh.	Black Cherry		X		X	
Prunus virginiana L.	Choke Cherry		X		C	X
Rosa blanda Ait.	Smooth Rose / Wild Rose					X
Rosa sp.	Rose				X	
Rubus idaeus L.	Wild Red Raspberry			X	X	X

Appendix B. Plant Species Recorded on Codrington Property

AECOM

Family / Species	Common Name	Status[1]	Location			
			Central Oak Woodland	Wetland	Southeast Quarter	Other Open Areas*
RUBIACEAE	**MADDER FAMILY**					
Galium aparine L.	Cleavers	U	X	X		
Galium palustre L.	Marsh Bedstraw			X		
Galium triflorum Michx.	Sweet-scented Bedstraw		X			X
SALICACEAE	**WILLOW FAMILY**					
Populus deltoides Marsh	Cottonwood			X		
Populus grandidentata Michx.	Large-toothed Aspen		X		X	X
Populus tremuloides Michx.	Trembling Aspen				C	X
Salix sp.	Willow			X		X
SCROPHULARIACEAE	**FIGWORT FAMILY**					
Verbascum thapsus L.	Common Mullein	+				X
TILIACEAE	**LINDEN FAMILY**					
Tilia americana L.	Basswood		X	X		
ULMACEAE	**ELM FAMILY**					
Ulmus americana L.	American Elm			X		X
VIOLACEAE	**VIOLET FAMILY**					
Viola affinis	Common Blue Violet					
Viola pubescens Ait.	Downy Yellow Violet			X		
Viola septentrionalis	Northern Violet			X		
Viola sororia Willd.	Common Blue Violet			X		
VITACEAE	**GRAPE FAMILY**					
Parthenocissus inserta (A. Kerner) Fritsch	Virginia Creeper			X	X	
Vitis riparia Michx.	Riverbank Grape			X	X	X

X = present in location; C = common in location

[1] Status

+ = Non-native species

U = Uncommon, generally 10-100 records within the region, R = Rare, generally <10 records in region (Cuddy 1991)

S3S4 = rare to uncommon/common (Natural Heritage Information Centre)

END = Endangered (Committee on the Status of Endangered Wildlife in Canada and Ministry of Natural Resources)

** Open areas included here are those west of the road allowance between Lots 32 and 33, thus excluding open areas in the Southeast Quarter*

Appendix C

Bird Species List

(app ti pgs)

Appendix C: Breeding Birds of Codrington Property

AECOM

Common Name	Scientific Name	Area-sensitive (OMNR[1])	Locations			
			Oak Woodland	Wetland	Southeast Quarter [2]	Other Open Areas [3]
Wood Duck	*Aix sponsa*			1		
Mallard	*Anas platyrhynchos*			1		
Red-tailed Hawk	*Buteo jamaicensis*					1
Ruffed Grouse	*Bonasa umbellus*	A[1]			2	
Mourning Dove	*Zenaida macroura*			1	2	1
Black-billed Cuckoo	*Coccyzus erythropthalmus*				1	
Hairy Woodpecker	*Picoides villosus*	A	1			
Northern Flicker	*Colaptes auratus*		1	1	1	
Eastern Wood-Pewee	*Contopus virens*		3			
Great Crested Flycatcher	*Myiarchus crinitus*		2			
Eastern Kingbird	*Tyrannus tyrannus*				1	2
Blue Jay	*Cyanocitta cristata*		2		3	
American Crow	*Corvus brachyrhynchos*				1	1
Black-capped Chickadee	*Poecile atricapillus*				2	1
White-breasted Nuthatch	*Sitta carolinensis*	A			1	
House Wren	*Troglodytes aedon*		1	1	1	
Veery	*Catharus fuscescens*	A	1			
American Robin	*Turdus migratorius*			2	3	1
Gray Catbird	*Dumetella carolinensis*				1	2
Cedar Waxwing	*Bombycilla cedrorum*		1		1	1
Warbling Vireo	*Vireo gilvus*			2		
Red-eyed Vireo	*Vireo olivaceus*		4	1		
Blue-winged Warbler	*Vermivora pinus*				2	1
Golden-winged Warbler	*Vermivora chrysoptera*				1	1
Nashville Warbler	*Vermivora ruficapilla*				1	
Yellow Warbler	*Dendroica petechia*			3		3
Chestnut-sided Warbler	*Dendroica pensylvanica*		1		2	
American Redstart	*Setophaga ruticilla*	A			1	
Ovenbird	*Seiurus aurocapillus*	A	5		3	
Mourning Warbler	*Oporornis philadelphia*				1	
Common Yellowthroat	*Geothlyphis trichas*			1		2
Rose-breasted Grosbeak	*Pheucticus ludovicianus*		2		3	
Indigo Bunting	*Passerina cyanea*		1		1	
Eastern Towhee	*Pipilio erythrophthalmus*				6	2
Field Sparrow	*Spizella pusilla*				4	3
Savannah Sparrow	*Passerculus sandwichensis*	A				2
Song Sparrow	*Melospiza melodia*			3	3	10
Red-winged Blackbird	*Agelaius phoeniceus*			4		1
Eastern Meadowlark	*Sturnella magna*	A				1
Common Grackle	*Quiscalus quiscula*			1		1
Brown-headed Cowbird	*Molothrus ater*				1	1

Appendix C: Breeding Birds of Codrington Property

AECOM

Common Name	Scientific Name	Area-sensitive (OMNR[1])	Locations			
			Oak Woodland	Wetland	Southeast Quarter [2]	Other Open Areas [3]
Baltimore Oriole	*Icterus galbula*		1	2	1	1
American Goldfinch	*Cardeulis tristis*					4

Field Work Conducted On: May 24, June 16, 2005

Total on Property
Number of Species: 43
Number of (provincial and national) Species at Risk [a]: 0
Number of S1 to S3 (provincially rare) Species [b]: 0
Number of Regionally Rare Species: 0
Number of Area-sensitive Forest Species: 4 (19 individuals)

KEY
[a] National Species at Risk are those listed by COSEWIC = Committee on the Status of Endangered Wildlife in Canada
Provincial Species at Risk are those listed by COSSARO = Committee on the Status of Species at Risk in Ontario
END = Endangered, THR = Threatened, SC = Special Concern (formerly Vulnerable)

[b] SRANK (from Natural Heritage Information Centre) shown for breeding status if: S1 (extremely rare), S2 (very rare), S3 (rare t
T (tracked species)that are S4 or S5 are also noted. Species actively tracked generally have fewer than 100 recent occurrence
or are highly ranked globally. SRANK not shown if: S4 (common), S5 (very common), SZB (breeding migrants or vagrants) an

1 = Area-sensitive source Ontario Ministry of Natural Resources (OMNR). 2000. Significant Wildlife Habitat Technical Guide (Appendix G). 151 p plus appendices. Ruffed Grouse and Purple Finch added to this list by GLL
2 - Woods, thickets and fields east of the Road Allowance between Lots 32 and 33
3 - Hydro line thickets, hedgrows and fields west of Road Allowance between Lots 32 and 33

Appendix D

Butternut Health Assessment

(app ti pgs)

Gartner Lee Limited

memorandum

to: Amarjit Sandhu, MHBC, 10 Davey Crescent, Kingston ON K7N 1X6
from: Rosalind Chaundy, Gartner Lee Limited
date: July 10, 2007
ref: 40642
re: Butternut Health Assessment

The Hilton CBM property was visited on May 29, 2007, in order to assess the health of the Butternut (*Juglans cinerea*) trees on the property. This species is listed as Endangered federally due to the rapid spread of a disease, the Butternut canker. Six trees (13 stems) along the south border of the property were assessed on this date. The table on the next page describes the health status of these individual trees using a method that combines descriptions of tree health and suggested management from two documents:

1. Czerwinski, E. 2005 (September). Ontario Butternut Forest Health Study. Ontario Ministry of Natural Resources, Peterborough. 5 pages (unpaginated).
2. Ostry, M.E., M.E. Mielke and D.D. Skilling. 1994. Butternut – Strategies For Managing A Threatened Tree. General Technical Report NC-165. St. Paul MN: United States Department of Agriculture, Forest Service, North Central Forest Experiment Station. 7 pp.

The trees are numbered from east to west in the locations shown on Figure 3 (Vegetation Communities) in the Level 1 and Level 2 Natural Environment Technical Report – Hilton Property. Tree #5 is about 50 metres east of where it is shown on the figure, but is still to the west of tree #4. Tree #6, a sapling not shown on the figure, is beside #5. All trees are flagged and numbered with red or orange flagging tape on an adjacent tree (except #6 which is flagged on the tree itself). Figure 3 will be edited and updated.

Of the six trees surveyed only one (#1) has clear signs of the Butternut canker and the rest are healthy. Tree #1 is nonetheless still relatively healthy at present. However, as the disease is present it is likely that the other individuals will become infected in future years. The 70-20-50 Retention Rule in Ostry *et al.* (1994), which has been used in Ontario, suggests that all individuals here should be retained (as suggested in report), as they have more than 70% live crown and less than 20% of the combined circumference of the trunk and root flares affected by cankers. The remainder of the rule suggests that trees with at least 50 % live crown and no cankers on the trunk or root flares should also be retained, but that those of poor vigour or dead can be cut. No trees assessed fall into either of these categories.

RFC:ns

Tree #	Vigour # *	Diameter at breast height	% Live Crown	Canker Symptoms Seen (on Branch)	Canker Symptoms Seen (on Trunk)	% Canker Stem Circumference	Callused Cankers	Comments
1 (two trunks joined at base)	2	35 cm 25 cm	90	none seen	4 oozing cankers (on larger trunk)	2%	No	cankers on larger of two trunks at base
2 (four trunks from one base)	1	20 cm 20 cm 22 cm 25 cm	95	none seen	none	0%	No	
3	1	13 cm	100	none seen	none	0%	No	20 m east of NW corner of field
4 (four trunks joined at base)	1	20 cm 18 cm 15 cm 21 cm	100	none seen	none, except for one possible non-oozing canker	0 - 1%?	No	some breakage in trunks presumably from other causes; old No-Trespassing sign on southeast trunk
5	1	3 cm	100	none seen	none	0%	No	
6	1	1 cm	-	-	-	-	-	appeared healthy – not rated due to small size

*Note: * Vigour 1 = Healthy, 2= Light Decline, 3 = Moderate Decline, 4 = Severe Decline, 5= Dead, natural, 6 = Dead, human caused. For full definitions see Czerwinski 2005.*

AECOM

Appendix E

Site Plan Planting Specifications

(app ti pgs)

Appendix E

Site Plan Planting Specifications

Preservation

1. Roughly 10 ha of the site along the northwest edge will be either retained in a natural state or restored (as shown in Figure 2 as outside the Limit of Extraction in the Level 1 and 2 Natural Environment Technical Report – Codrington Property).
2. Some of this is area is currently agricultural (pre-pit development) and will be reforested early in the life of the pit. The reforestation of the agricultural lands could occur with salvaged vegetation from the woodland area which will be removed for extraction purposes, or it could be re-planted with nursery stock.
3. If salvaging is used it would mean that the existing seed bank, ground cover, shrubs and small trees on site would be moved from the woodlands on site and placed in the agricultural area to be reforested.
4. Prior to berm construction, tree protection fencing should be placed at a distance of 12m from the trunks of the Butternut trees within the setback area (along the south license boundary), with the assistance of a qualified botanist (Figure 3 in Level 1 and 2 Natural Environment Technical Report – Codrington Property). No disturbance will be permitted in this tree protection zone.

Reforestation

1. For the rehabilitation of the former woodland in the centre west portion of the licensed area planting would occur in the northwest of the site such that the woodland will be returned to larger than its original size, with a significantly increased quantity of interior woodland (in the configuration as shown in Figure 5 and Figure 7 of the Level 1 and 2 Natural Environment Technical Report – Codrington Property).
2. Parts of this 24 ha rehabilitation area are composed of the preservation area mentioned above, and thus some reforestation will occur during and some after extraction.
3. The goal of the reforestation is to return the planted woodlands to forest with: native tree species similar to existing composition; a variable age structure; and with improved shape for interior wildlife habitat.
4. A detailed planting plan will be created by a professional biologist.
5. The reforestation will also require supervision and monitoring by a professional with expertise in native restoration.
6. Any temporary cover crops will need to be removed prior to native plant restoration.

7. Areas where forest rehabilitation is to occur should ideally have a similar drainage regime and topsoil type as occur currently on site. Topsoils are mostly well-drained silty fine sands, sandy silts and sands. If available, replacement with native topsoils from the site before trees and shrubs are planted should occur. Imported topsoil should not be used due to problems associated with seeds of invasive species potentially occurring.
8. Reforestation, pre, during and post-extraction, would occur with native tree species similar to those on the site now, or with other native species suitable to the site conditions and found in the watershed. The following is a suggested list of tree species to be planted with the approximate percentages of each species:
    - Red Oak (*Quercus rubra*) 35%;
    - Largetooth Aspen (*Populus grandidenta*) 20%;
    - Sugar Maple (*Acer saccharum*) 10%;
    - White Oak (*Quercus alba*) 10% (this species should be planted on the steepest slopes (former pit walls) along with other species);
    - White Pine (*Pinus strobus*) 10%;
    - Red Maple (*Acer rubrum*) 10%; and
    - Black Cherry (*Prunus serotina*) 5%.
9. Butternut could also be planted at the time of final restoration (~2% of stock) if by that date there is Butternut Canker disease-resistant strains of the species. This species requires full sun when young.
10. Trees should be planted in clusters to allow for natural regeneration.
11. Trees should also be planted in a variety of sizes. They should be in approximately three (or more) size grades, for example: 60 mm caliper (perhaps 10% of stock), 30 mm caliper (30%), and whips (1 to 2 m tall, 60%). This means that the stock will range in age from about 2 years to 10 years old.
12. Native upland shrub species such as Chokecherry (*Prunus virginianus*), Round-leaved Dogwood (*Cornus rugosa*), Maple-leaved Viburnum (*Viburnum acerifolium*) and Downy Arrow-wood (*Viburnum rafinesquianum*) should also be planted. The latter three species require some shade and so these species can be planted in the partial shade of the largest trees planted, but the numbers of these shrubs feasible to plant will be relatively small due to lack of shade.
13. Nursery stock is acceptable as long as it is clearly of Ontario origin.
14. Precise numbers and sizes and spacing will be determined when creating a detailed planting plan and determining plant availability.
15. Mulching should occur with seed-free straw (not hay) or wood chips to a depth of three to five cm, in a 50 cm ‘donut’ around the tree (i.e., avoid touching the trunk with mulch.
16. Trees should not be staked.
17. If possible and available, nuts of Bitternut Hickory (*Carya cordiformis*) and American Beech (*Fagus americana*) should be planted over parts of the forest restoration area in the fall at a density simulating natural conditions. The nuts should be buried and not left on the surface.

18. In order to ensure the highest survival of planted material, in the first year, watering should be done at the time of planting as well as twice a month until vigorous growth appears or until the fall of the first year.
19. Optional rodent guards could be used at the base of the trees and if used should be high enough up the tree so rodents cannot stand on the snow cover and feed on the trunk. Such protection should be present for about five years after which it should be removed. If follow-up on the removal is uncertain, it is better not to use rodent guards.
20. Some mortality of planted trees would be expected, but this would be offset by planting with replacement trees if less than 90% survive. Survivorship monitoring should occur at one and two years planting.
21. An additional piece of woodland rehabilitation, about 11 ha in size, should occur within the southeast portion of the licensed area in one block, in a configuration as shown along the south edge and east edges of the site (Figure 7 of the Level 1 and 2 Natural Environment Technical Report – Codrington Property). It would be planted with similar species and in a similar fashion as above (Reforestation 1 through 21).

Regeneration

1. The remainder of the land east of the road allowance, and another part of the main block (together about 20 ha) should be left to return to meadow and thicket habitat similar to that on the site prior to pit excavation (in the configuration as shown as Meadow Thicket on Figure 7 of the Level 1 and 2 Natural Environment Technical Report – Codrington Property). Some of this area could be seeded with meadow plants and planted with native shrubs that are shade-intolerant.

Additional Best Management Practices and Enhancements

1. Edges of adjacent woodlands (i.e., along the buffers) shall be planted with conifers (e.g., Eastern White Cedar or White Spruce) which will help to minimize dust and noise disturbance into the woodlands;
2. Topsoil and overburden shall be stripped and stored separately where sufficient soil horizons exist. Topsoil and overburden may be stored in berms; used during progressive rehabilitation; and/or stored in temporary berms/stockpiles at the perimeter of the area to be extracted until needed for rehabilitation;
3. Surface drainage from any disturbed areas shall be directed into the pit excavation. Silt fencing, straw bales, ditches etc, shall be used as required to prevent sedimentation from leaving the site, until vegetation is established; and
4. All berms shall be graded to a maximum of 1.5:1 slopes. Berms, overburden stockpiles, and all areas progressively rehabilitated shall be vegetated with a perennial native grass mixture planted in the fall or spring season and shall be maintained and reseeded until self sustaining cover is established.
5. Two snake hibernacula should be built. These are approximately 2 by 2 m holes that are dug in the ground above the water table. They are filled with large boulders or other objects and then soil is placed on top. Each hibernacula should be within the meadow or thicket area, not close to roads and with a south or west exposure. Additional construction details should be gathered when hibernacula are to be built.

Appendix F

Curricula Vitae

(app ti pgs)

AECOM

Dale Anne Leadbeater

B.Sc., B.Ed
Senior Biologist

Resumé

Professional History

AECOM
(formerly Gartner Lee Limited)
Senior Biologist
Markham, ON
2008

AECOM
(formerly Gartner Lee Limited)
Senior Biologist,
Office Manager Ecology
Markham, ON
2004 – 2008

AECOM
(formerly Gartner Lee Limited)
Senior Biologist
Markham, ON
1999 – 2004

AECOM
(formerly Gartner Lee Limited)
Biologist
Markham, ON
1998 – 1999

Central Lake Ontario Conservation Authority
Ecologist
1997 – 1998

AECOM
(formerly Gartner Lee Limited)
Biologist
Markham, ON
1994 – 1997

Canadian Federation of University Women, and the Durham Board of Education
Secondary School Teacher, Math and Science and Presenter for Scientists in School,
1993

Royal Ontario Museum
Research Assistant to Dr. Tim Dickinson, Department of Botany
1993

Summary

Dale Leadbeater has extensive experience in education, communication, and environmental consulting with specialization in botany, ecology and wetlands. Positions at the University of Toronto, a wide variety of consulting contracts, teaching assignments and an active volunteer role on behalf of wildlife conservation have contributed to her unique understanding of issues related to the natural environment, including assessment of environmental effects of development and environmental planning. She is a qualified wetland evaluator and serves on the Board of Directors of the Society for Ecological Restoration – Ontario Chapter. Her recent work includes Provincial and Federal Environmental Assessment, land use planning, plan review and policy development for Regional and Municipal Official Planning exercises and natural heritage management plans for both private and municipal clients.

Experience

Land Management Plans

- *Master Plan for Regional Municipality of Halton Forest; 2001 – 2004*
  Detailed inventory and public consultation formed the basis of a 20-year Master Plan for Forest Management.
- *Niagara Falls Moraine Management Plan and Implementation, Niagara Parks Commission; 1998 – 2003*
  A management strategy was developed for the Niagara Parks Commission to balance aesthetics, recreation (access and trails) and view management with sustaining and enhancing biodiversity. Important aspects of the project included the development of policies and management strategies to guide the future protection and enhancement of the moraine.
- *Orono Crown Forest Land Management Plan, Ministry of Natural Resources; 1999 – 2000*
  Development of baseline inventory, advisory committee and issues analysis in support of Management Planning in conjunction with a public consultation process.
- *Trail Sensitivity Report - Oshawa Second Marsh; 1994*
  A study was conducted for Environment Canada to locate sensitive areas in the portion of the wetland known locally as Ghost Road Bush, in order to design a trail that met tourism and educational criteria, while minimizing impact to sensitive features.

Professional History

Royal Ontario Museum
Co-curator of Outreach Exhibit
1991 – 1993

Freelance Environmental Consultant
1978 – 1993

University of Toronto
Curatorial Assistant/Acting Curator of the Vascular Plant Herbarium, Department of Botany
1973 – 1978

Academic Training

Bachelor of Education, Ontario Teaching Certificate
University of Toronto, Faculty of Education
1992 – 1993

Bachelor of Science
University of Toronto
1987 – 1992

Bachelor of Science
University of Toronto
1971 – 1974

- *Vegetation Inventory of the North Shore of Lake Superior; 1977*
  Evaluated environmental impact of camping facilities at Pukaskwa National Park.
- *Loggerhead Marsh, Management Plan. City of Peterborough; 1999 – 2000*
  Maintenance of marsh attributes while promoting use as a stormwater polishing facility.

Expert Testimony

Ontario Municipal Board:

- Ajax A3 Planning Area: Representing the Town of Ajax (1997)
- Bramwest Subwatershed Study: Representing the Region of Peel and Credit Valley Conservation (2000)
- Birchdale Village Subdivision: Representing Black Creek Developments (2000)
- German Mills Drive Subdivision: Representing Forest Manor Investments (2000)
- Wat Lao Temple, Caledon: Representing adjacent land owners (2000)
- Gibson Hill Wetland: Representing the City of Kawartha Lakes (2003)
- 56 Grovetree Road Development within Ravine including preparation of Environmental Impact Study: Representing the City of Toronto (2005)
- 70 – 200 Russell Hill Road: Representing the City of Toronto (2006)

Ontario Provincial Court

- Contravention of Tree Cutting By: Representing the Regional Municipality of Halton (2004)

Commissioner of Lands and Mines

- 119R Glen Road, Toronto. Representing a private landowner.

Environmental Impact Studies

- *1900 Bayview Condominium Environmental Impact Study and Ravine Management Plan; 2003 – 2006*
  Infill development within Ravine Protection Limit, City of Toronto. Environmental work was accepted by the City of Toronto and Conservation Authority and although some issues remained for the Ontario Municipal Board, environmental issues were not contested.
- *Bloorview Children's Hospital Redevelopment, Shepard and Leslie, City of Toronto; 2004 – 2006*
  Infill development within Ravine Protection Limit, City of Toronto. Environmental work was not contested at the Ontario Municipal Board.

- *Bramwest Block 4 Environmental Implementation Review; 2004 – Present*
  Unique opportunity to design natural heritage mitigation specific to sandy outwash terrain.
- *Oak Ridges Moraine (ORM) Conformity Reports; 2005 – Present*
  Demonstration of compliance with the ORM Conservation Plan to protect ORM integrity while permitting development proposals in the City of Pickering, Town of Aurora and Township of Uxbridge.
- *Marcy's Woods Environmental Impact Study, Town of Fort Erie; 2005*
  Identification of minor development opportunity in a complex landscape that included a provincially significant wetland, an area of natural and scientific interest and coastal sand dunes.
- *Ajax A9 Environmental Study, Town of Ajax; 2003 – 2006*
  Analysis of environmental constraints and opportunities in support of secondary planning.
- *Jizoco EIS, Town of Ajax; 2003*
  Proposal for residential development on a site transversed by three watercourses.
- *Carruthers Creek Golf Course EIS, Town of Ajax; 1999 – 2000*
  Required careful, large scale analysis of water budget to prevent impact to a provincially significant wetland.
- *Heather Glen Golf Course EIS, Regional Municipality of Durham; 1999 – 2000*
  A "forensic" EIS to evaluate impacts after construction.
- *Ajax A3 Co-ordinated Environmental Study, Town of Ajax; 1997*
  Assessment of environmental sensitivities for a reach of Carruthers Creek and recommendations for guidelines for development.
- *Lyon's Creek EIS, City of Niagara Falls; 1996*
  Assessment of impact on wetland and woodlot of proposed development and recommendation of mitigation and setbacks.
- *Environmental Impact Study for Class 1 Wetland, Haliburton; 1995*
  Assessment of lake front development impacts on a provincially significant wetland.
- *Lower Highland Creek Trail EIS and Detailed Design; 1995*
  The proposal to extend the valley trail through this area from Lawrence Avenue to the Lake Ontario waterfront required particular attention to sensitive features and functions. AECOM (formerly Gartner Lee Limited) prepared the wetland EIS the trail alignment and subsequently the detailed design for the trail construction for Metro Parks and Culture.

Sustainability and Restoration Ecology

- *Framework for Assessing Sustainable Land Development Potential (FALDP); 2005*
  A tool that integrates the scientific characterization of natural environmental features with financial costs and social benefits in order to provide a means of communicating and negotiating tradeoffs with stakeholder groups across multiple scenarios.
- *Function of Natural Heritage Features In Water Quantity Control in Southern Ontario, Ontario Ministry of Natural Resources; 2002 – 2004*
  Literature review and interviews with researchers to compile a summary of the state of the art.
- *Taylor Creek Park Restoration Priorities, City of Toronto; 2000 – 2001*
  Determination of priority sites for restoration potential based on a functional ecosystem analysis and landscape context.

- *Riverdale Farm Sanctuary Pond Rehabilitation; 2000 – 2001*
  Analysis of pond and wetland dynamics in the context of a major valley slope ecosystem to provide guidance for options for naturalization program.
- *Farewell Week Restoration Priorities; 1999*
  Testing of Environment Canada's AOC guidelines in support of identification of restoration priorities.
- *Town of Vaughan; 1997*
  Design of a mitigation and enhancement plan for the Leslie Street Wetland to permit golf course construction.
- *City of Oshawa; 1994 – 1997*
  Second Marsh Trail Sensitivity Study and Vegetation Monitoring Study: Participation in the analysis of impacts on natural areas of a recreational trail systems and input to trail design and monitoring.
- *City of Toronto; 1994*
  Preparation of a document and map for City of Toronto Parks and Recreation to identify priorities for restoration of the ravine system together with direction for management.

Ecosystem/Subwatershed Management Studies

- *Identification of Sites for Wetland Creation in the Regions of Peel, Halton and York; 2004 – 2005*
  Managed a modelling exercise for Toronto and Region Conservation and Credit Valley Conservation to prepare mapping that identified sites within the Peel, Halton and York Region portions of their watersheds that would be suitable for wetland creation using GIS.
- *Foster Creek Subwatershed Study, Municipality of Clarington; 1999 – 2000*
  Managed the preparation of this project to facilitate development proposals.
- *Lynde Shores Conservation Area Management Plan; 1997*
  While at CLOCA, provided the wildlife and vegetation functional analysis and framework for evaluation.
- *Gateway West Subwatershed Plan - City of Brampton; 1995 – 1996*
  Assisted in preparation of a subwatershed study in support of Brampton's Secondary Plan.
- *Simcoe County and Tay Township; 1995 – 1996*
  Assisted in preparation of natural heritage system as input to the Official Plan.
- *Whitby Secondary Plan; 1996*
  Provided natural heritage component for land use planning.

Environmental Assessments

- *Route Selection for Highway 407, Brock Road to Highway 115; 2005 – Present*
  Full environmental assessment to determine transportation corridor through sensitive head-waters, wetlands and forests.
- *Don Rivermouth Naturalization and Flood Control Project; 2004 – Present*
  Unique approach to a full environmental assessment for a proposed wetland and river naturalization that includes flood protection for a portion of the portlands.

- *Widening of the Queen Elizabeth Way, Trafalgar Road to Third Line, Oakville; 2000 – 2007*
  Resolution of natural heritage issues for preliminary and detailed design for crossing of Oakville Creek.
- *400-Series Highways – Ontario Ministry of Transportation. Highway 404 Extension from Newmarket to Beaverton, 1994-1997; Highway 403 Widening, Hamilton, 1995-1997; Highway 401 Widening, Pickering, 1994; Highway 410, Preliminary and Detailed Design Studies, Brampton; 1997 to 2004*
  Full and Class Environmental Assessments where potential impacts to wetlands, riparian habitats, wildlife habitat and natural corridors were major issues.
- *Highway 6 Widening – Highway 403 to Highway 5, Flamborough; 1997 – 2005*
  Provided vegetation and wildlife habitat inventory and assessment for the preliminary design study.
- *Highway 69, Sudbury to French River, Natural Environment and Socio-Economic Assessments; 1997*
  Inventory and assessment of effects of highway on natural and social environments for a 70 km stretch of highway between the French River and Sudbury were provided.
- *Ontario Hydro, 1994*
  Assessment of environmental implications of redevelopment of the Ear Falls Dam Hydro Generating Station, including social impacts.
- *Regional Municipality of Durham, Pringle Creek Bridge, Consumer's Drive, Whitby, 1994; Manning Drive and Adelaide Avenue connector, Corbett Creek, Oshawa; 1995*
  Class environmental assessment of minor roadworks with potential impacts on aquatic environment, wetlands and wildlife corridors.

Biological Monitoring

- *Ontario Ministry of Transportation; 2005*
  Participated in a review of the impacts of road salt on ecosystems and the response as a result of reduction of application.
- *Glenridge Naturalization Site Forest Sensitivity Study, Regional Municipality of Niagara; 1994 – Present*
  Monitored the effect of increased salt concentration in seeps associated with the former Glenridge Quarry, St. Catharines, ON.
- *Environment Canada and Friends of Second Marsh; 1996 – 1998*
  Vegetation mapping using Ecological Land Classification for Southern Ontario (Lee *et al.*, 1998) and design and implementation of plan survivorship protocols.
- *Town of Whitby and CLOCA; 1998*
  Design of wildlife monitoring protocol for Whitby Shores residential development.
- *Environment Canada and Friends of Second Marsh; 1999*
  Monitoring of revegetation in Oshawa Second Marsh.

Policy and Official Planning

- *City of Vaughan, Environmental Input to the Official Plan*
  Development of an innovative approach to the management of natural heritage within a sustainable framework that compliments the emerging Environmental Management Plan.
- *Ministry of Public Infrastructure Renewal; 2005*
  Review of Natural Heritage System in support of the Growth Plan for the Greater Golden Horseshoe
- *Regional Municipality of Halton; 2002*
  Rationale and methodology for determining significant woodlands in the context of the Provincial Policy Statement 2.3 in support of the update to the Official Plan.
- *Central Lake Ontario Conservation Authority; 1998*
  Developed guidelines for implementation of the Environmental Hazard Protection Limits with respect to wetlands.

Environmental Sustainability of Tourism

- *Premier-ranked Tourist Destinations: A Self-guided Workbook; 2001*
  Collaborated in the development of a user-friendly guide to evaluating tourism products in Ontario for the Investment and Development Office, Ontario Ministry of Tourism, Culture and Recreation.
- *Ecotour Facilitator; 1990 – 2002*
  Arranged, wrote interpretive notes for and conducted ecotours throughout Ontario, Central and South America. The tours emphasize the need to understand and enjoy the destinations while minimizing negative impacts to the cultural and natural environments and to demonstrate the economic benefits of resource stewardship and sustainable ecotourism.

Educational Assignments

- *Environmental Impact Assessment, Scarborough College, University of Toronto; 2007*
  Designed and instructed this third-year undergraduate course.
- *Consultant to a Joint Trent University – Fleming College Restoration Ecology*
  Course to commence 2008.
- *Ecological Land Classification for Southern Ontario on behalf of the Ontario Ministry of Natural Resources; 1999 – 2008*
  Designed the teaching objectives, outcomes and much of the methodology for the course and led the teaching team delivering this training course.
- *Environmental Impact Assessment, Trent University; 2003*
  Facilitated and co-taught this third-year undergraduate course.
- *Miscellaneous Lectures in Restoration Ecology and Botany; 1975 – Present*
  Trent University and York University, and participated in a created wetlands symposium at Sheridan College. She has conducted numerous public information seminars whose audiences ranged from staff at the Poison Control Centre of the Hospital for Sick Children to naturalists' and horticulture groups. She has taught classes in wildlife and ecology for the Scientists in School project of the Durham Region Board of Education and Canadian University Women's Club, grades Kindergarten to eight. She has also taught OAC Biology and grade 11 Math.

Awards

- Award of Appreciation, Durham Region Field Naturalists, 50th Anniversary Celebration (2005)
- Conservation Award, Pickering Naturalists (2005)
- Award of Merit, Friends of Second Marsh (1995 – 1996)
- Environmental Citizenship Award, Environment Canada (1993)

Professional Affiliations

- Field Associate of the Botany Department, Royal Ontario Museum
- Society for Wetland Scientists
- Society for Ecological Restoration, Ontario Chapter – Board of Directors
- Federation of Ontario Naturalists
- Field Botanists of Ontario
- Pickering Naturalists
- Kawartha Field Naturalists
- Toronto Entomological Association

Publications

Leadbeater, D., 2004:
An Issue of Conservation: The Cameron Ranch. Website material for the Couchiching Conservancy.

Leadbeater, D., 2001:
So What is Native Anyway? Native Plant Resource Guide for Ontario 2001-2002 for Ecological Restoration, Ontario Chapter.

Varga, S., D. Leadbeater, J. Webber, J. Kaiser, B. Crins, J. Kamstra, D. Banville, E. Ashley, G. Miller, C. Kingsley, C. Jacobsen, K. Mewa, L. Tebby, E. Mosley and E. Zajc, 2000:
Distribution and Status of the Vascular Plants of the Greater Toronto Area. Ontario Ministry of Natural Resources, Aurora District.

Leadbeater, D., 1999:
On the Path to Naturalization: Incorporating Native Plantings into Urban/Suburban Habitats. Native Plant Resource Guide 2999-2000. Society for Ecological Restoration.

Henshaw, B. and D. Leadbeater, 1999:
The Watershed of Farewell Creek - Natural Heritage Features and Restoration Properties. Central Lake Ontario Conservation Authority and Friends of Second Marsh, Stewardship Branch.

Leadbeater, D. and T. Bosco, 1998-1999:
Highland Creek, Trail of Trials. Society for Ecological Restoration.

Henshaw, B. and D. Leadbeater, 1998:
The Spatial Distribution of Waterfowl Nests and Predation Patterns in the Vicinity of Oshawa Second Marsh and Lynde Shores Conservation Area. Prepared for: Friends of Second Marsh and Environment Canada.

Hoy, D. (neé Leadbeater), 1997:
The Ridges at Long Sault. pp. 47-50 *in* Storm Coalition, The Oak Ridges Moraine. Boston Mills Press.

Hoy, D., 1996:
Cattails: Coming of Age. Wetlands and Wildlife. Friends of Second Marsh, Vol. 2, No. 1.

Kamstra, J., D. Hoy and B. Henshaw, 1994:
Biological Sensitivities of the Oshawa Second Marsh Secondary Trail. Prepared by AECOM (formerly Gartner Lee Limited) for Parks Division, City of Oshawa. Unpublished.

Hoy, D., 1994:
Flora of Durham - Update 1993. The Durham Region Natural History Report 1993. Margaret Bain and Brian Henshaw Eds. & Pubs.

Hoy, D., 1994:
Wetland Restoration - Preliminary Report on Vegetation Inventory and Analysis. Prepared for M.M. Dillon Limited. Unpublished.

Hoy, D., 1993:
Bird counters set record by identifying 101 species. The Haliburton County Echo, Haliburton.

Hoy, D., 1993:
Pumphouse Marsh, Oshawa - Black Terns and Water Willows. The Durham Region Natural History Report 1992. Margaret Bain and Brian Henshaw Eds. & Pubs.

Hoy, D., 1993:
Suggestions for Vegetative Remediation as a Method to Control Canada Geese at Duffin Creek Water Pollution Control Plant, Pickering, Ontario. Prepared for Brian Henshaw, consulting for the Regional Municipality of Durham, Works Department. Unpublished.

Hoy, D., 1993:
Vascular Plant Checklist for Five Short List Candidate Waste Disposal Sites, Regional Municipality of Durham. Prepared for M.M. Dillon Consulting Engineers. Unpublished.

Hoy, D., 1993:
Vascular Plant Specimen Identifications for Four Short List Candidate Landfill Sites, Lambton County. Prepared for M.M. Dillon Consulting Engineers. Unpublished.

Hoy, D., 1992:
Durham Flora - Starting to Grow, 1991. Annual Bird Report, Durham Region, Ontario, 1991. Margaret Bain and Brian Henshaw Eds. & Pubs.

Hoy, D., 1991:
Toward a Flora of Durham. Annual Bird Report, Durham Region, Ontario, 1990. Margaret Bain and Brian Henshaw Eds. & Pubs.

Leadbeater, D.A., 1979:
Trees, Shrubs and Flowers to know in Ontario. J.M. Dent & Sons (Canada) Limited. In press. Contributor to reprint of McKay, Sheila & Paul Catling,

AECOM

Rosalind F.C. Chaundy

B.Sc.,M.Sc.F
Terrestrial Biologist

Resumé

Professional History

AECOM
(formerly Gartner Lee Limited)
Terrestrial Biologist
Markham, ON
2001 – Present

Bird Studies Canada
Technical Co-ordinator
Important Bird Areas of Canada
1999 – 2001

Independent Biological Consultant
1993 – 1996

Owl Rehabilitation and Research Foundation
Technician
1991 – 1993

Biological Consultant and Technician
1988 – 1991

Academic Training

Master of Science in Forestry
University of Toronto
Faculty of Forestry
1996 – 1998

Bachelor of Science
University of British Columbia
Zoology
1983 – 1988

Summary

Rosalind Chaundy is an Ecologist with over 20 years of ecological field inventory, assessment and research experience, and an in-depth knowledge of avifauna and forest ecosystems. Since joining Gartner Lee in 2001, she has prepared numerous Environmental Impact Studies, Environmental Assessments and other assessment reports. Rosalind manages many smaller projects and co-ordinates natural heritage, terrestrial ecology, wildlife or ornithological components of larger projects. She has worked on projects where she was responsible for: wildlife monitoring, functional habitat analysis, identification of local, provincial and nationally significant species, development constraints and opportunities, attribute assessment, landscape connectivity and wildlife passage analysis, impact and mitigation components of the project. These projects took place in a variety of locations across south-central Ontario. She has the ability to inventory a wide range of organisms including birds, amphibians, mammals, and terrestrial plants.

Rosalind has completed two comprehensive training courses: the Ecological Land Classification (ELC) course for Southern Ontario, and Ontario Ministry of Natural Resources' Ontario Wetland Evaluation System course. She has also completed workshops or courses in Air Photo Interpretation, Surface Water Quality Sampling Techniques, Project Management, and Cumulative Affects Assessment. Projects she has undertaken prior to working at Gartner Lee include: the national co-ordination of the assessment of Important Bird Areas, Ontario Forest Bird Monitoring Program initiation and surveys, as well as regional co-ordination for the Ontario Atlas of Mammals.

Experience

Provincial Environmental Assessments (EA)

- *Highway 407 East (Extension), Government of Ontario in Durham Region, 2006 – ongoing*
  Terrestrial Wildlife Lead for East (GLL) Portion of Project: conducted Ecological Land Classification surveys; co-ordinated and conducted bird surveys; provided analysis and impacts of alternative routes on wildlife; contributed to impact assessment reporting (wildlife and vegetation); contributed to drainage reports; analyzed and designed wildlife passage requirements and structures.

- *Southeast Collector Trunk Sewer EA, York and Durham Regions, 2006 – 2008*
  Assisted with co-ordination of Natural Environment Baseline Studies report; co-ordinated wildlife survey program; conducted bird surveys; wrote ornithology section of report; contributed to evaluation of alternatives; contributed to impact assessment report including proposed environmental enhancements for wildlife.
- *Conestogo Highlands Wind Farm EA, Wellington County, 2006 – 2008*
  Co-ordinated and conducted four-season bird surveys for a large wind farm project; liaised with Canadian Wildlife Service over protocols; reporting.
- *Stouffville Road Improvements Class EA, York Region, 2003, 2005 – 2006*
  Conducted amphibian surveys; classified vegetation communities and assessed communities for relative sensitivity and wildlife potential; assessed culverts for wildlife passage potential.
- *Ecology Impact Assessment, Walker (Landfill) EA, Niagara Region, 2004 – 2006*
  Project managed and co-ordinated EA ecology report for proposed landfill.

Site Assessments and Impact Studies

- *St. Mary and St. Abraam Coptic Orthodox Church Scoped Environmental Impact Study (EIS), City of Ajax, 2007 – ongoing*
  Project managed, prepared EIS, staked Top-of-Bank, and liaised with client and conservation authority.
- *L Level 1 and 2 Natural Environment Technical Report, private aggregate company, Northumberland County, 2004 – ongoing*
  Managed project and co-ordinated natural environment technical report for proposed pit based on my field studies of birds, vegetation, and amphibians; wrote report and liaised with client and other consultants.
- *Assessment of Wetland/Future Quarry Interface, K.J. Beamish Construction Co. Limited, Kawartha Lakes, 2008 – ongoing*
  Surveyed wildlife and vegetation, staked wetland edge with Ministry; ongoing tasks.
- *Eco-place Bird Assessment, Nordeagle Developments Ltd., Town of Whitby, 2008*
  Analyzed potential of proposed high-rise building to cause impacts to breeding and migratory birds.
- *Whiting Street Environmental Impact Study, Ingersoll, County of Oxford, 2006*
  EIS; work included field studies (birds, amphibians, vegetation, water level monitoring); communications with client and conservation authority.
- *Environmental Impact Study Report, Community Planning Area #3, Town of Bradford-West Gwillimbury, 2004 – 2006*
  Project managed EIS report; included wildlife (birds and amphibians) and vegetation surveys, co-ordination and report writing and negotiations with conservation authority.
- *Downers Corners Wetland, Otonabee Region Conservation Authority and City of Peterborough, 2004*
  Co-ordinated reporting and conducted wildlife inventory and impact assessment of development on Provincially Significant Wetland;.
- *Orangeville South Arterial Road, Counties of Dufferin and Peel, 2003 – 2004*
  Assessed impacts of road through sensitive environmental features and proposed mitigation including wildlife passage for Environmental Impact Statement.

Natural Heritage Studies, Management Plans and Evaluations

- *Key Natural Heritage Feature Assessment, Oak Ridges Moraine Private Property, Town of Whitchurch-Stouffville, 2008-2009*
  Assessed natural features on property for potential purposes of division into park land and development land.
- *Area-sensitive Forest Birds in Urban Areas – A Review, Environment Canada, 2005*
  Contributed to research and writing of review paper discussing area-sensitive forest birds in urban areas and reasons/stressors for their presence and absence.
- *Pickering Lands Integrated Water Management Study, Greater Toronto Airport Authority, 2004 – 2005*
  Evaluated landscape connectivity of Pickering Lands using vegetation classification and air photo mapping.
- *Wetland Evaluation, Town of Innisfil, Simcoe County, 2004*
  Co-evaluator in evaluation of swamp wetland.
- *Halton Agreement Forest Management Plan, Regional Municipality of Halton, 2001*
  Assessed wildlife significance and carried out landscape connectivity analysis of 14 forest tracts in municipality.
- *Important Bird Areas of Canada Program, Bird Studies Canada and Canadian Nature Federation, 1999 – 2001*
  Using internationally set criteria, co-ordinated the identification and assessment of hundreds of sites across Canada that were important for birds at a national and international level.

Ecological Restoration

- *Windermere Basin Wetland Implementation Environmental Assessment, City of Hamilton, 2007-2008*
  Assessed current wildlife and wildlife potential for industrially-located basin in City. Contributed to wetland restoration discussions and plans for site.
- *Sewage Lagoon Wetland Restoration, York Region, 2008 - ongoing*
  Surveyed wildlife at four lagoon sites; will be involved in the assessment and design for future wetland wildlife habitat.
- *Bloorview Ravine Stewardship Plan, Cityzen Development Group, City of Toronto, 2008*
  Developed and wrote Ravine Stewardship Plan and associated restoration in ravine containing numerous invasive species.
- *Planting Plan for Residential Housing Development, Cityzen Development Group, City of Oakville, 2008*
  Developed planting plan with aquatic and terrestrial species in a pond and adjacent lands in newly developing residential area.
- *Noble Ridge Community Planting Plan, Nobleton, R.M of York, 2006*
  Developed planting plan for valleyland and buffers adjacent to a large residential development.

Biological Inventory

- *The Massassaga Provincial Park, Ontario Species at Risk Inventories, 2006*
  Surveyed Prairie Warblers throughout park.

- *Ontario Breeding Bird Atlas I and II, Federation of Ontario Naturalists/ Canadian Wildlife Service, 1984-1985; 2001-2006*
  For 1st atlas, as employee, surveyed locations for breeding birds in wide-ranging parts of Ontario from the Carolinian forest zone to the boreal zone. For 2nd atlas, as volunteer, surveyed two areas and edited text in atlas book for several species.
- *Queen Elizabeth II Species at Risk Study, Ontario, 2005*
  Participated in field searches for rare bird and herpetile species in new park.
- *Redhill Valley Raptor Study, Hamilton Region Conservation Authority, 1996*
  Surveyed and reported on the status of migratory birds of prey and breeding owls in valley.
- *Ecological Land Classification (Forest Ecosystem Classification), Ontario Ministry of Natural Resources, 1995*
  As part of the development of Ecological Land Classification program conducted detailed inventories of forest flora and soils in eastern Ontario.
- *Atlas of the Mammals of Ontario, 1991-1993*
  Co-ordinated mammal survey volunteers in the Niagara region and assessed sightings.

Biological Monitoring

- *Annual Amphibian and Vegetation Monitoring, ,Quarry in R.M. of Niagara, 2006 – ongoing*
  Baseline and annual field monitoring and reporting on amphibian and vegetation monitoring in seepage/pond areas.
- *Gull Management Study, Landfill in R.M. of Niagara, 2004 – 2006*
  Participated in baseline studies, researched and co-ordinated part of gull study and management plan for landfill.
- *Bird Monitoring, Block 12 City of Vaughan, 2001 – 2003*
  Initiated, conducted predevelopment bird monitoring program in East Don River valleylands and analyzed data.
- *Ontario Forest Bird Monitoring Project, Canadian Wildlife Service, 1989*
  Selected sites for permanent bird monitoring in eastern Ontario and conducted first year of surveys.
- *Pribilof Islands Seabird Monitoring, United States Fish and Wildlife Service, Alaska, 1988*
  Monitored cliff-nesting seabird populations and assessed their productivity.
- *Migration Monitoring, Long Point Bird Observatory, 1988*
  Banded and surveyed all bird species migrating through Long Point, a major migration stop-over location.

Peer-Review

- *Martison Phosphate Mine Technical Review, Constance Lake First Nations, near Hearst, Cochrane Region, 2008*
  Peer-reviewed avian sections of Baseline Biological Study Report and Preliminary Feasibility Study report on proposed phosphate mine.

Research Projects

Masters thesis, Faculty of Forestry, University of Toronto, 1996-1998:

Conducted studies to assess the different impacts of natural disturbance (wildlife) and human disturbance (clear-cutting)on lepidopteran communities in jack pine forests of central Ontario.

Woodlands Biodiversity Project (Simcoe section), Long Point Bird Observatory and Federation of Ontario Naturalists, 1994:

Chose appropriate sites of varying size and forest type and surveyed birds and plants for the purpose of researching forest fragmentation.

Aquatic toxicology research, Canadian Wildlife Service, 1990:

Undertook field studies on waterbirds and amphibians in Hamilton Harbour and Holland Marsh respectively as part of research that examined the prevalence of toxins, including organo-phosphate pesticides in these organisms. Reported on colonial waterbirds in Hamilton Harbour.

Professional Affiliations

- Society for Conservation Biologists
- Bird Studies Canada
- Field Botanists of Ontario
- Ottawa Field – Naturalists Club
- Ontario Nature (formerly Federation of Ontario Naturalists)

Publications/Presentations

COSEWIC, 2002:

COSEWIC Assessment and Update Status Report on the Western Screech-owl, *Otus kennicottii.* Committee on the Status of Endangered Wildlife in Canada. Ottawa. Vi + 31 pp.

Chaundy, R. and S. Wilcox, 2001:

Canadian Important Bird Areas Site Catalog. www.bsc-eoc.org/iba/IBAsites.html

Chaundy, R., 1999:

Moth diversity in young jack pine-deciduous forests after disturbance by wildfire and clear-cutting. M.Sc.F. thesis. University of Toronto.

Chaundy, R., 1996:

Migrant raptors and breeding birds of the Redhill Valley. Report written for Hamilton Region Conservation Authority.

Chaundy, R., 1996:

Understorey prescribed burning in white pine forests: an option to consider. Poster shown at the Winter Woodlot Owners Conference (OMNR/OMAFRA), Kemptville, Ontario. February, 1997.

Chaundy, R. and T. Gray, 1996:
Forests, fires and logging: setting the record straight. Fact Sheet #2, Forest Ecology Series. A Wildlands League (the Ontario chapter of the Canadian Parks and Wilderness Society) publication.

Chaundy, R., 1990:
Egg and chick collections of colonial waterbirds made for contaminant analyses in Hamilton Harbour, 1990. Canadian Wildlife Service internal report.

Dragoo, D.E., B.K. Bains, A.L. Sowls and R.F. Chaundy, 1989:
The status of cliff nesting seabirds in the Pribilof Islands, Alaska, 1976-1988: a summary. U.S. Fish and Wildlife Service internal report.

Chaundy, R., 1989:
The impact of Bt spraying on non-target lepidoptera in St Lawrence Islands National Park. Parks Canada internal report.