Classifying Sites on Municipal Drains in the City of Kawartha Lakes Based on the Presence of Flow and Sensitive Fishes

2018

KAWARTHA CONSERVATION

Discover · Protect · Restore

About Kawartha Conservation

Who we are

We are a watershed-based organization that uses planning, stewardship, science, and conservation lands management to protect and sustain outstanding water quality and quantity supported by healthy landscapes.

Why is watershed management important?

Abundant, clean water is the lifeblood of the Kawarthas. It is essential for our quality of life, health, and continued prosperity. It supplies our drinking water, maintains property values, sustains an agricultural industry, and contributes to a tourism-based economy that relies on recreational boating, fishing, and swimming. Our programs and services promote an integrated watershed approach that balance human, environmental, and economic needs.

The community we support

We focus our programs and services within the natural boundaries of the Kawartha watershed, which extend from Lake Scugog in the southwest and Pigeon Lake in the east, to Balsam Lake in the northwest and Crystal Lake in the northeast – a total of 2,563 square kilometers.

Our history and governance

In 1979, we were established by our municipal partners under the *Ontario Conservation Authorities Act*.

The natural boundaries of our watershed overlap the six municipalities that govern Kawartha Conservation through representation on our Board of Directors. Our municipal partners include the City of Kawartha Lakes, Region of Durham, Township of Scugog, Township of Brock, Municipality of Clarington, Municipality of Trent Lakes, and Township of Cavan Monaghan.

KAWARTHA CONSERVATION

Discover · Protect · Restore

Kawartha Conservation
277 Kenrei Road, Lindsay ON K9V 4R1
T: 705.328.2271 F: 705.328.2286
GenInfo@KawarthaConservation.com
KawarthaConservation.com

Executive Summary

This report provides information related to flow conditions and fish communities on municipal agricultural drains within the City of Kawartha Lakes to inform the approval process when undertaking drain maintenance activities. In the summer and fall of 2018, Kawartha Conservation sampled 135 sites on 40 drains according to Fisheries and Oceans Canada's Drain Classification Protocol. Results indicate that several drains do function as fish habitat and can contain numerous fish species (all of which were found to be spring spawners), including fishes that are considered sensitive to drain maintenance activities. In terms of classifying each sample site based on flow conditions and fish communities, the following categories were apparent: *Perennial - Sensitive Species Present* at 11 sites on 7 drains, *Perennial – No Sensitive Species Present* at 49 sites on 21 drains, *Intermittent* at 75 sites on 30 drains, and *Unknown* at 100 additional sites that were not sampled. These data will help to inform an update to the classification of drains within the City of Kawartha Lakes, to be undertaken in early 2019 by Fisheries and Oceans Canada and released on the Agricultural Information Atlas in partnership with the Ontario Ministry of Agricultural, Food, and Rural Affairs.

Acknowledgements

Kawartha Conservation would like to thank the City of Kawartha Lakes and Fisheries and Oceans Canada for providing funding, and the following staff involved in project, including: Brett Tregunno, Rob Stavinga, Nancy Aspden, Anelie Norton, Jofina Victor, and Alyson Karson.

Table of Contents

About Kawartha Conservation ii

Executive Summary iiii

Table of Contents iv

1.1 Introduction 1

1.2 Methods 2

1.3 Results 2

1.4 Discussion 3

1.5 References 4

Appendix A: Maps of each drain with site classifications.

Appendix B: Site photos, where available.

Appendix C: Raw data.

1.1 Introduction

The purpose of this report is to help expedite the approval of municipal drain maintenance activities between the City of Kawartha Lakes, Kawartha Conservation, and Fisheries and Oceans Canada by providing updated information regarding the presence of flow conditions and sensitive fish species on existing municipal drains within the overlapping jurisdictions of the City of Kawartha Lakes and Kawartha Conservation.

Municipal agricultural drains are an integral component of the rural infrastructure in the City of Kawartha Lakes. These drains are constructed pursuant to the *Drainage Act*, providing a legal pathway through municipal bylaw to drain water thereby increasing the productive capacity of all upstream farm lands being drained, typically on croplands. Municipal drains within the City of Kawartha Lakes **(Figure 1)** are either open ditches or closed systems (such as pipes or tiles buried in the ground), and all require maintenance to ensure they remain functioning when the capacity of the municipal drain to move water is reduced.

Certain maintenance activities (e.g., bottom cleanouts, beaver dam removals, removal of slope vegetation, etc.) that are undertaken on drains, particularly within open ditches, have the potential to cause negative impacts to water resource features such as watercourses, wetlands, and fish habitat therefore some form of regulatory approval is typically required prior to undertaking maintenance. Municipal drains that are open ditches often meet the definition of watercourses[1] as per the *Conservation Authorities Act*, therefore certain maintenance activities require approval from the local Conservation Authority. In 2014 the *Drainage Act* and Sections 28 Regulation Team released a protocol (Province of Ontario, 2012) to streamline the permitting process for most maintenance activities, thereby making the process more efficient.

Municipal drains that are open ditches also often meet the definition of fish habitat[2] as per the *Fisheries Act*, therefore certain maintenance activities are subject to the approval requirements of Fisheries and Oceans Canada. In 2017, Fisheries and Oceans Canada released guidelines for maintenance activities on municipal drains (DFO, 2017), which includes a Class Authorization Process for the Maintenance of Municipal Drains to streamline approvals for certain types of drains. Municipal drains are classified into six categories based on their sensitivity (using parameters such as fish presence, spawning season, and flow) and from there the appropriate authorization is given to undertake the maintenance works **(Table 1)**.

The Agricultural Information Atlas (OMAFRA, 2018), a website application hosted by the Ontario Ministry of Agricultural, Food, and Rural Affairs is the central depository of municipal drain information related to their location, classification, and other relevant information. Most (not all) of the City of Kawartha Lakes drains are currently listed on the Agricultural Information Atlas and most have a drain classification already associated with them which was, in part, informed by a previous municipal drain classification project undertaken in 2002 (Kawartha Conservation, 2003).

Over 15 years has elapsed since the previous classification project. Since that time changes have occurred that necessitate data updates, including changes related to: the classification guidelines, new drains constructed since that time, maintenance that has been undertaken, and other land use activities that could influence fish habitat and flow conditions. In 2018, the City of Kawartha Lakes contracted Kawartha Conservation for a one-year project to obtain information that would help to update the classification of their municipal drains according to Fisheries and Oceans Canada's guidelines. This report provides a summary of Kawartha Conservation's findings, to be considered by Fisheries and Oceans Canada and the Ontario Ministry of Agricultural, Food, and Rural Affairs in their next update of existing classifications. The next update to the classifications, and subsequent posting on the Agricultural Information Atlas, is scheduled for March 2019.

[1] A watercourse is defined as: *an identifiable depression in the ground in which a flow of water regularly or continuously occurs*.
[2] Fish habitat is defined as*: the spawning grounds and any other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes*.

1.2 Methods

A list of municipal drains and their location was obtained in a digital file from City of Kawartha Lakes (CKL, 2018), and imported into ArcGIS Pro (ESRI, 2018a) computer mapping program. Drains that are known to exist but were not listed in the City of Kawartha Lakes data (i.e., most recent constructed drains) were manually added to the digital file. The upstream drainage area of each drain was determined as approximate using Arc Hydro (ESRI, 2018b). Only drains that exist within the jurisdictions of both the City of Kawartha Lakes and Kawartha Conservation were included within the scope of this project.

Candidate sampling locations received a unique site identification number and were positioned where each drain intersected a road crossing, at the beginning and end of a drain, and at the confluence of two or more drain sections. Where practical an attempt was made to visit all candidate sampling locations. Landowners with properties intersecting any candidate sampling location were mailed a request for permission letter in July 2018. Where no correspondence was received, a follow up phone call or in person visit was made in an attempt to secure permission.

Candidate sampling locations where permission was obtained or not needed were sampled according to methodology in the Classifying Ontario Municipal Drains Protocol, Version 3.1 (DFO, 2018). Where water was present, sites were fished using the techniques of: backpack electrofishing, seine netting, dip netting, or combination thereof. These fished sites were typically 40 metres in length, isolated by instream block nets to restrict fish movement in-and-out of the site, and sampled 3 consecutive times by a crew of 2 or 3 Kawartha Conservation staff led by an Aquatic Biologist. All fishes were identified to species, their abundance enumerated, and released back into waters. Data were recorded digitally using a Samsung Tablet, with the program Survey123 (ESRI, 2018c). Data were exported and as necessary entered into a Microsoft Excel database.

Flow and fish presence data obtained from each candidate sampling location was used to classify each site into the following categories: *permanent – sensitive species present*, *permanent – no sensitive species present*, *intermittent*, and *unknown*, as per **Table 2**.

1.3 Results

There were 235 candidate sampling locations on 48 municipal drains. Staff visited and thus undertook sampling at 135 of these locations (57% of total), between July and November 2018. There was at least one sample site on 40 drains (83% of total drains), with an average of 3.4 sites per drain, a maximum of 9 sites, and a minimum of 1 site. Staff did not visit 100 candidate sampling locations (43% of total), the reasons for which include: could not contact landowner, permission denied, onset of an early winter that hindered access (i.e., unsafe conditions) to sample sites where permission was granted, and remote access. Sites were visited on all drains except for the following 7 (17% of total) including: Davidson 3, Denby, Ferguson, Fowler Drainage Works, Gingerich, Kime, and McFeeders Angeline St. N.

Visible flow was apparent at 60 sites (26% of total) on 23 drains (48% of total), and therefore these sites were fished (45 by backpack electrofishing, 3 by seine netting, 1 by electrofishing and seining, and 11 by dip netting). No visible flow was apparent at 75 sites (32% of total) and thus these sites could not be fished, which included sites that upon a brief visual inspection exhibited either no channel characteristics (e.g., piped underground) or where there was an existing channel but no water was visible (e.g., dry).

Site classifications based on combining flow data and fish data are summarized for all drains in **Figure 2**, and are shown for each drain in **Appendix A**. *Perennial - Sensitive Species Present* classification exists at 11 sites on 7 drains, including the following: 2A (all locations), Grant, Kievall, Lownsbrough Ext., McArthur, Ops1, and Short. *Perennial – No Sensitive Species Present* classification exists at 49 sites on 21 drains, including 6 samples were no fish were captured but visible water flow was apparent. *Intermittent* classification exists at 75 sites on 30 drains. *Unknown* classification

exists at 100 candidate sampling locations on 38 drains, which includes all candidate sampling locations not visited/sampled.

Fishes were found at 53 sites (88% of fished, or 23% of all candidate sampling locations) within 22 drains (96% of fished, or 46% of all drains) **(Table 3)**. 8227 individual fishes were caught, with an average of 137 per sampled site, a maximum of 1540, and a minimum of 0. Sensitive fish species present found include Mottled Sculpin and Longnose Dace. These were found at 11 sites (18% of fished sites), on 7 drains (30% of all fished drains). All fishes caught spawn in the spring.

A total of 24 fish species in 7 families (minnows, mudminnnows, perches, sculpins, black basses, sticklebacks, and suckers) were recorded, with an average of 5 fish species per sampled site (maximum of 13, minimum of 0), and an average of 6.4 species per sampled drain (maximum of 15, minimum of 0). The most common species, in terms of being the most encountered per drain and most abundant, include: Creek Chub, Brook Stickleback, Eastern Blacknose Dace, White Sucker, Central Mudminnow, and Northern Redbelly Dace. These species are present at 48 to 83% of fished drains and together comprise over 70% of the fish community at any given fished site, on average **(Figure 3)**. The rarest species, in terms of being the least encountered and least abundant, include: Yellow Perch, Smallmouth Bass, Logperch, Iowa Darter, and Bluegill. These species are present at less than 5% of fished drains and on average collectively comprise less than 1% of the fish community at any given fished site **(Figure 3)**.

Representative photographs of each site (128 available, or 95% of total sampled sites) are located in **Appendix B.** Raw data collected at every site are located in **Appendix C**.

1.4 Discussion

This study reaffirms that municipal drains in the City of Kawartha Lakes are important water resources that do function as fish habitat, as well as providing agricultural drainage. Open ditch drains having water present within their channel in the summer are almost guaranteed to support fishes. Fish communities at any given location along these drains can range from numerous individuals of a single species to numerous individuals of multiple species. Most drains contain fishes that are not sensitive but there are a few that do contain sensitive species.

The data collected and summarized in this project have been provided to Fisheries and Oceans Canada to inform drain classification updates, in support of the Class Authorization process. It is ultimately the responsibility of Fisheries and Oceans Canada, in partnership with the Ontario Ministry of Agriculture, Food, and Rural Affairs to formally update the classification and mapping of each drain based on all available data. Based on data from this project, a minimum of four classification categories (Class C, Class E, Class F, and Unrated) are likely exist when the update to the existing classification is undertaken in 2019.

Most of the existing drains within the City of Kawartha Lakes were sampled at least once for this project, however there were a significant number of candidate sampling locations, as well as some drains in their entirety, that were not sampled. This is somewhat of a data limitation, but was not unexpected as permission access issues (or lack thereof) were anticipated given the large geographical extent of the project. Some of these missing data will presumably be supplemented with existing data that was previously collected for the purposes of other projects, for example from the classification project undertaken in 2002 and from road infrastructure projects. Where no data are available, and as such classifications remain unknown, site-specific assessments in the areas requiring maintenance could be undertaken to classify sections on an ad-hoc basis.

Recommendations for future projects that would help expedite municipal drain maintenance include the routine updating of mapping information (for example by adding the location of new drains to the Agricultural Information Atlas), and routine updating of field information (for example, by filling in data gaps and capturing changes that might occur over time in fish communities and flow presence).

1.5 References

CKL (City of Kawartha Lakes). 2018. Georeferenced data with location of existing municipal drains, shapefile named: Municipal_Drains_CKL_Export_April24_2018.

DFO (Fisheries and Oceans Canada). 2017. Guidance for maintaining and repairing municipal drains in Ontario, Version 1.1. Fisheries and Oceans Canada, Central and Arctic Region. Burlington, Ontario.

DFO (Fisheries and Oceans Canada). 2018. Classifying Ontario Municipal Drains Protocol, Version 3.1. Fisheries and Oceans Canada, Central and Arctic Region. Burlington, Ontario.

ESRI (Environmental Systems Research Institute). 2018a. ArcGIS Pro. Mapping and data processing application.

ESRI (Environmental Systems Research Institute). 2018b. Arc Hydro. A hydrologic assessment tool.

ESRI (Environmental Systems Research Institute). 2018c. Survey123. ArcGIS online. Field data collected program.

Kawartha Conservation. 2003. Drain Classification Project Report For Kawartha Conservation, City of Kawartha Lakes, and Department of Fisheries and Oceans. Lindsay, Ontario.

OMAFRA (Ontario Ministry of Agriculture, Food, and Rural Affairs). 2018. Agricultural Information Atlas. Available at: http://www.omafra.gov.on.ca/english/landuse/gis/portal.htm. Accessed November 2018.

Ontario (Province of Ontario). 2012. Drainage Act and Conservation Authorities Act protocol. Protocol for municipalities and conservation authorities in drain maintenance and repair activities. Queen's Printer for Ontario.

Table 1: Summary of key drain characteristics that link to the Class Authorization process of Fisheries and Oceans Canada.

Class	Flow	Spawning Period	Species	Authorization
A	Permanent	Fall or Spring/Fall	No sensitive species present	Class A
C	Permanent	Spring	No sensitive species present	Class C
D	Permanent	Fall or Spring/Fall	Sensitive species present	Site Specific
E	Permanent	Spring	Sensitive species present	Class E
F	Intermittent	Spring	Not Applicable	None if works undertaken in dry otherwise Site Specific Review
Unrated	Unknown	Unknown	Unknown	Site Specific Review or Class Authorization, depending on available data.

Table 2: Classification methodology used in this report for each candidate sampling location, based on flow and fish criteria.

Site Classification	Flow Criteria	Fishes Criteria
Permanent – sensitive species present	Site received a ranking of Moderate, Weak, or Very Weak, as per Section 1.3.2 in protocol (DFO, 2018)	One or more sensitive fishes, as listed in Appendix 1 in protocol (DFO, 2018), were found at site.
Permanent – sensitive species not present	Site received a ranking of Moderate, Weak, or Very Weak, as per Section 1.3.2 in protocol (DFO, 2018).	No sensitive fishes, as listed in Appendix 1 in protocol (DFO, 2018), were found at site.
Intermittent	Site received a ranking of Strong, as per Section 1.3.2 in protocol (DFO, 2018).	Site not fished.
Unknown	Site not visited.	Site not visited.

Table 3: Summary of fish species caught at each fished drain. Bold indicates sensitive species.

Drain Name	#SitesFished	Bluegill	BluntnoseMinnow	BrassyMinnow	BrookStickleback	CentralMudminnow	CentralStoneroller	CommonShiner	CreekChub	EasternBlacknoseDace	FatheadMinnow	FinescaleDace	HornyheadChub	IowaDarter	LargemouthBass	Logperch	**LongnoseDace**	**MottledSculpin**	NorthernPearlDace	NorthernRedbellyDace	Pumpkinseed	RockBass	SmallmouthBass	UnknownYOY	WhiteSucker	YellowPerch
2A	3		x	x		x		x	x	x			x		x		**x**	**x**				x	x	x	x	
Anderson	2																									
Avery	2		x		x	x		x	x	x	x		x							x				x	x	
Corneil	1								x																	
Corneil2010	2								x																	
Darmar-Tamlin	3				x				x	x	x									x						
Dykstra	1								x	x									x							
Grant	3				x	x		x	x	x								**x**		x					x	
Hall	1				x					x																
HancockEast	1						x		x	x																
Kievall	8		x	x	x	x		x	x	x	x	x			x			**x**		x				x	x	
Lownsbrough	2		x		x	x			x	x	x														x	
LownsbroughExt.	1				x	x			x	x								**x**							x	
McArthur	4		x		x	x			x	x			x					**x**		x					x	
Murdoch	2	x		x	x	x			x		x				x					x	x	x			x	x
Ops1	9		x	x	x		x	x	x	x	x	x		x		x	**x**		x	x				x	x	
Ops20-74	5				x	x			x	x	x				x					x	x				x	
Ops3-78	1				x	x																				
Ops4	2				x				x											x					x	
Pearson	1				x				x	x										x					x	
Short	4		x	x	x	x		x	x	x	x	x	x		x			**x**		x		x			x	
Unnamed	1				x																					
Washington	1				x				x	x															x	
Grand Total	60	1	7	5	17	11	2	6	19	16	8	3	4	1	5	1	**2**	**6**	2	11	2	3	1	4	14	1

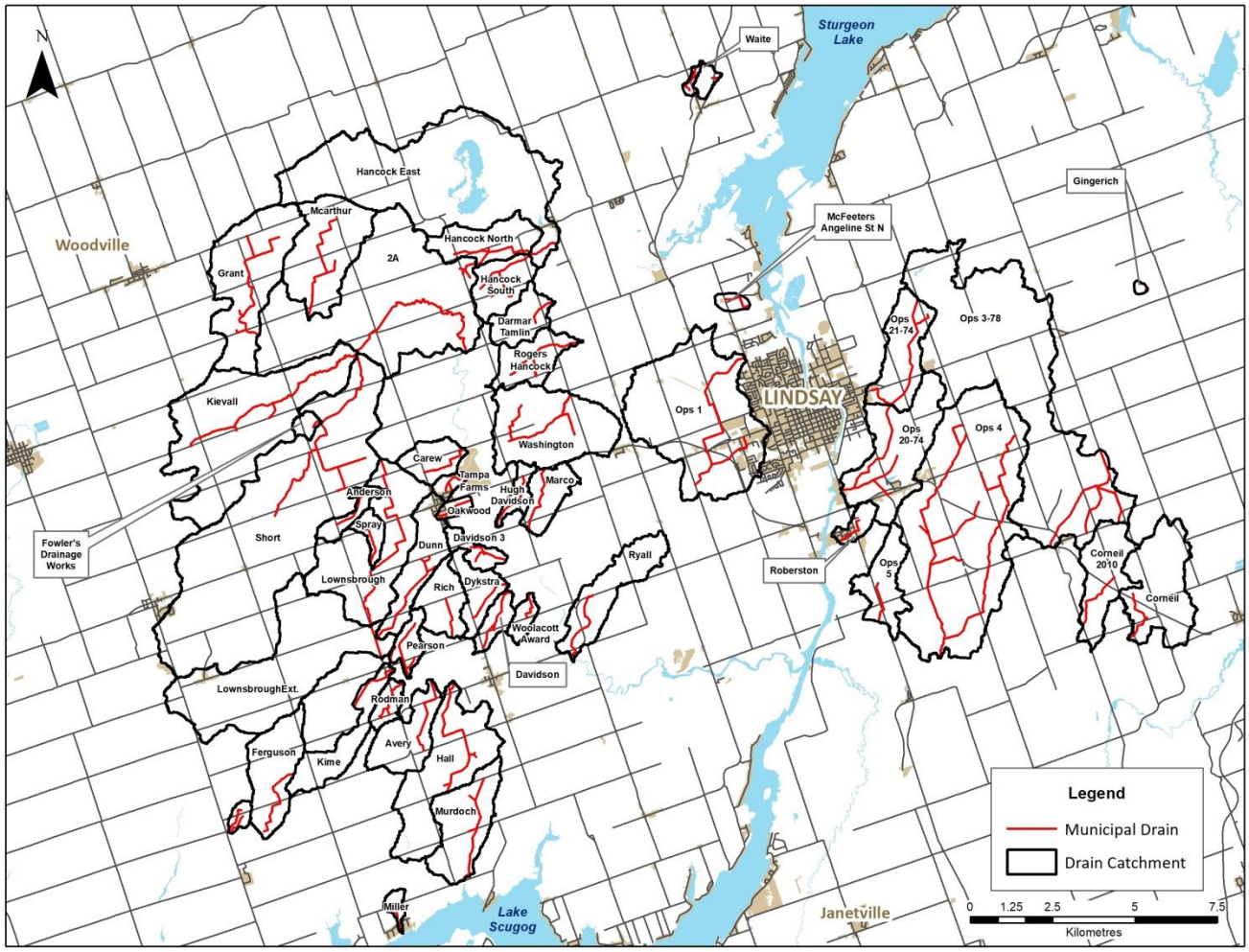


Figure 1: Map showing all municipal drains within the scope of this study

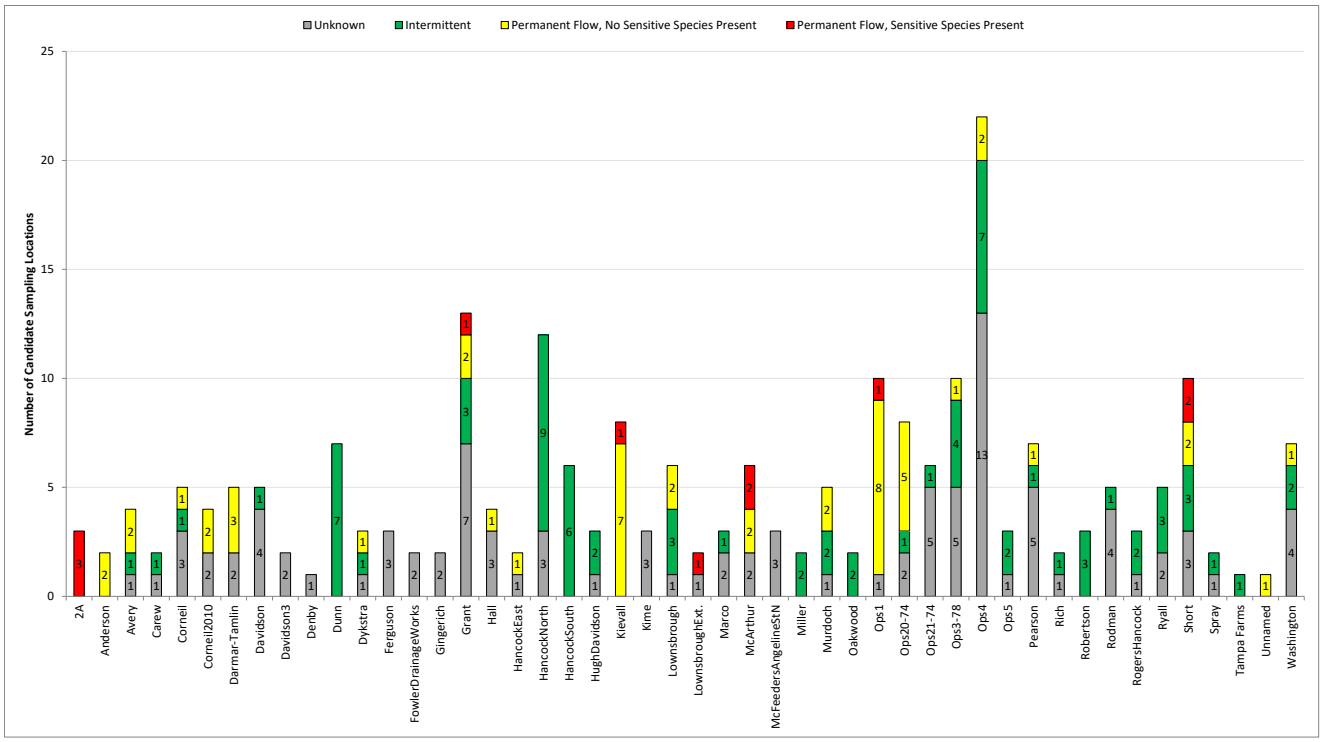


Figure 2: Summary of site classifications, based on flow and fish data, for all drains. The value inside each bar indicates the number of candidate sampling locations within each category.

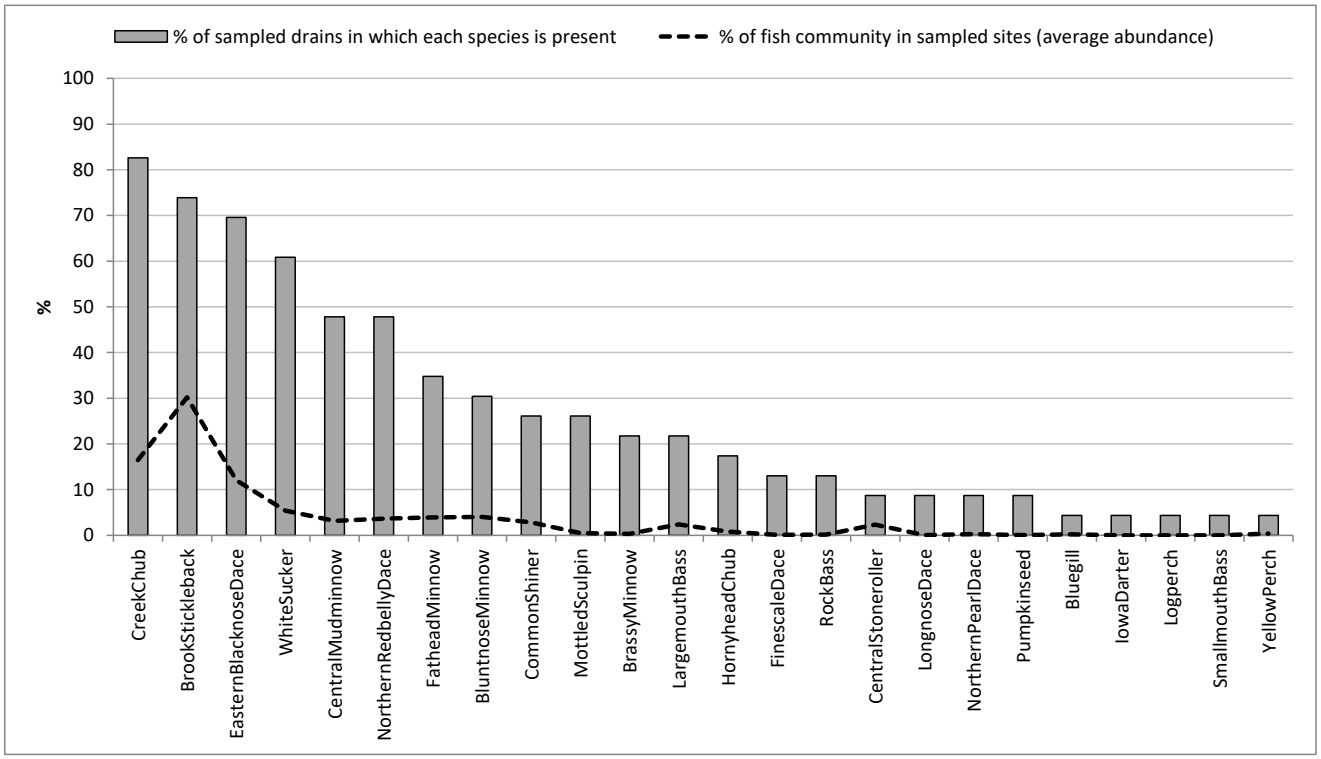
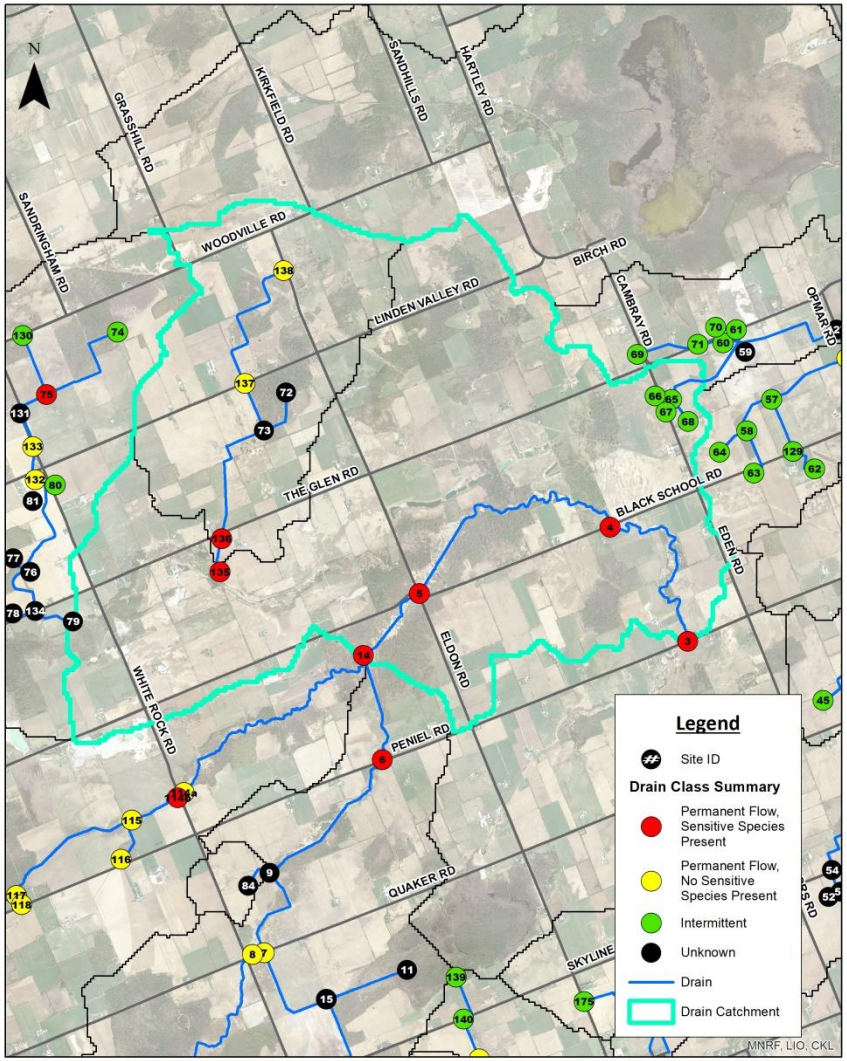


Figure 3: Fish species caught according to how common/rare they are per drain (bars), and how abundant/sparse they are per site (dashes).

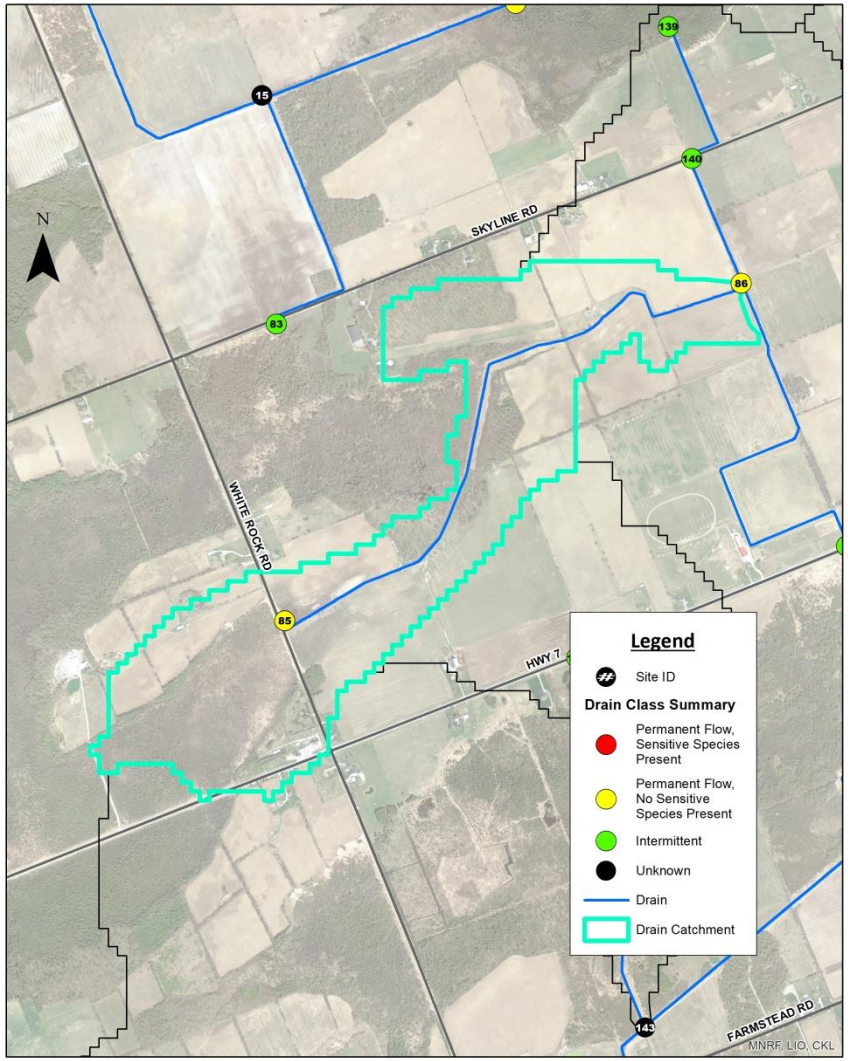
Kawartha Conservation
277 Kenrei Road, Lindsay ON K9V 4R1
T: 705.328.2271 F: 705.328.2286
GenInfo@KawarthaConservation.com
KawarthaConservation.com

Appendix A: Drain Maps

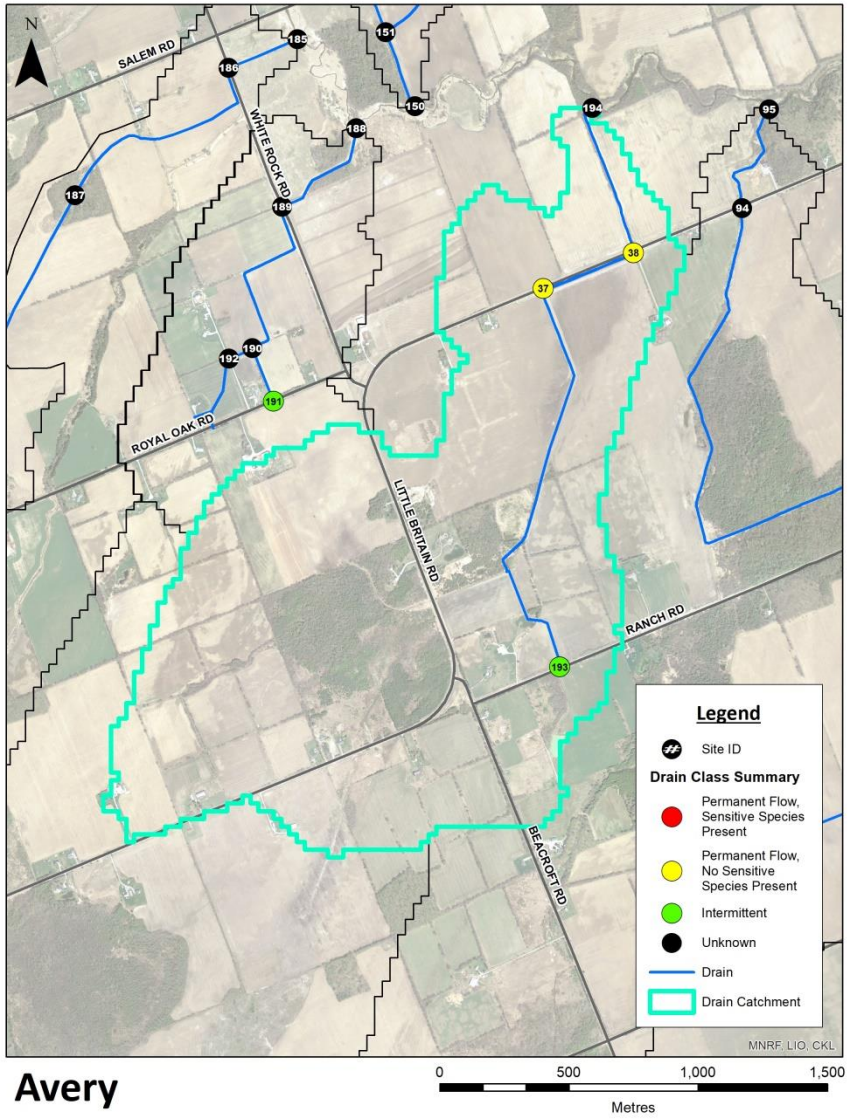


2A

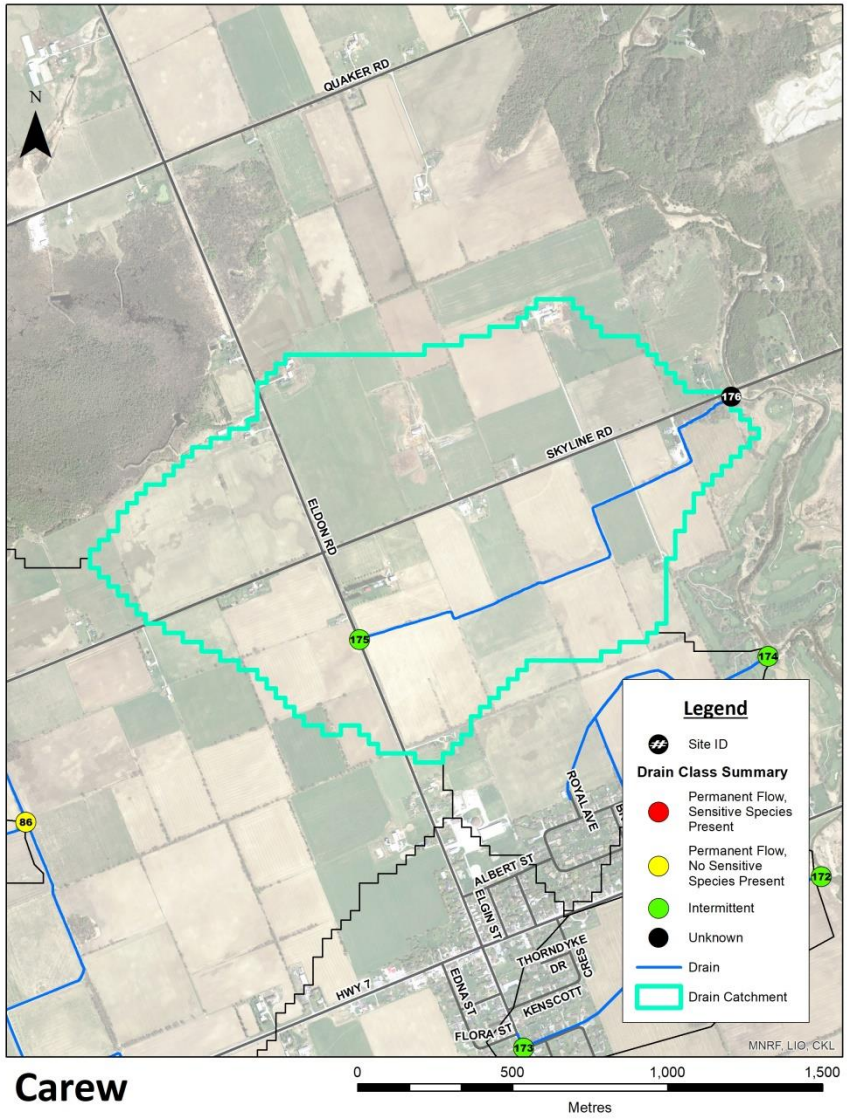
Appendix A: Drain Maps



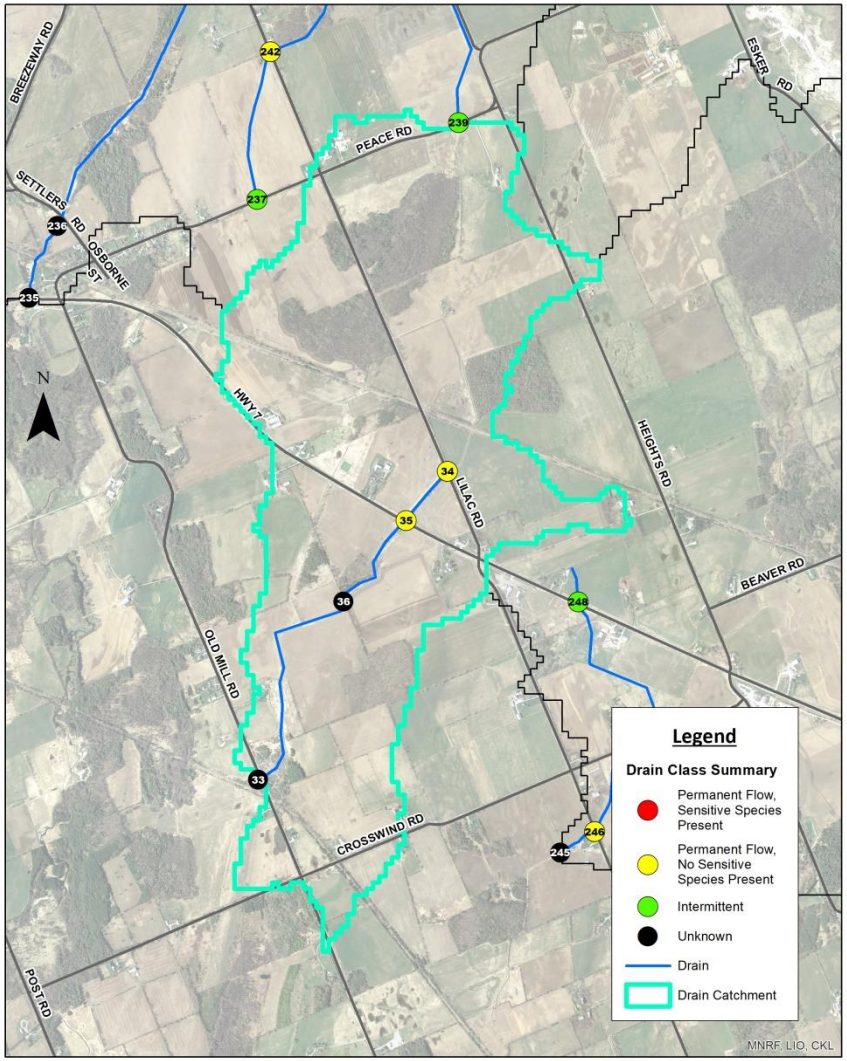
Appendix A: Drain Maps



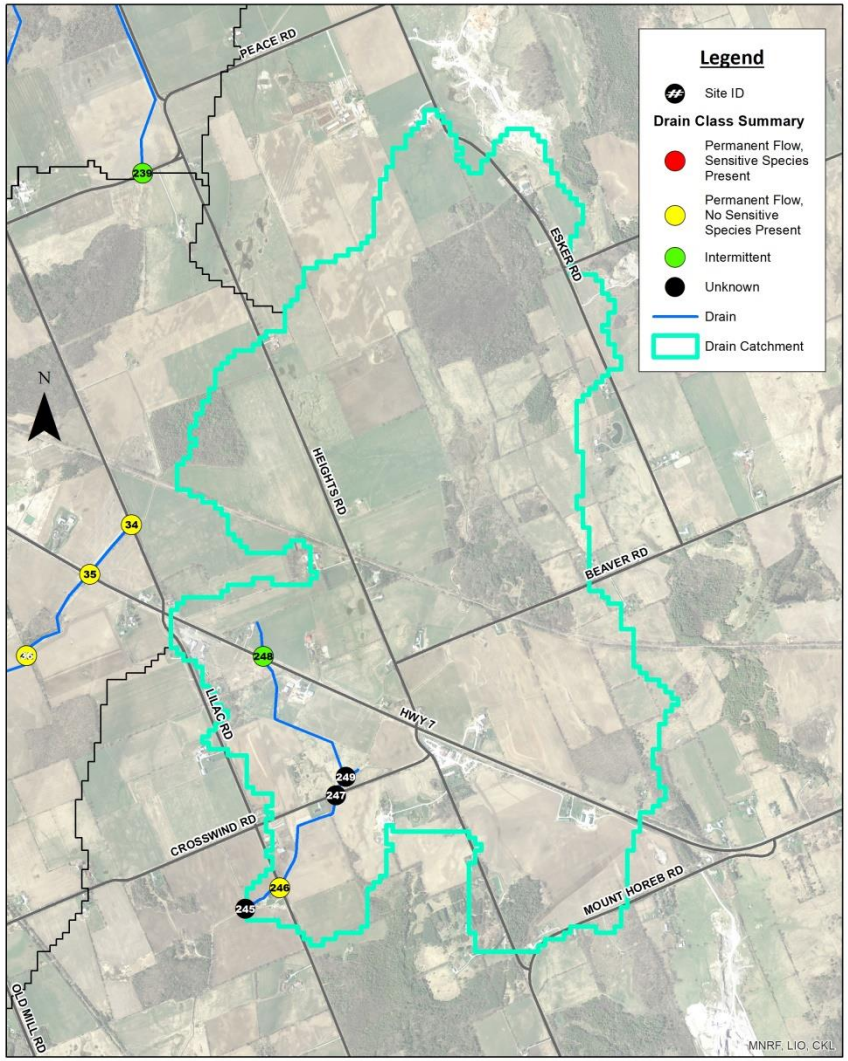
Appendix A: Drain Maps



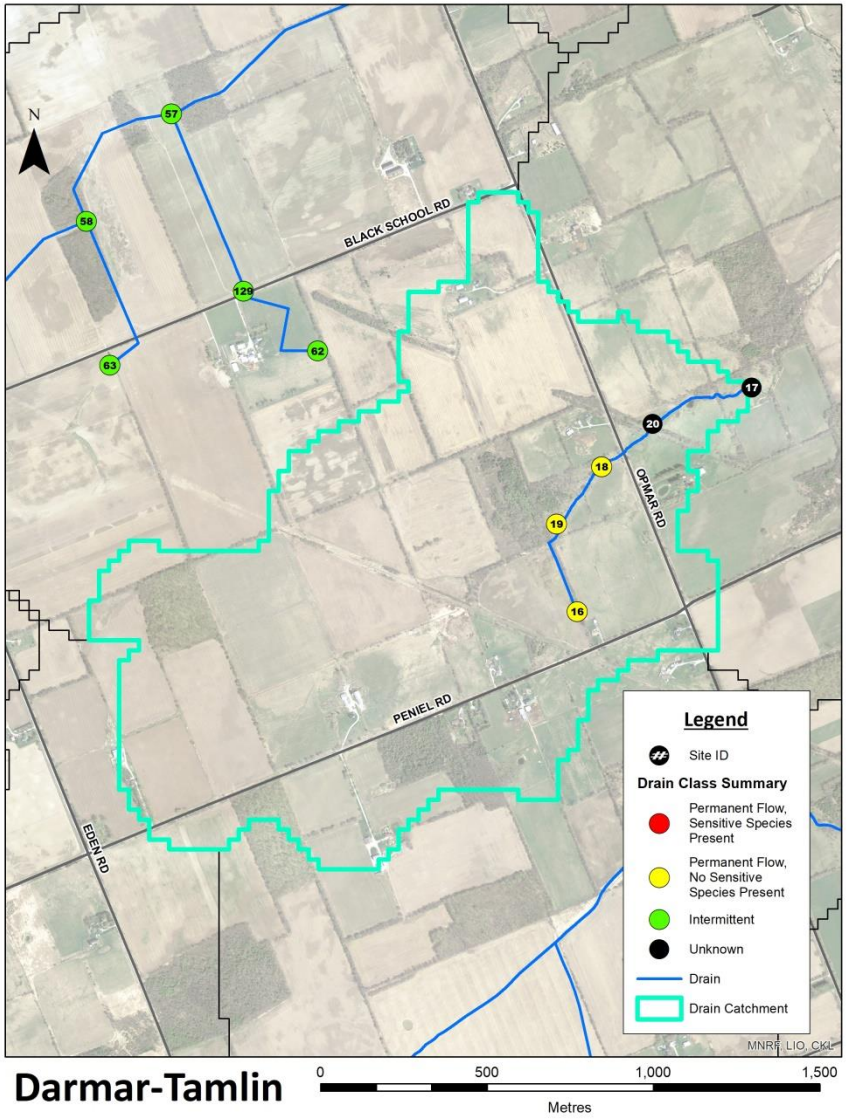
Appendix A: Drain Maps



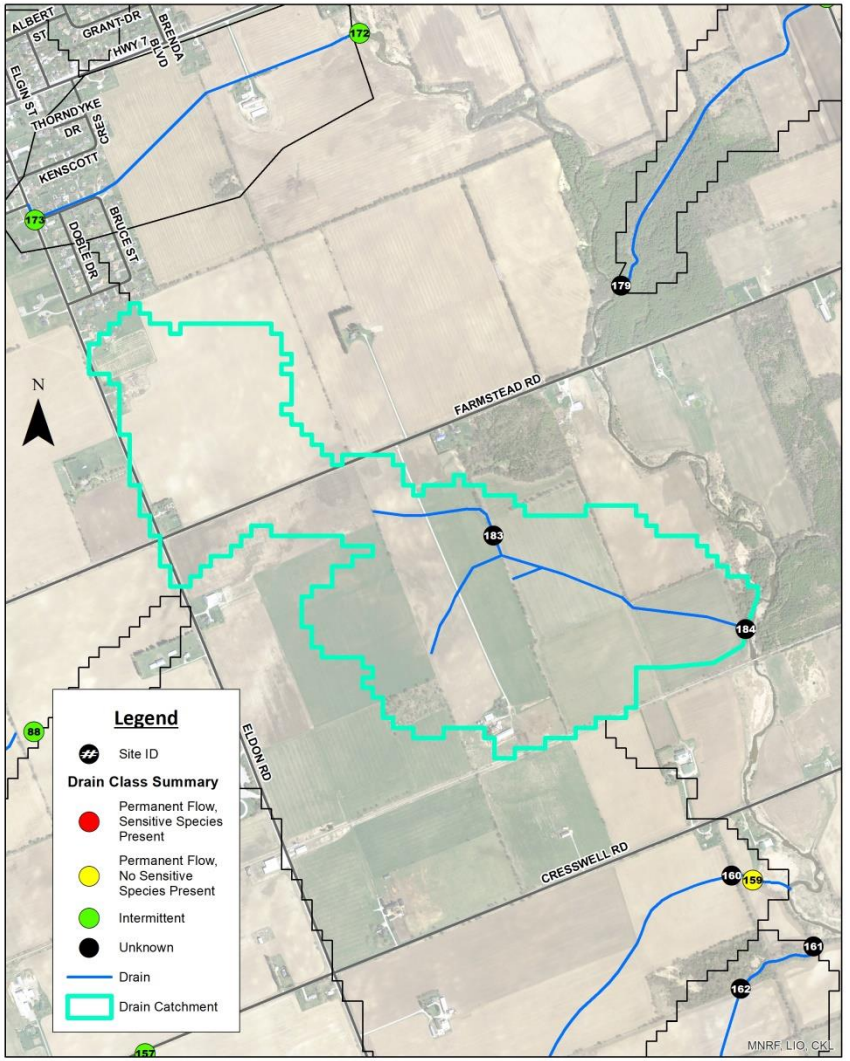
Appendix A: Drain Maps



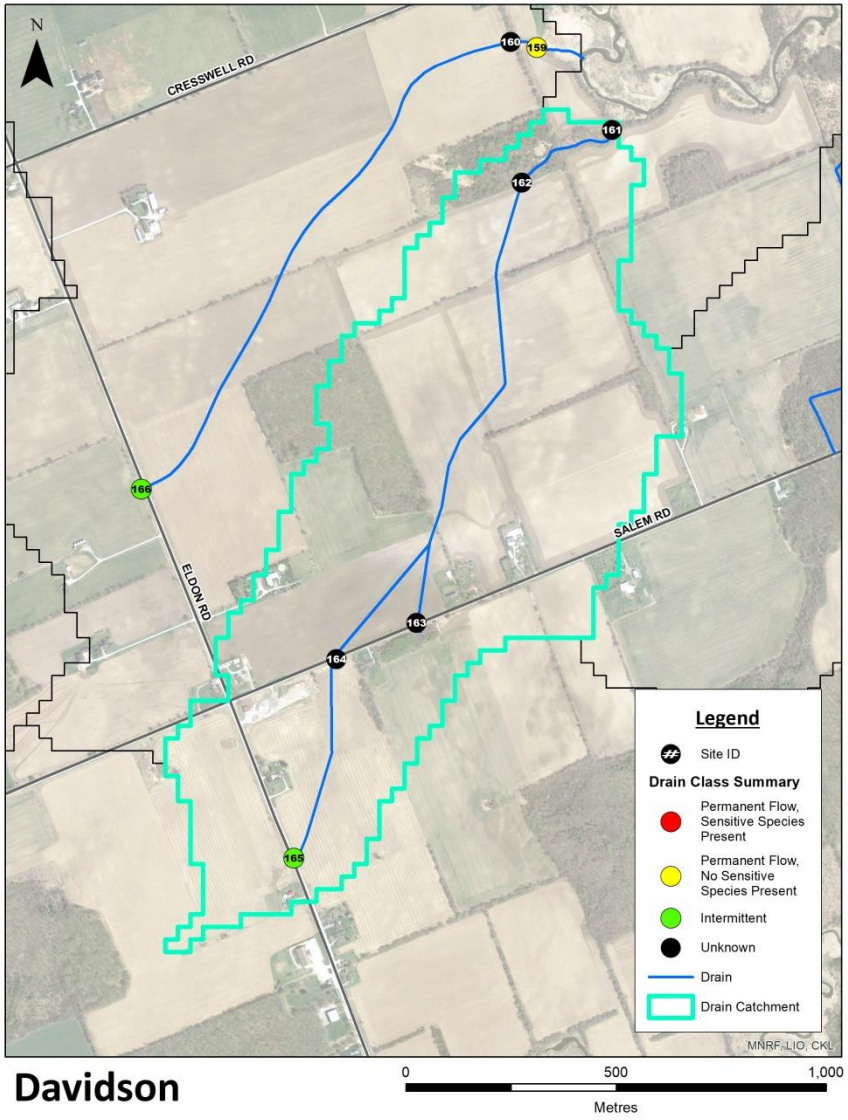
Appendix A: Drain Maps



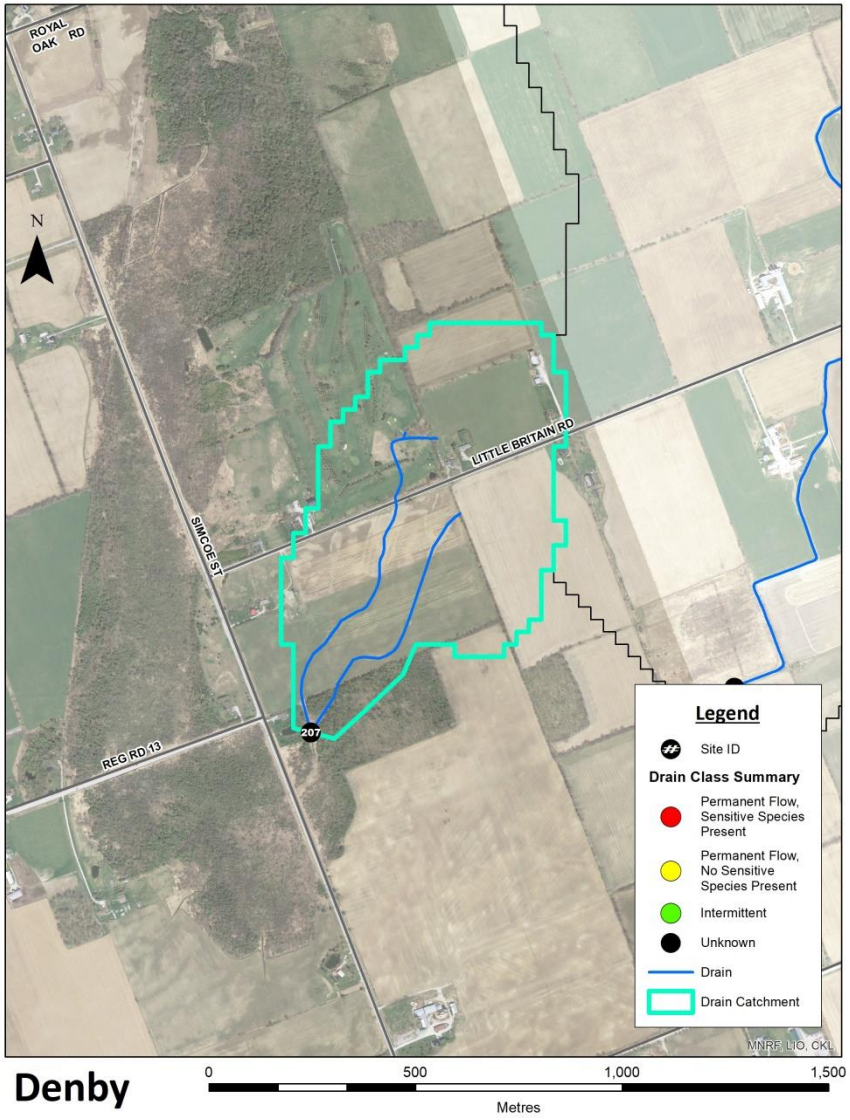
Appendix A: Drain Maps



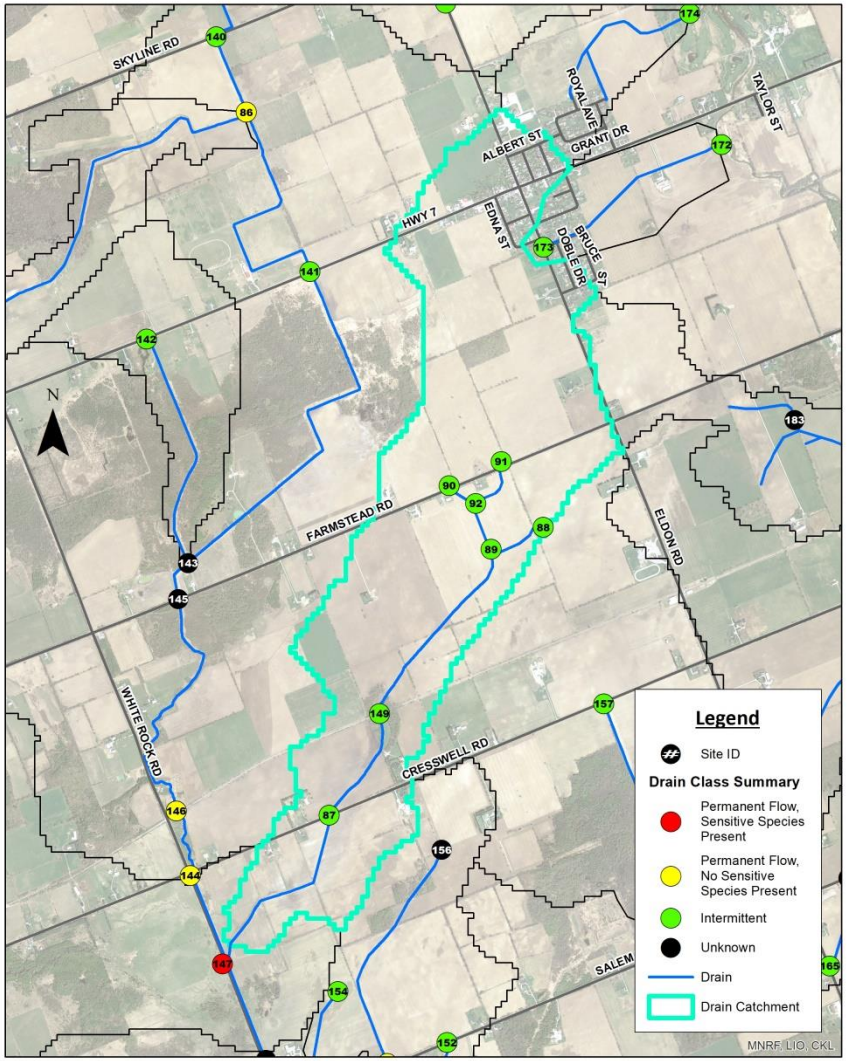
Appendix A: Drain Maps



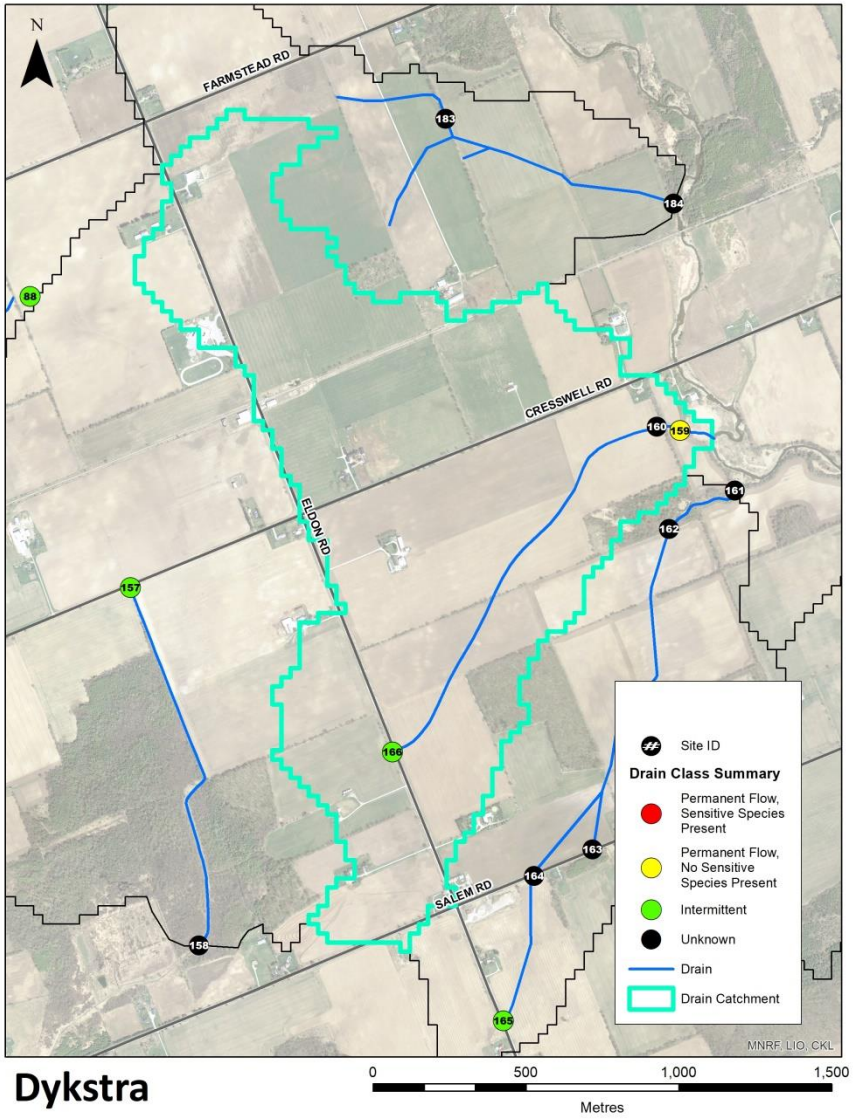
Appendix A: Drain Maps



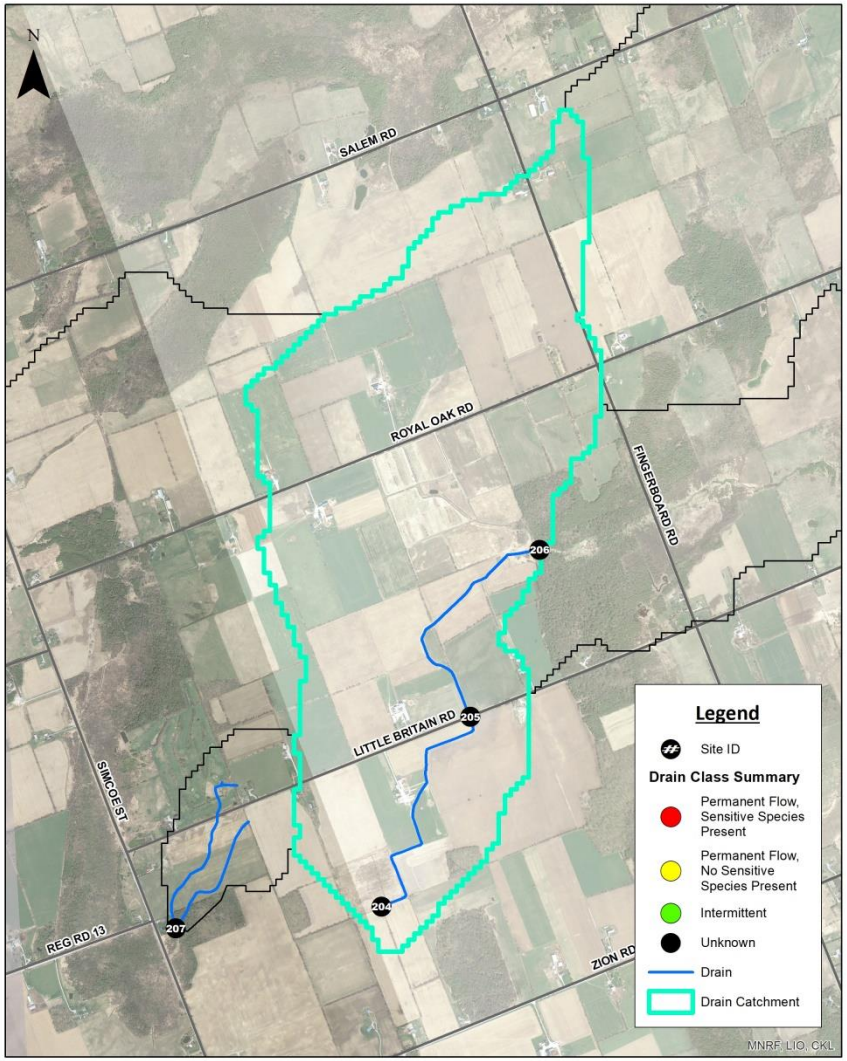
Appendix A: Drain Maps



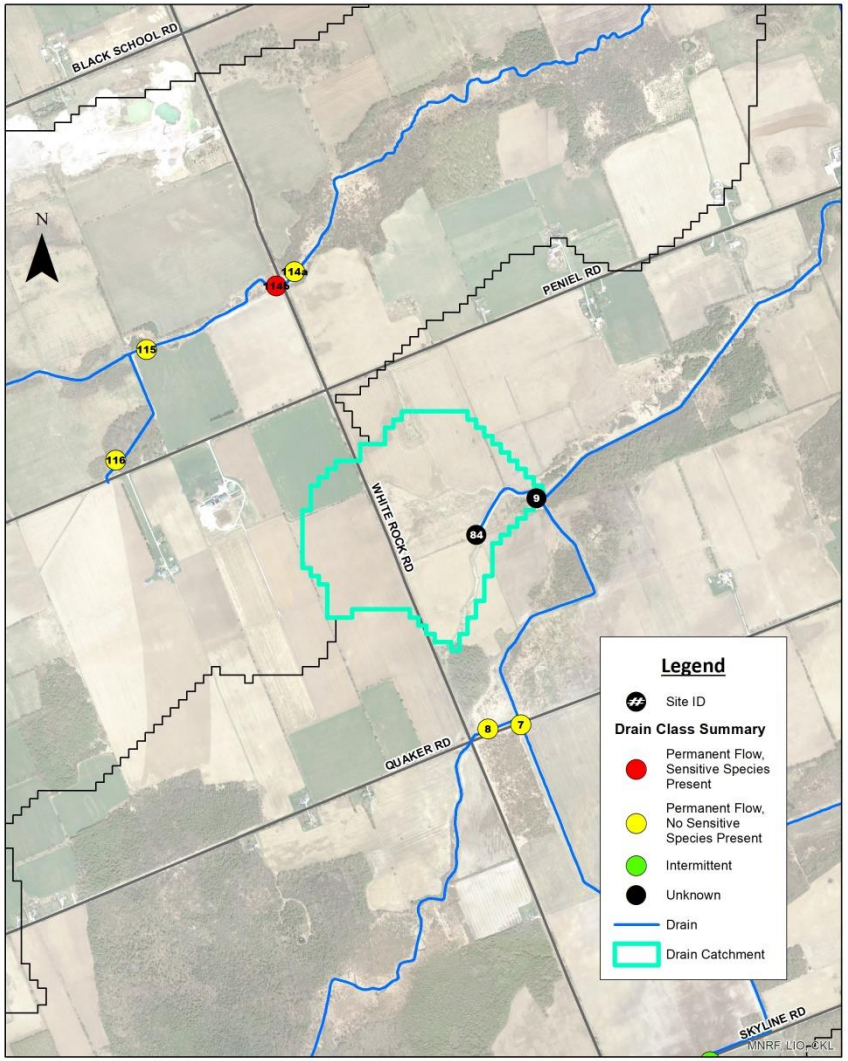
Appendix A: Drain Maps



Appendix A: Drain Maps

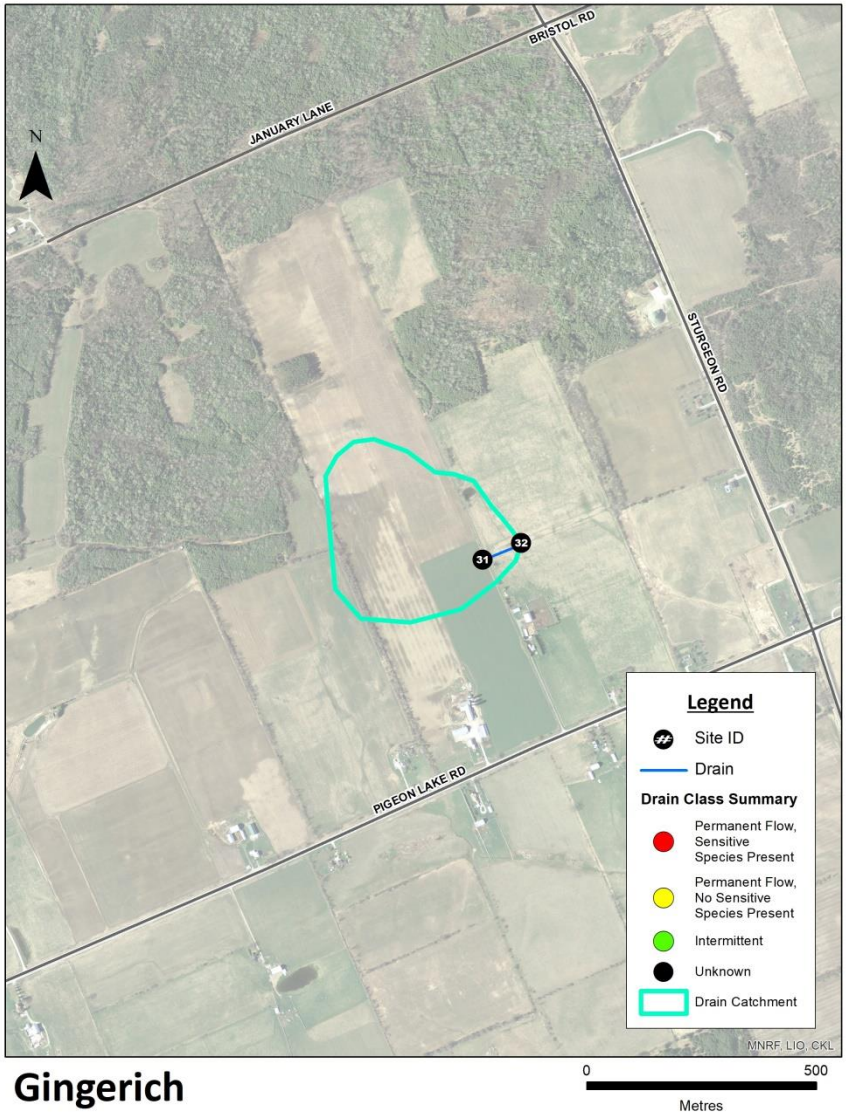


Appendix A: Drain Maps

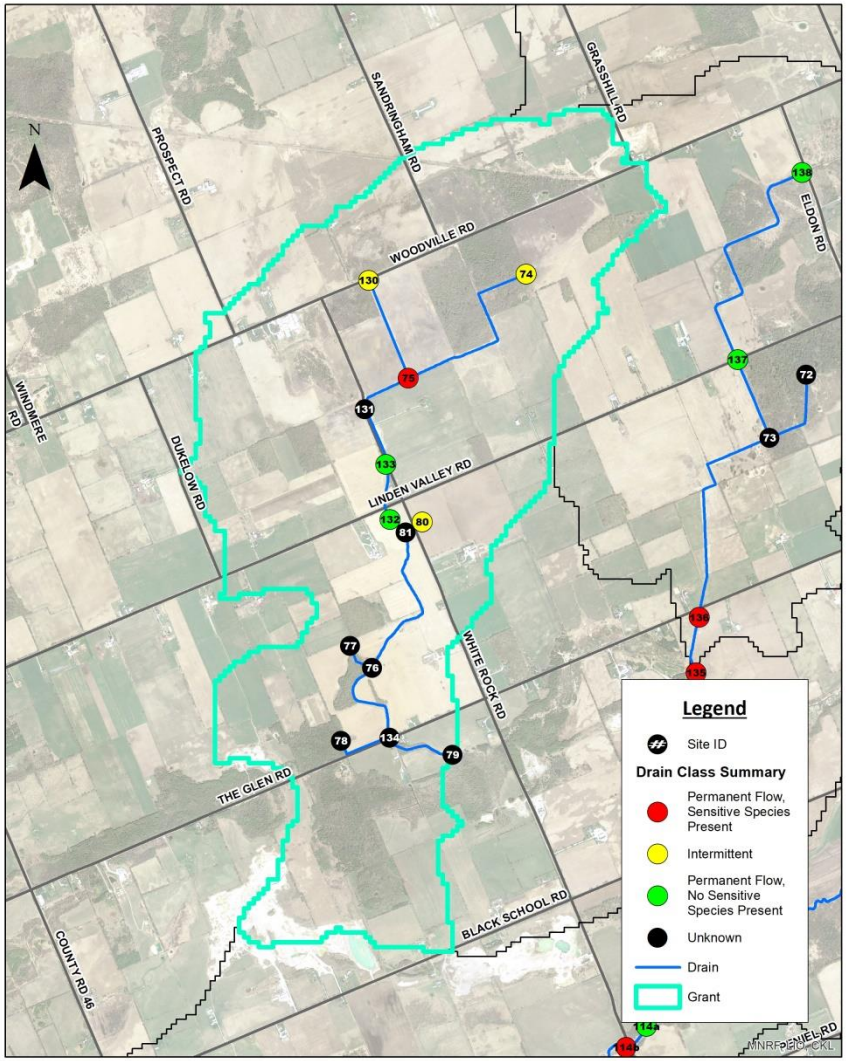


Fowler Drainage Works

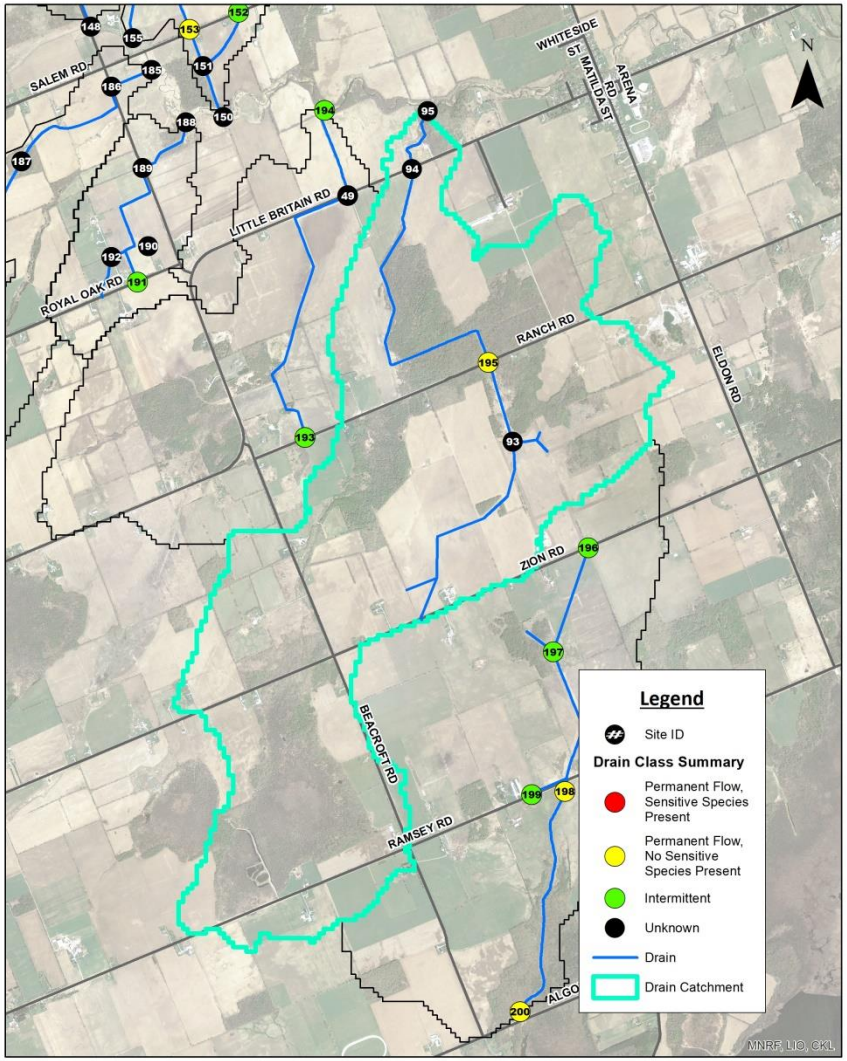
Appendix A: Drain Maps



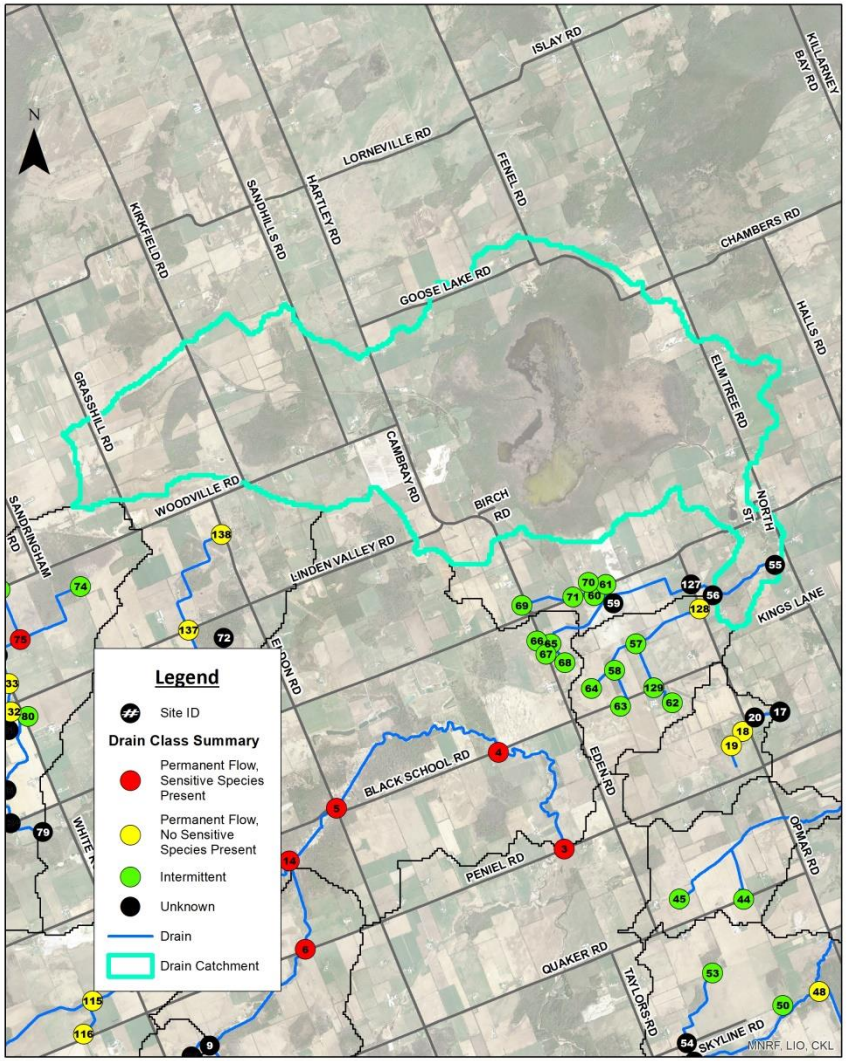
Appendix A: Drain Maps



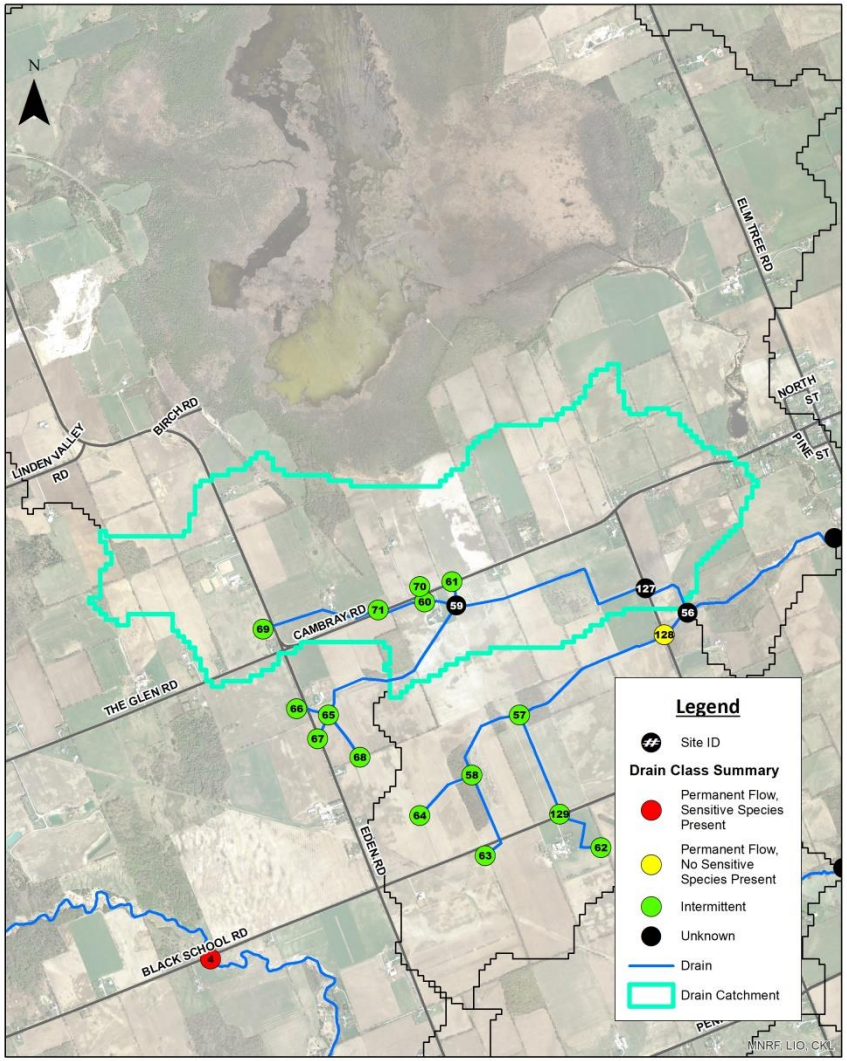
Appendix A: Drain Maps



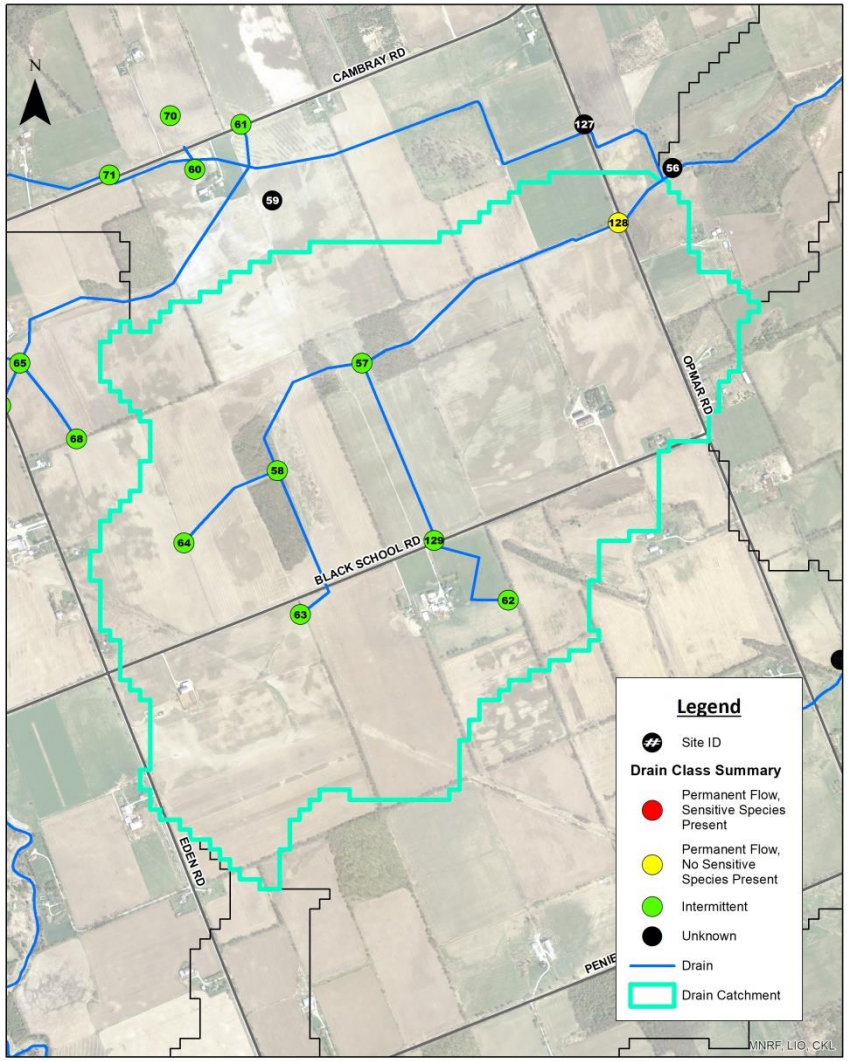
Appendix A: Drain Maps



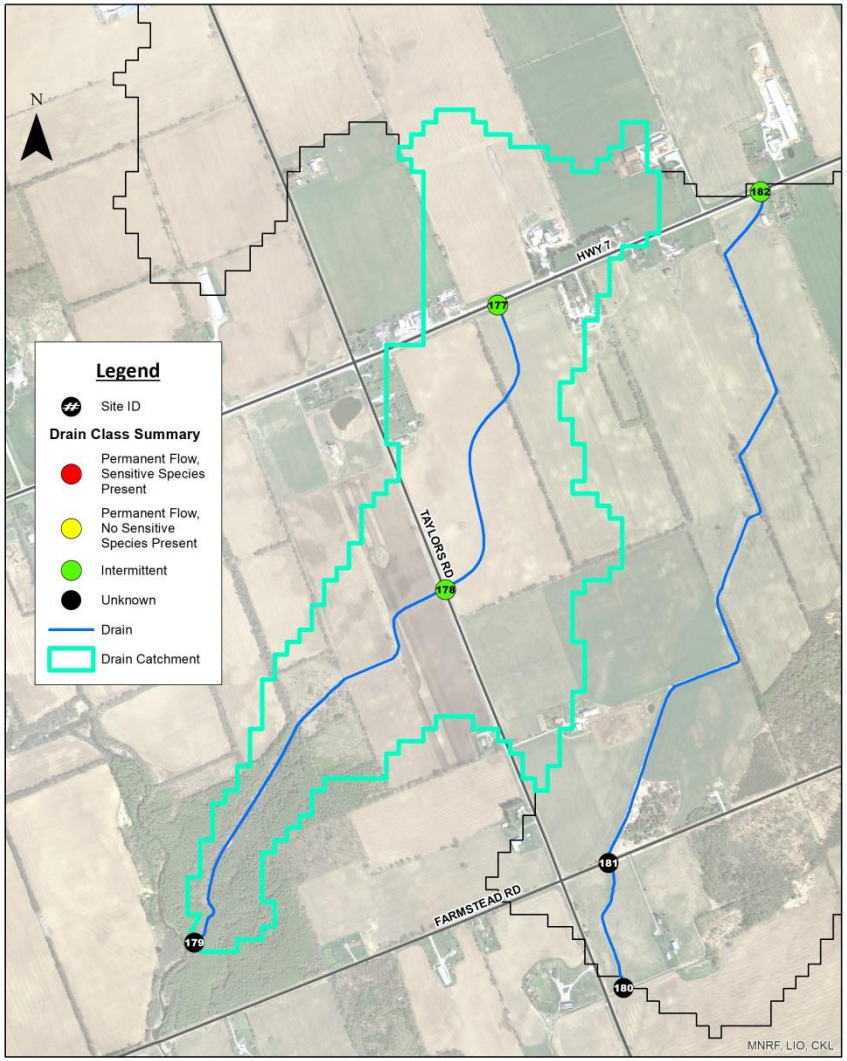
Appendix A: Drain Maps



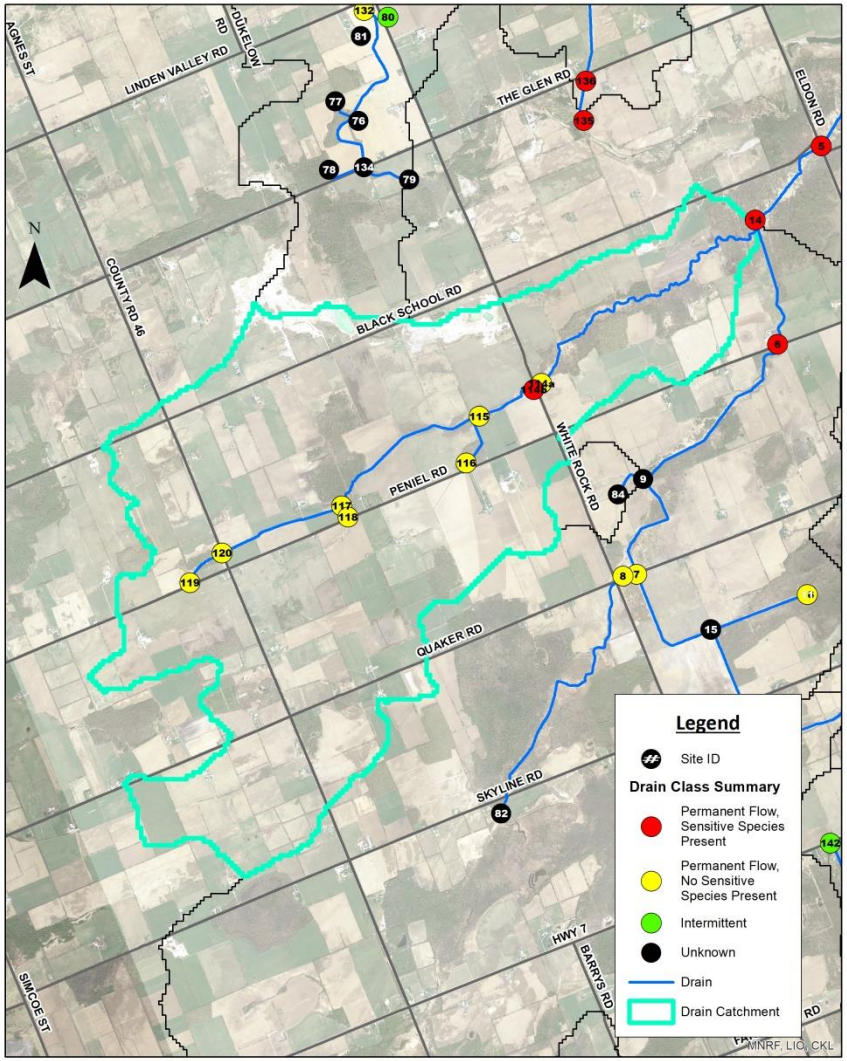
Appendix A: Drain Maps



Appendix A: Drain Maps

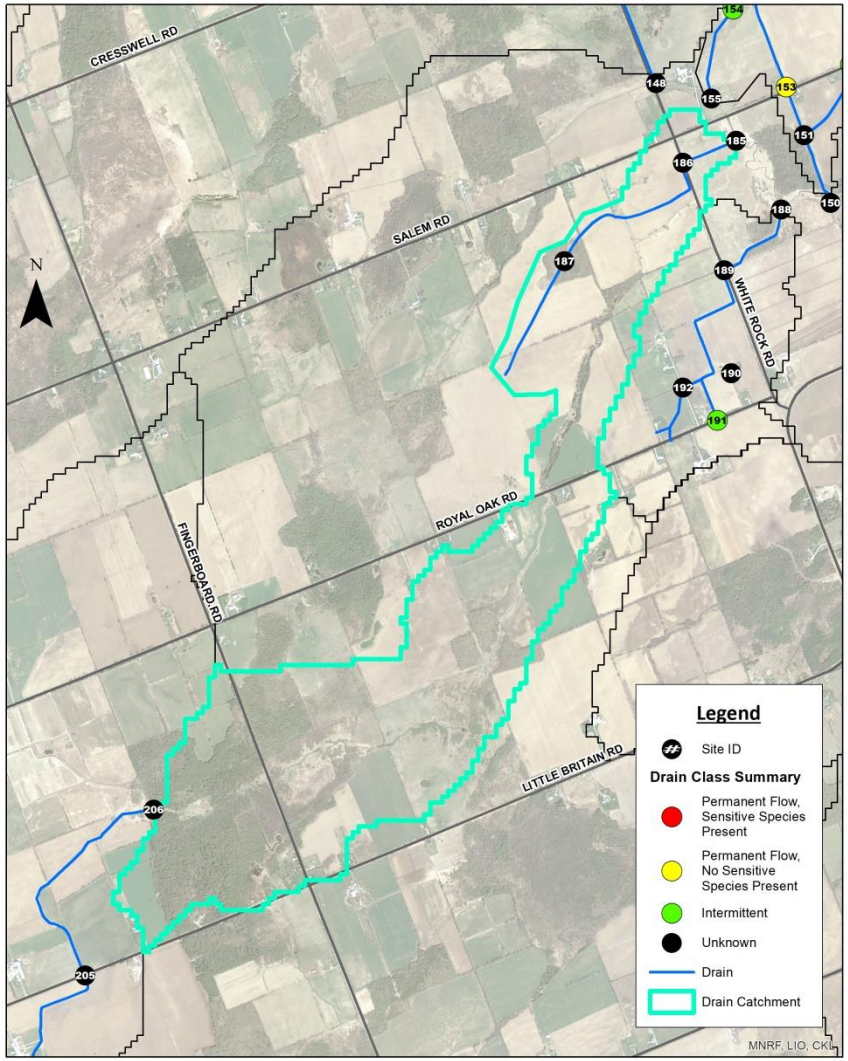


Appendix A: Drain Maps

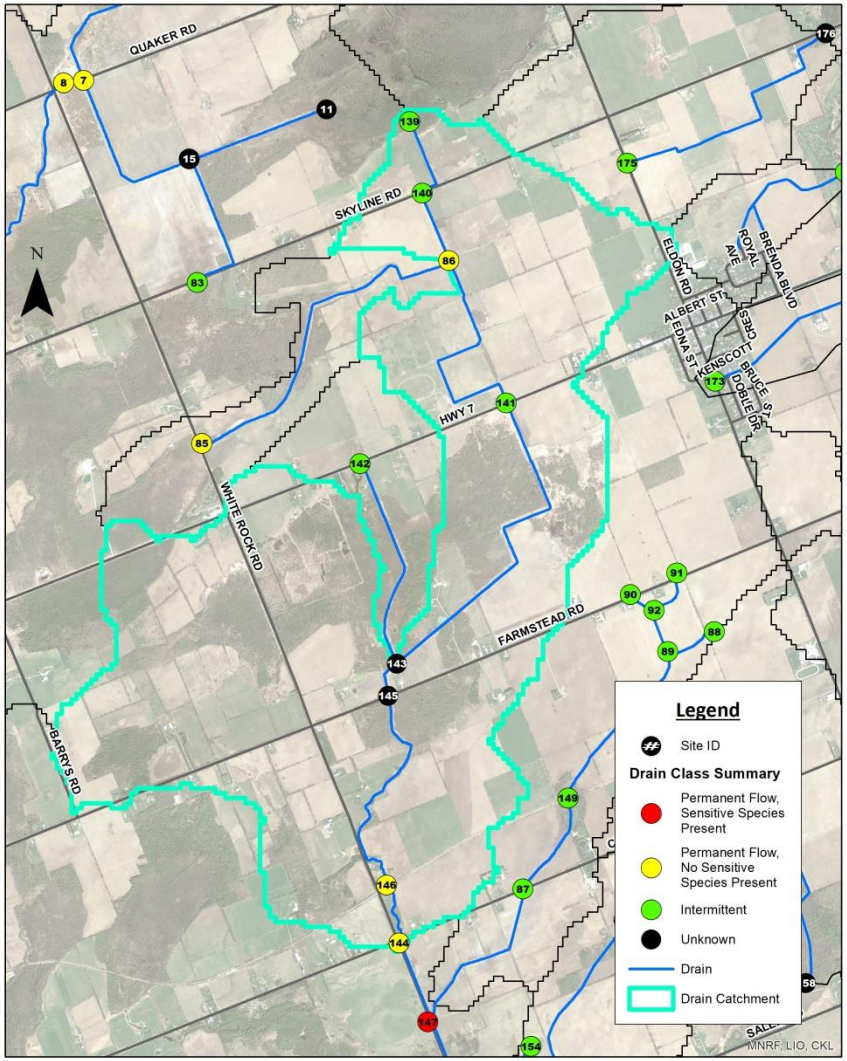


Kievall

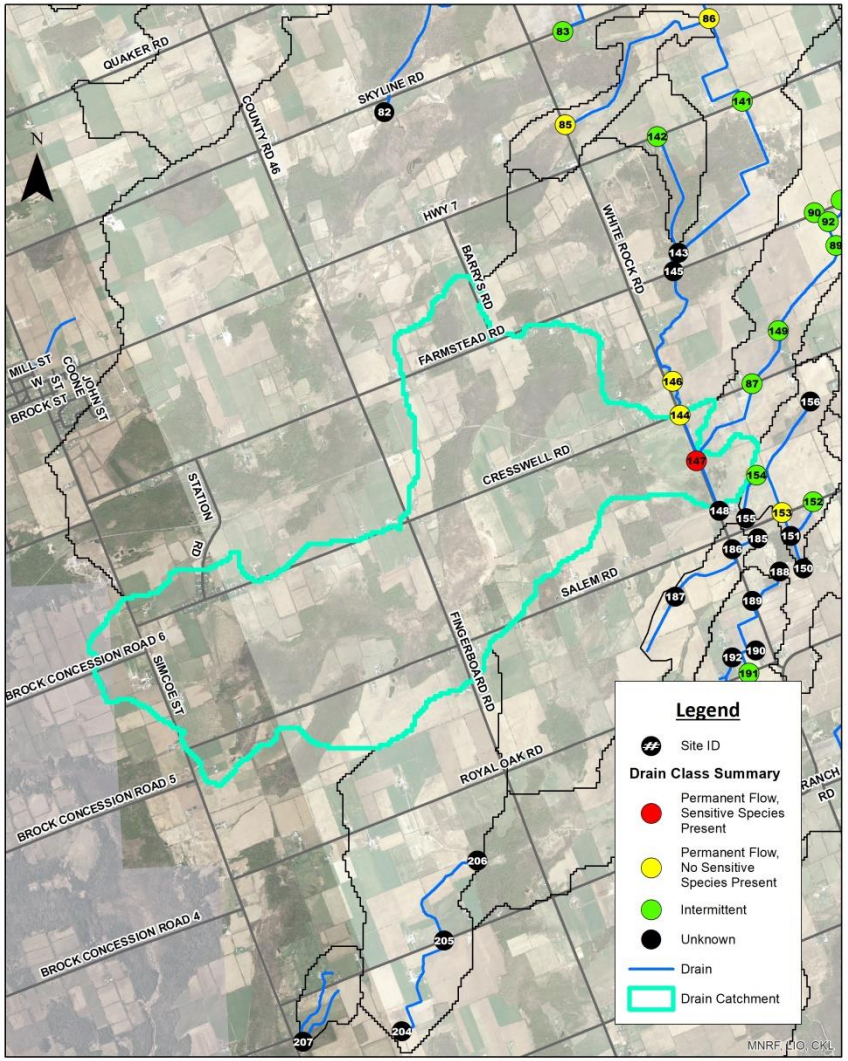
Appendix A: Drain Maps



Appendix A: Drain Maps

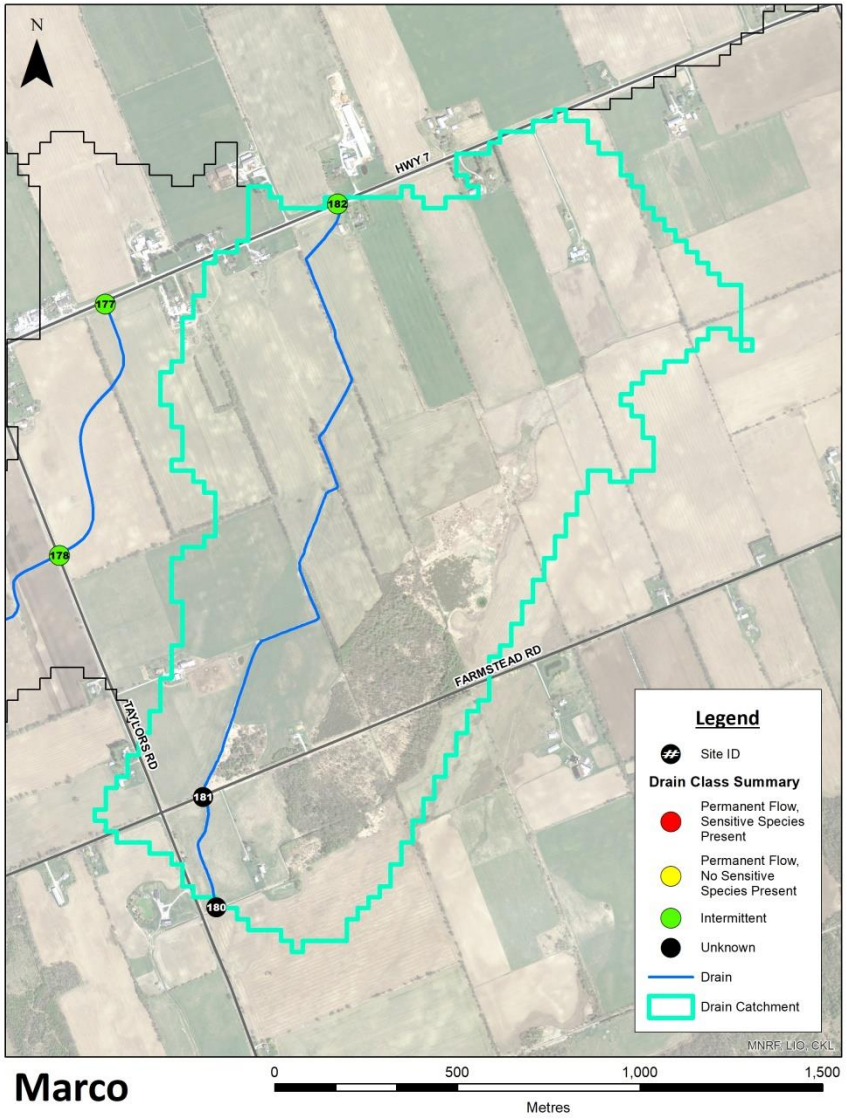


Appendix A: Drain Maps

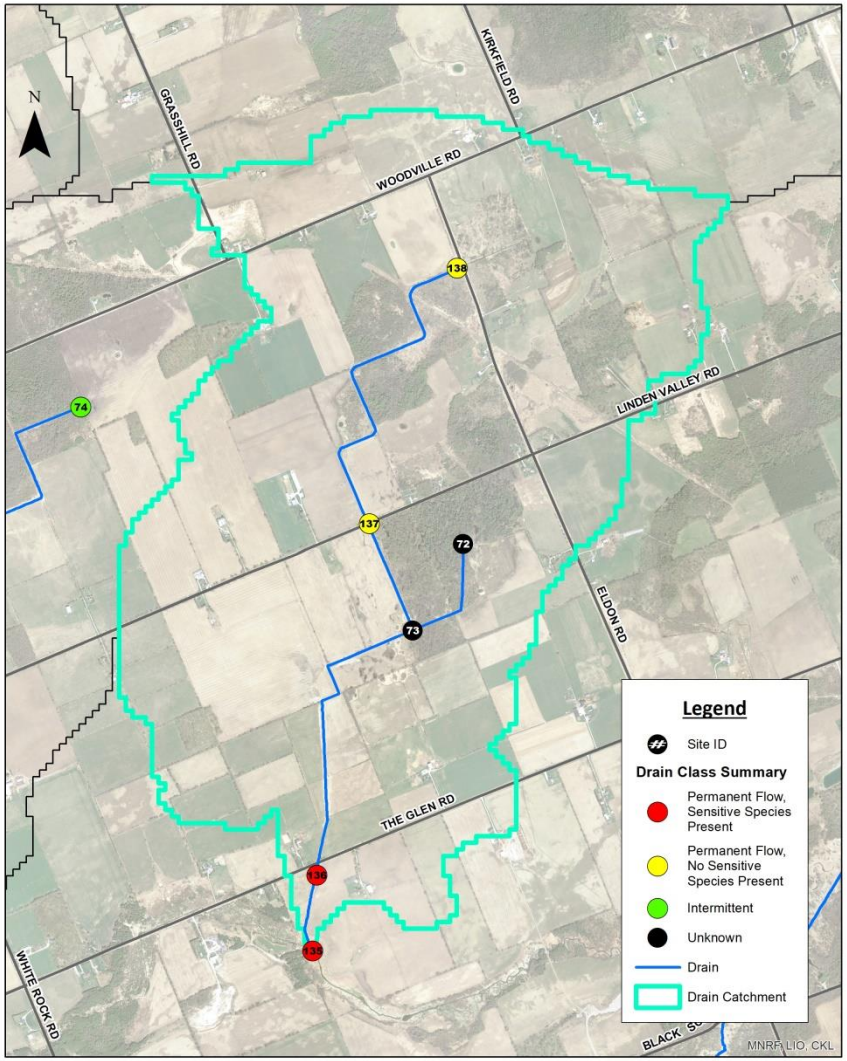


Lownsbrough Ext.

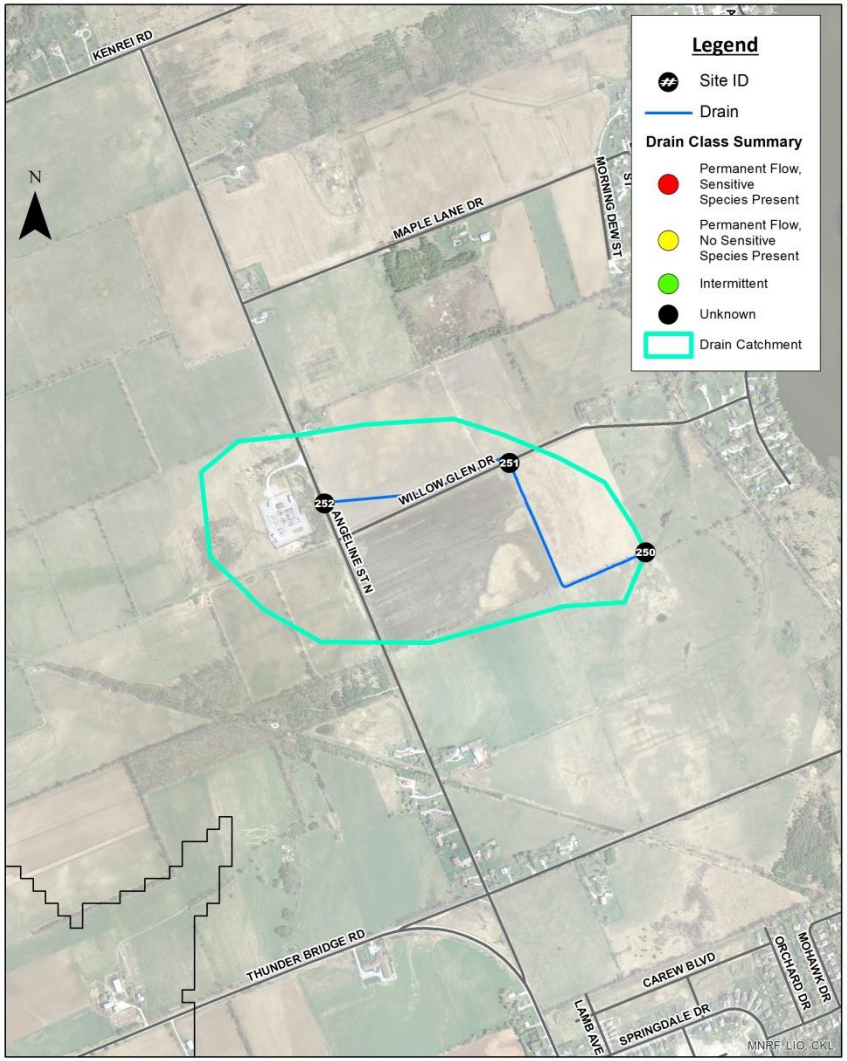
Appendix A: Drain Maps



Appendix A: Drain Maps

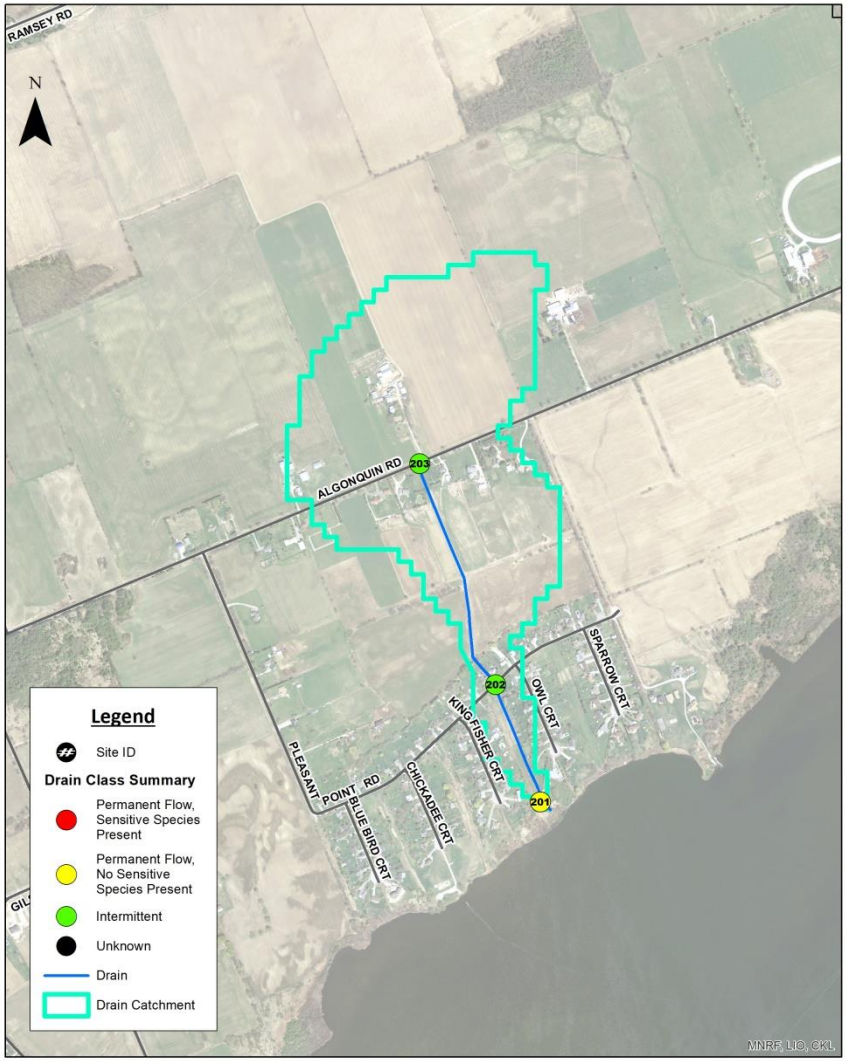


Appendix A: Drain Maps

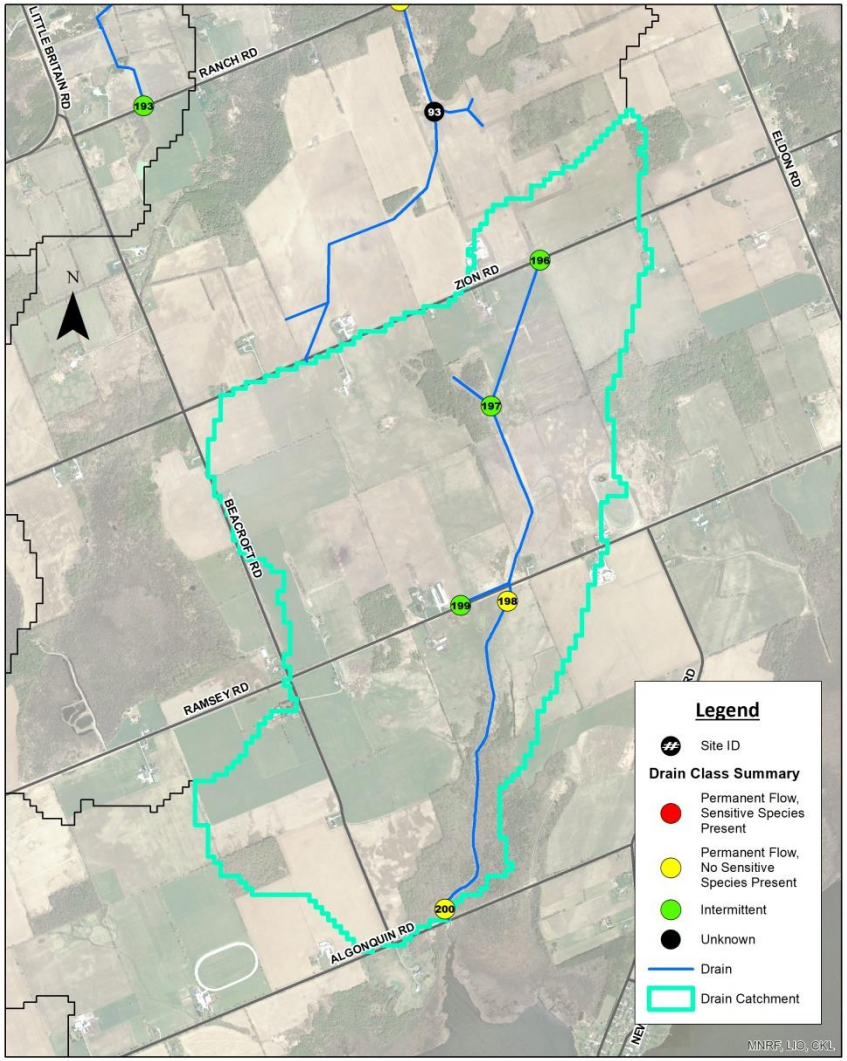


McFeeters Angeline St. N

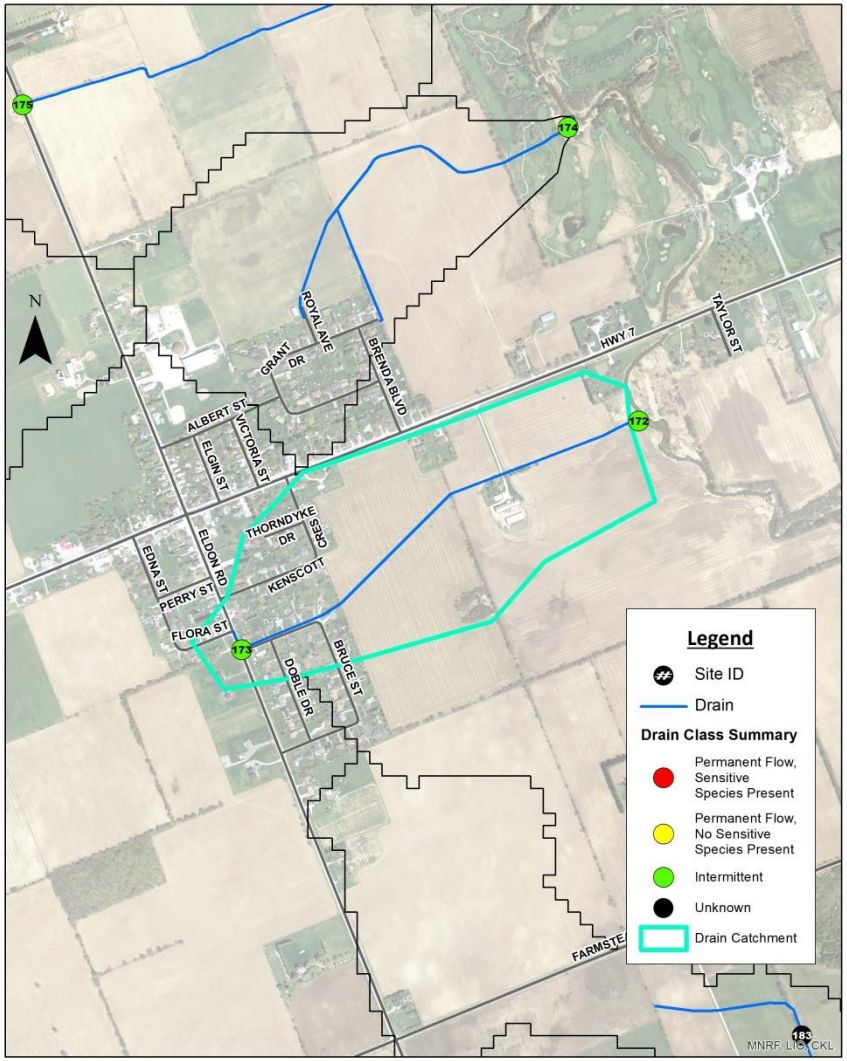
Appendix A: Drain Maps



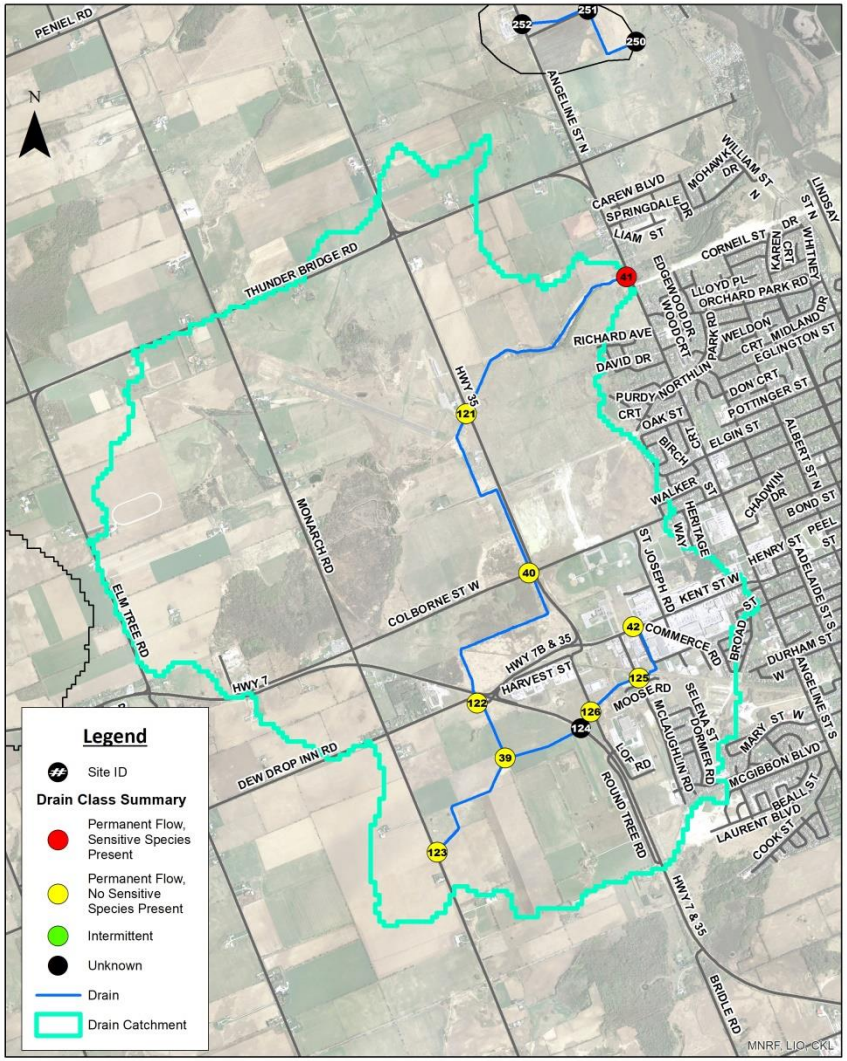
Appendix A: Drain Maps



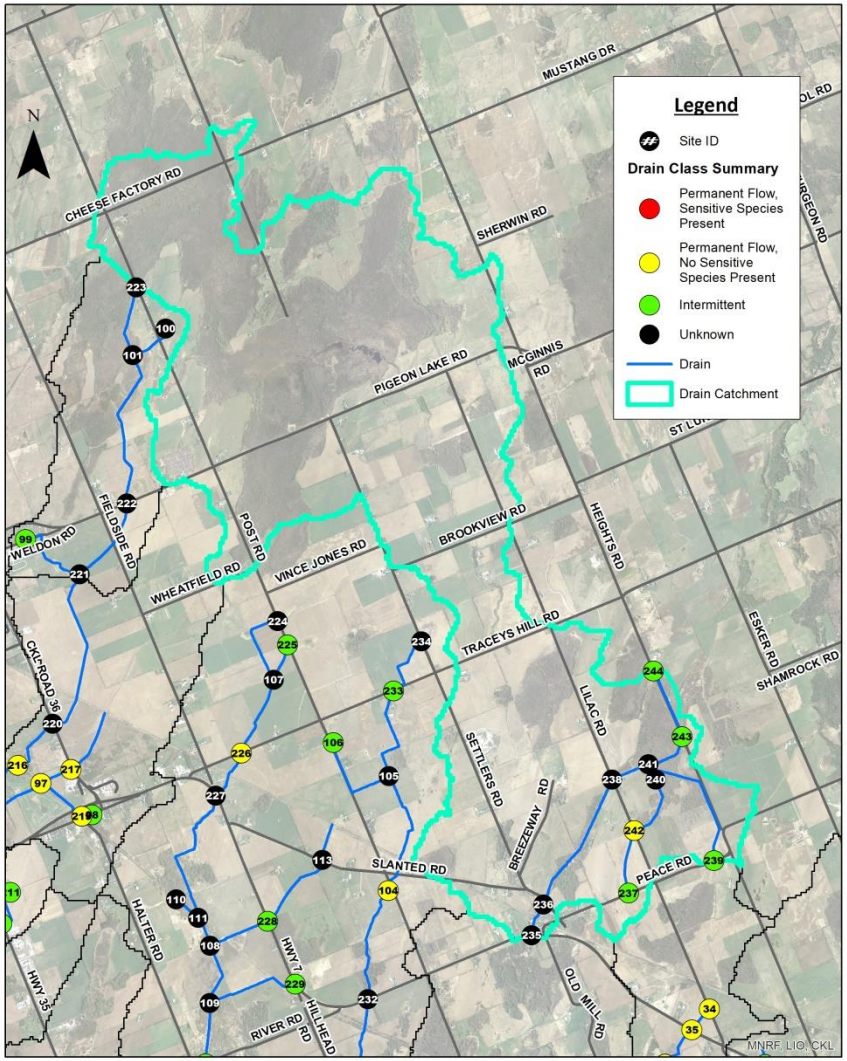
Appendix A: Drain Maps



Appendix A: Drain Maps

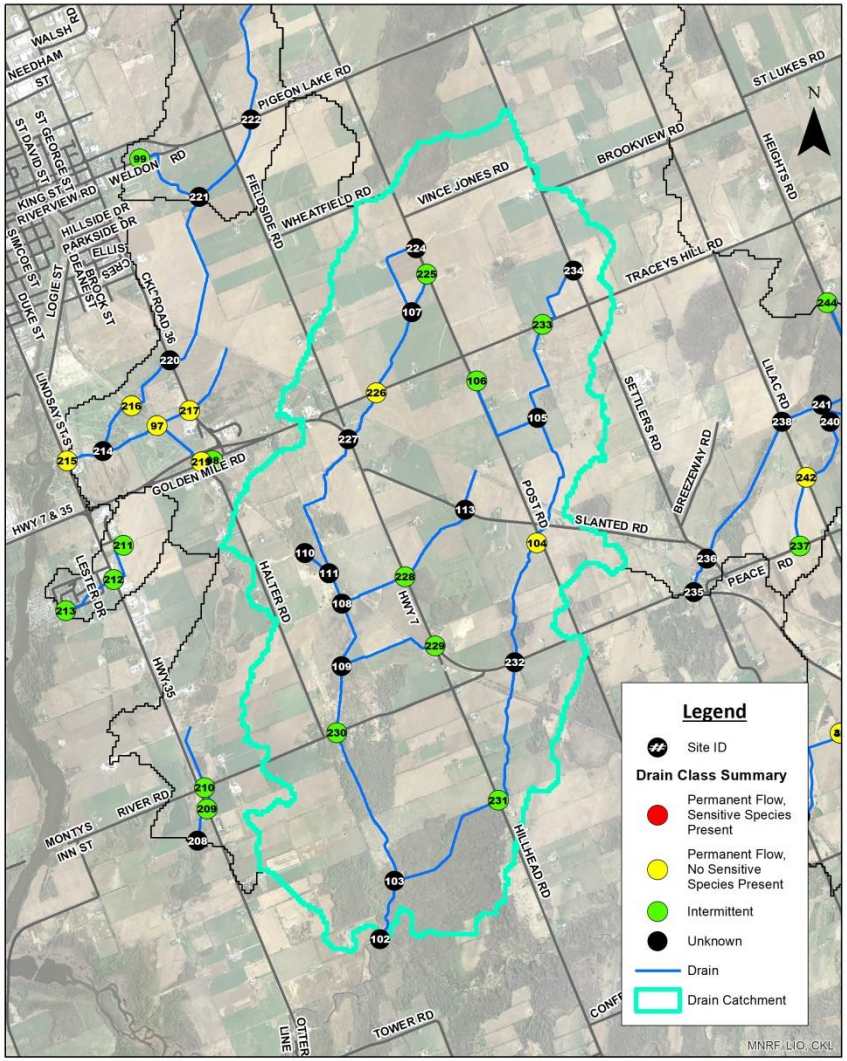


Appendix A: Drain Maps

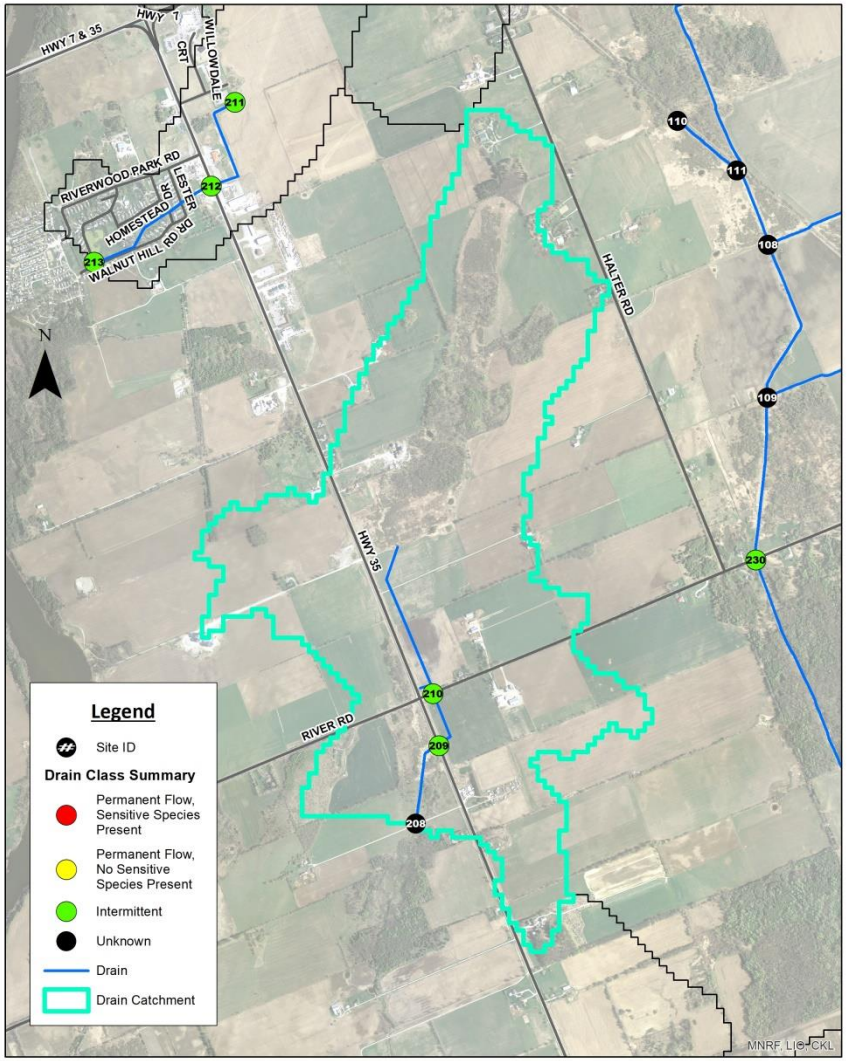


Ops 3-78

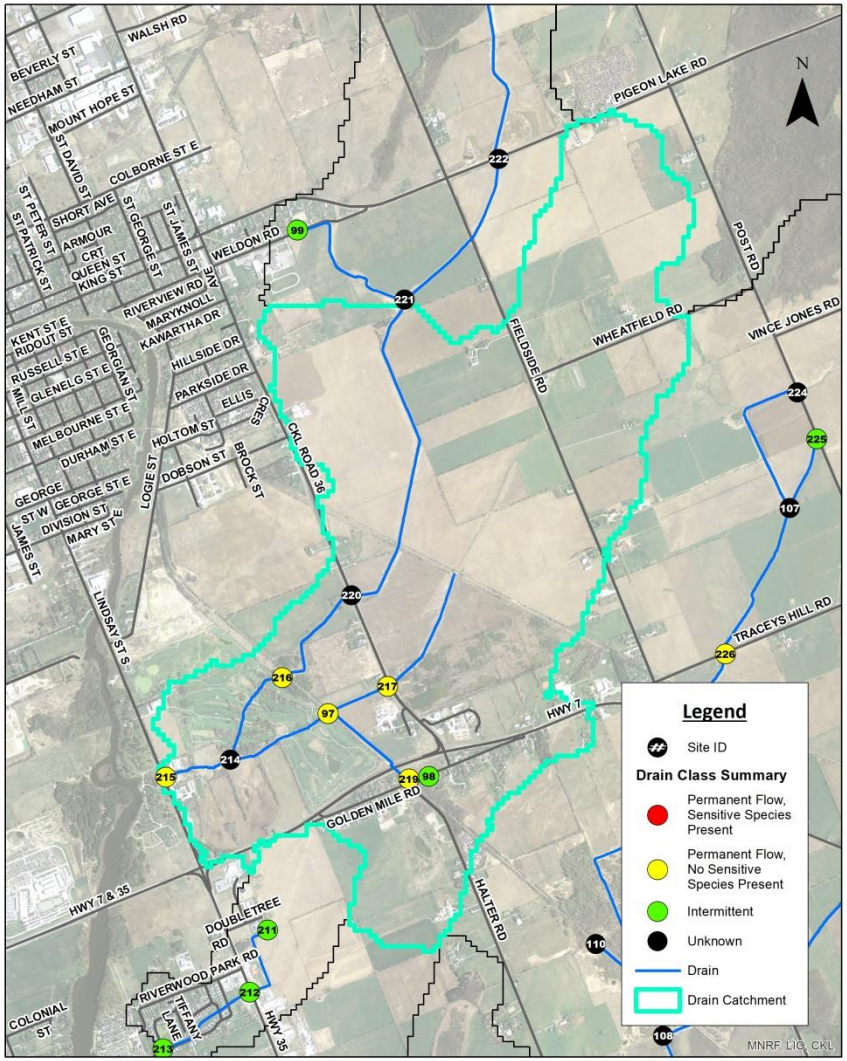
Appendix A: Drain Maps



Appendix A: Drain Maps

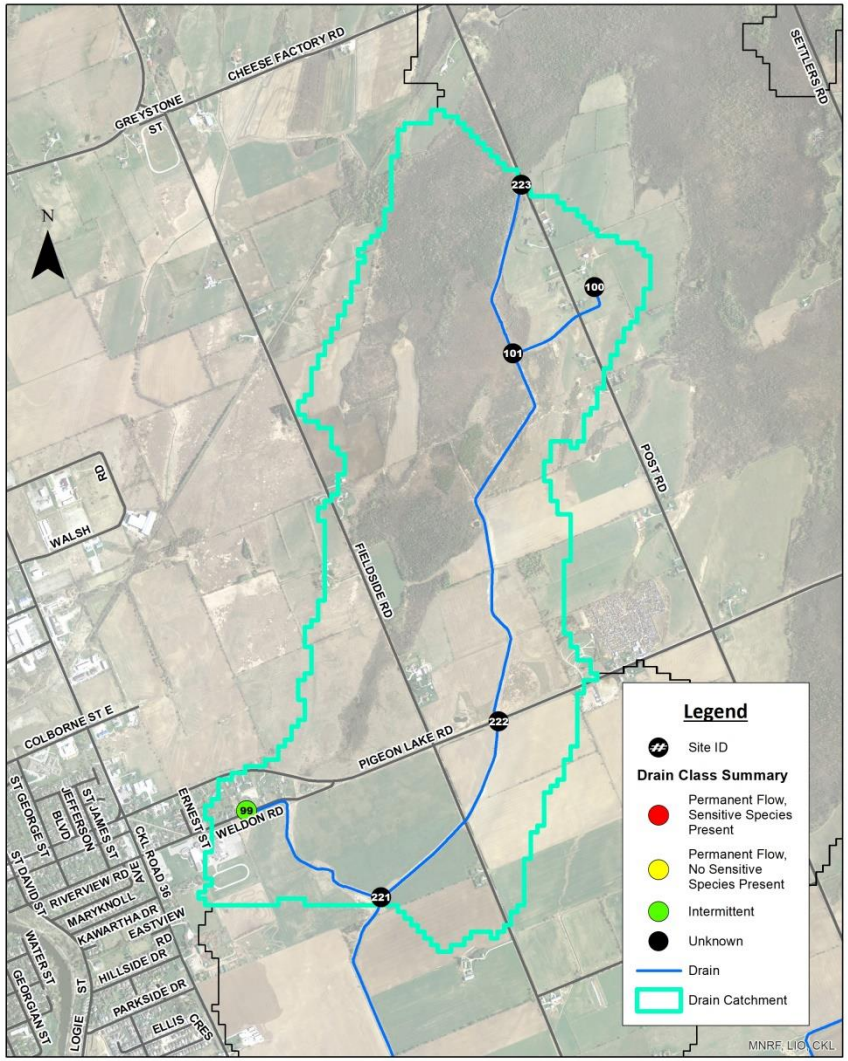


Appendix A: Drain Maps

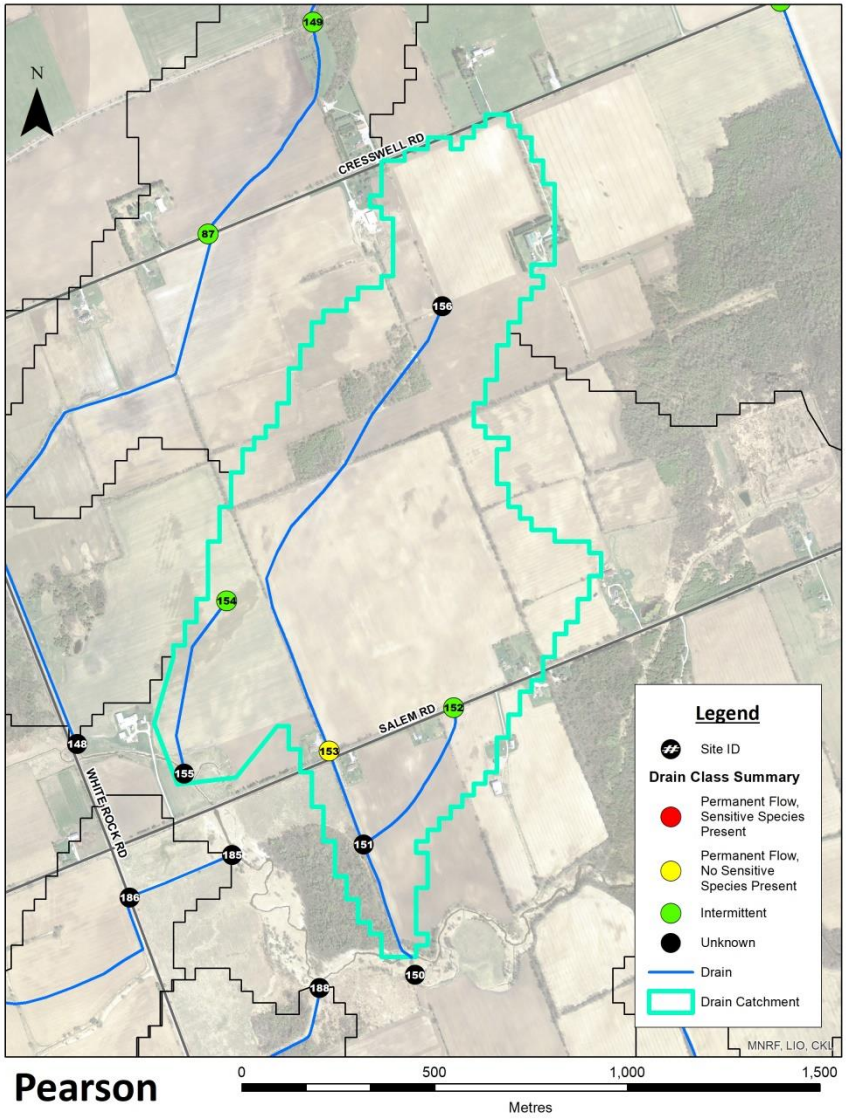


Ops 20-74

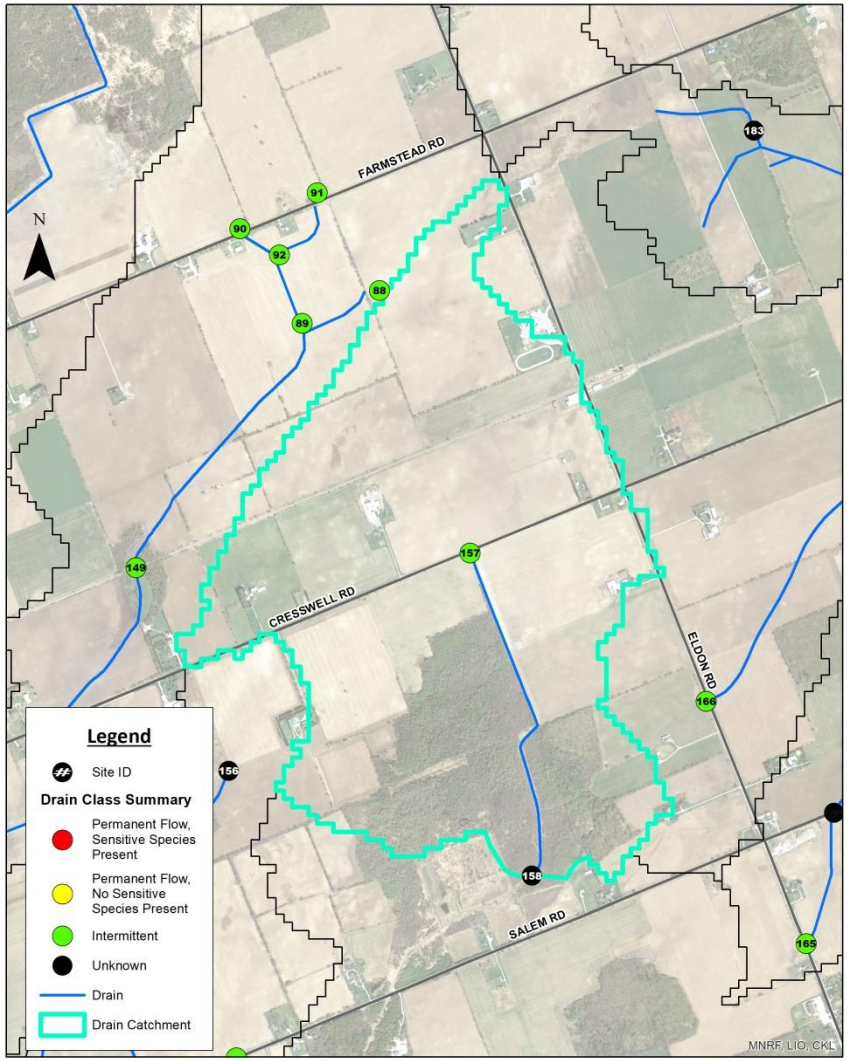
Appendix A: Drain Maps



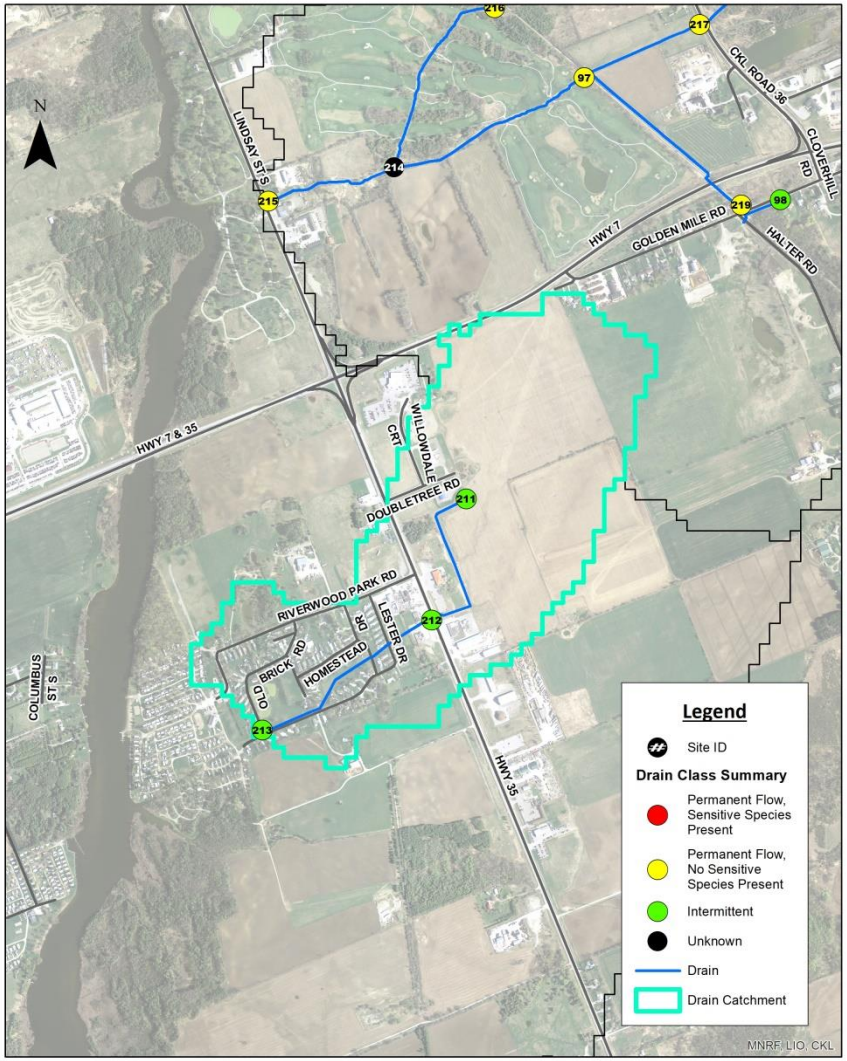
Appendix A: Drain Maps



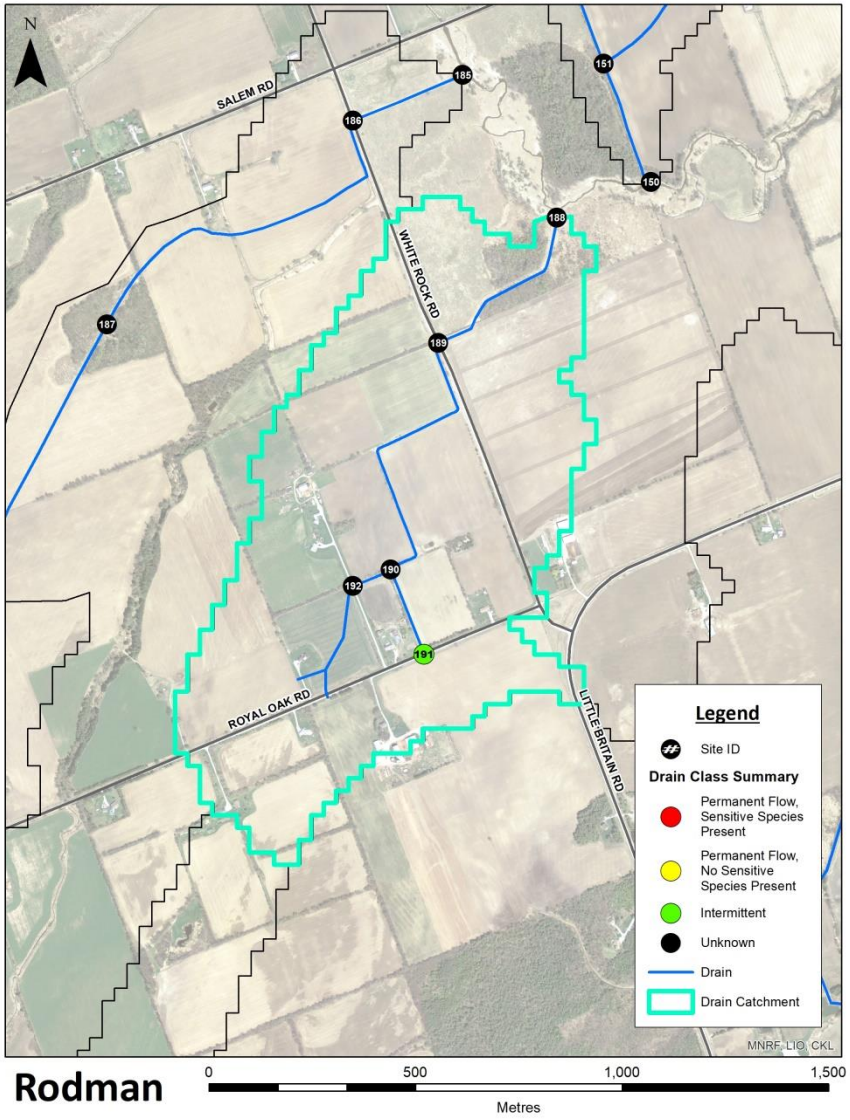
Appendix A: Drain Maps



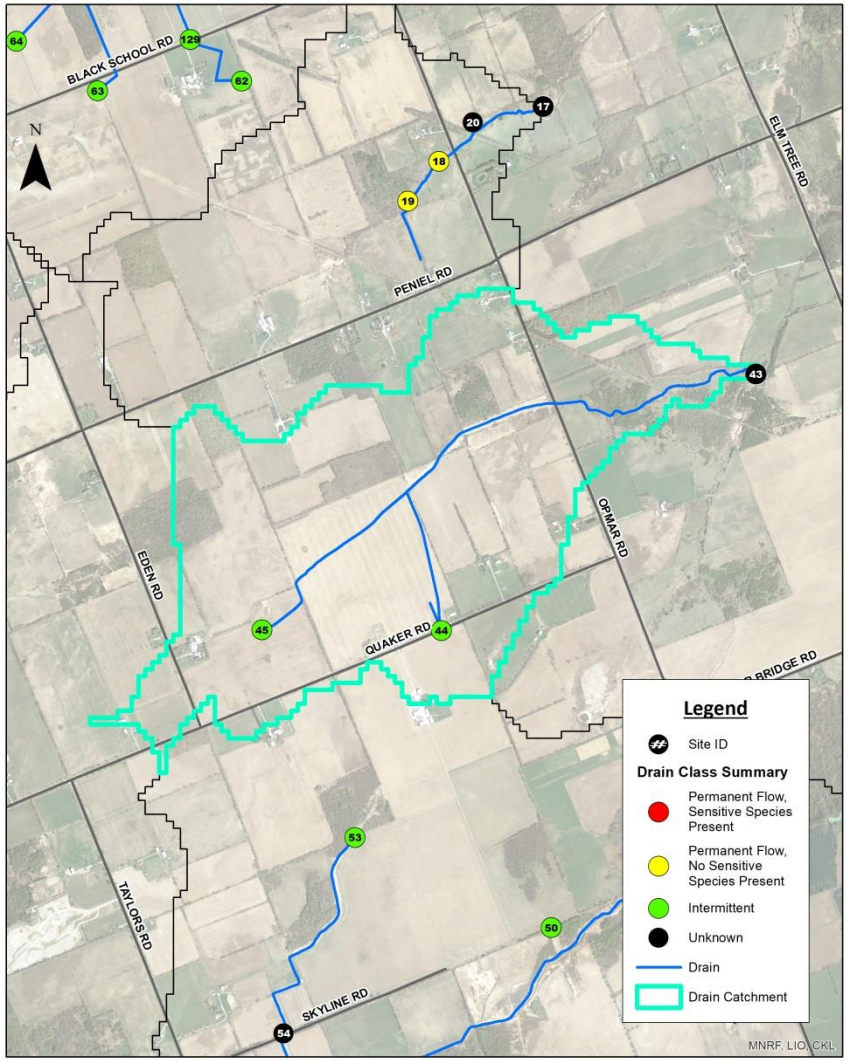
Appendix A: Drain Maps



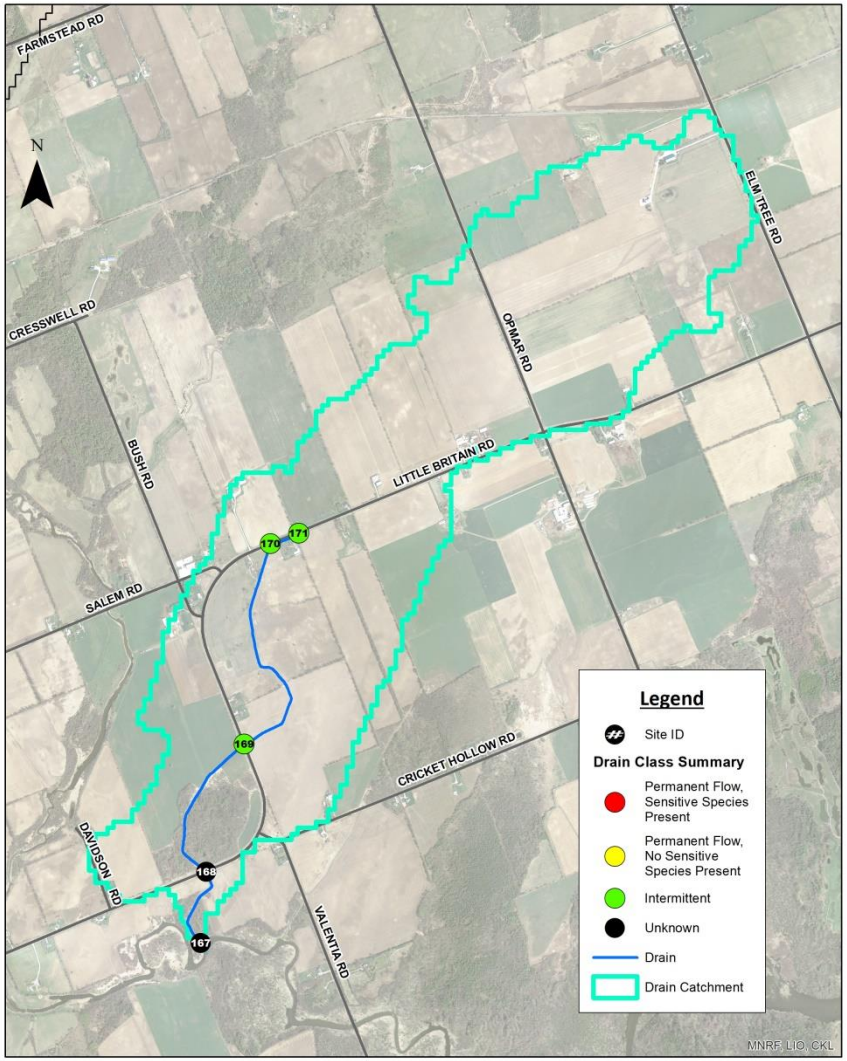
Appendix A: Drain Maps



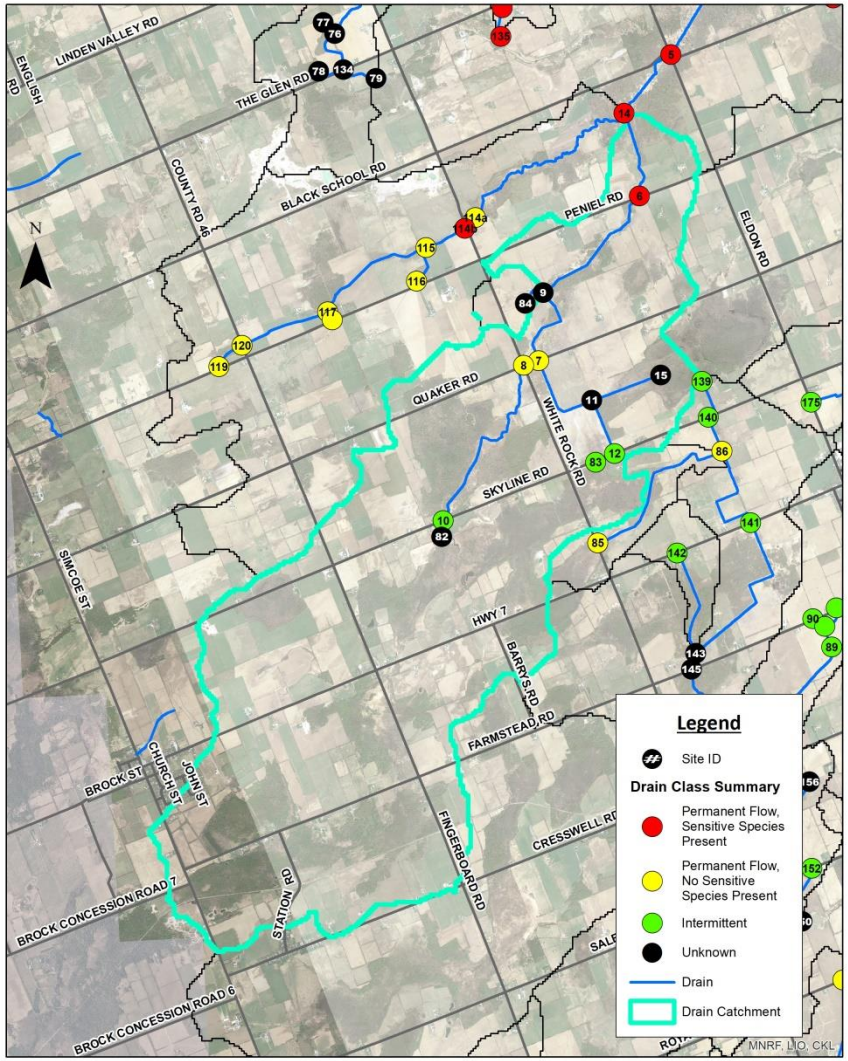
Appendix A: Drain Maps



Appendix A: Drain Maps

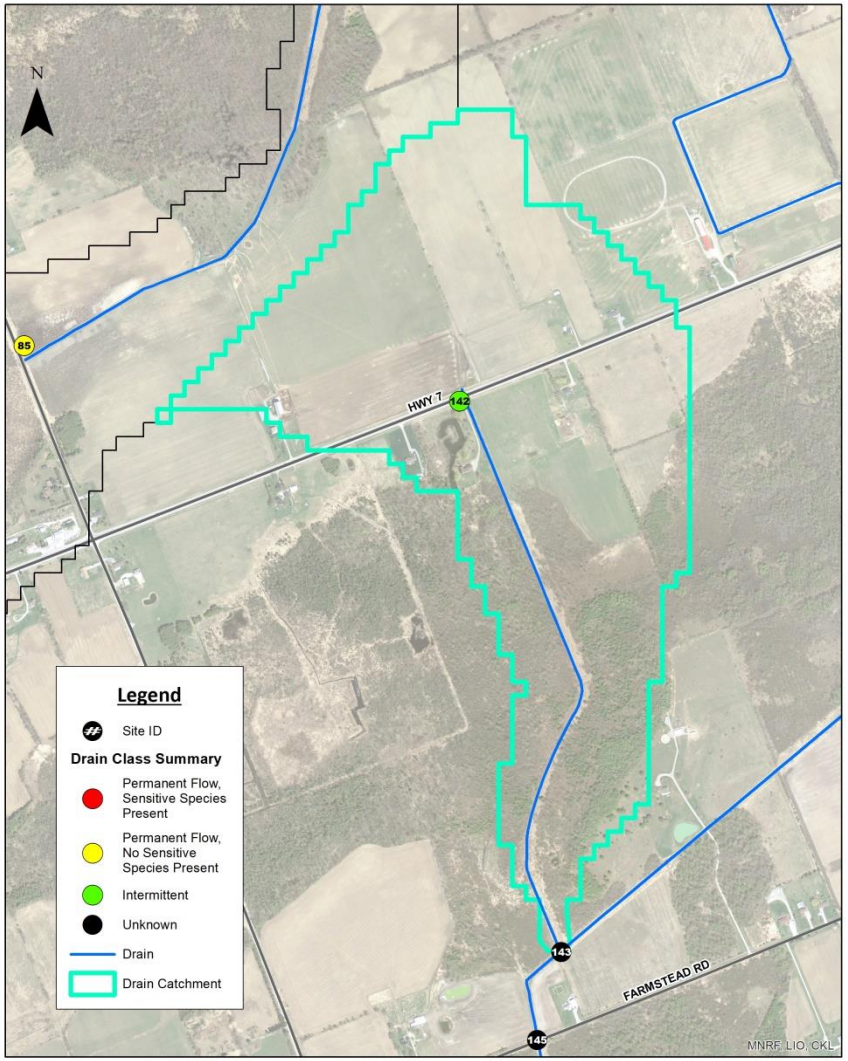


Appendix A: Drain Maps

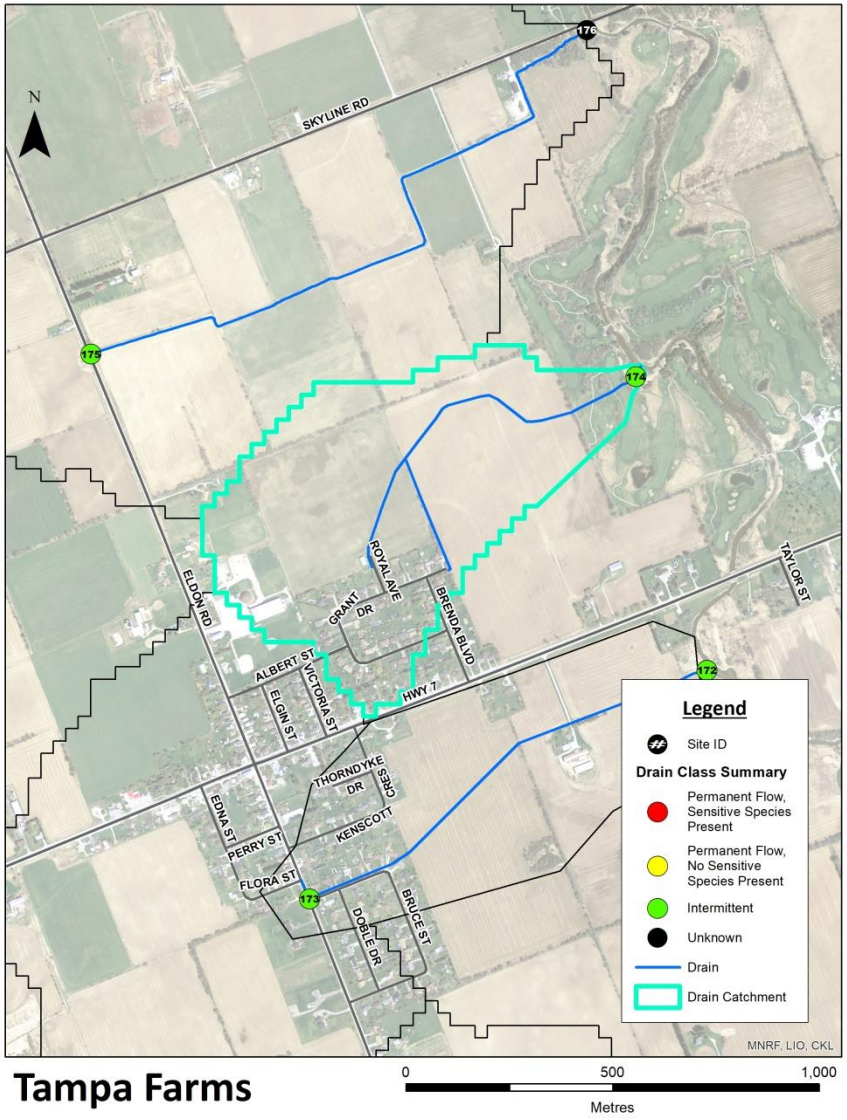


Short

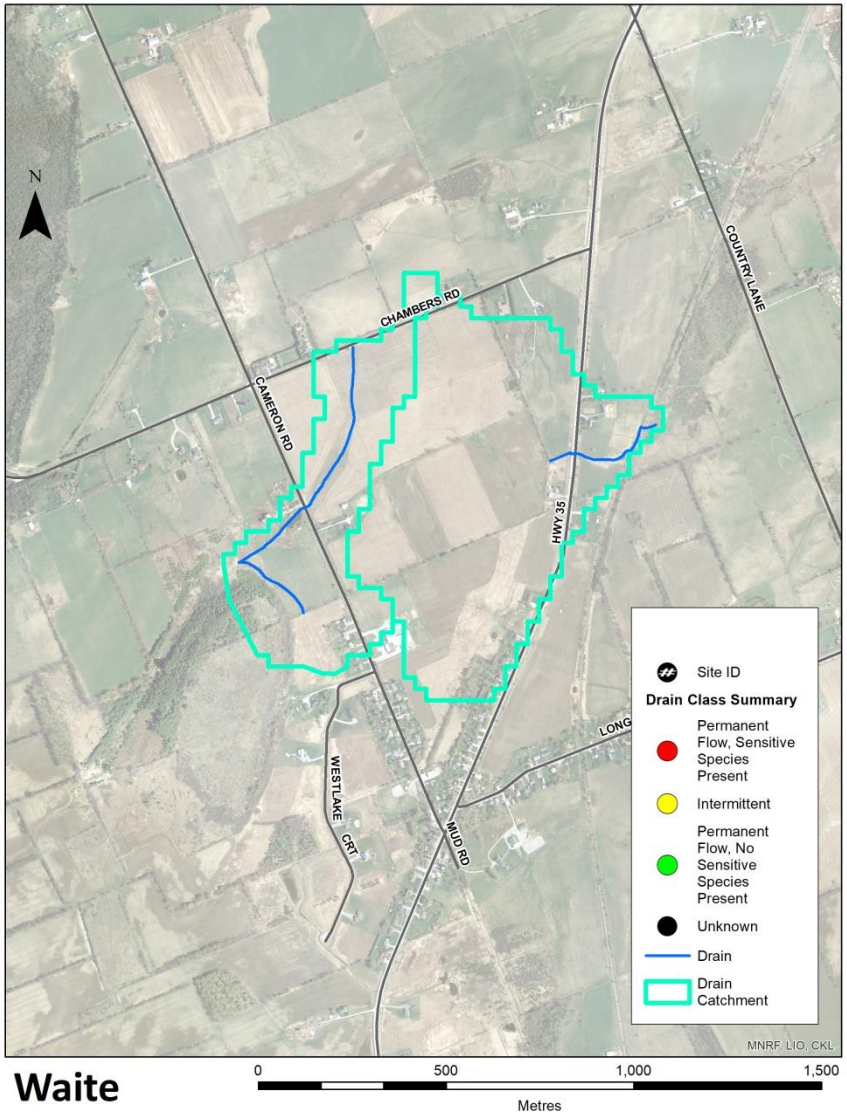
Appendix A: Drain Maps



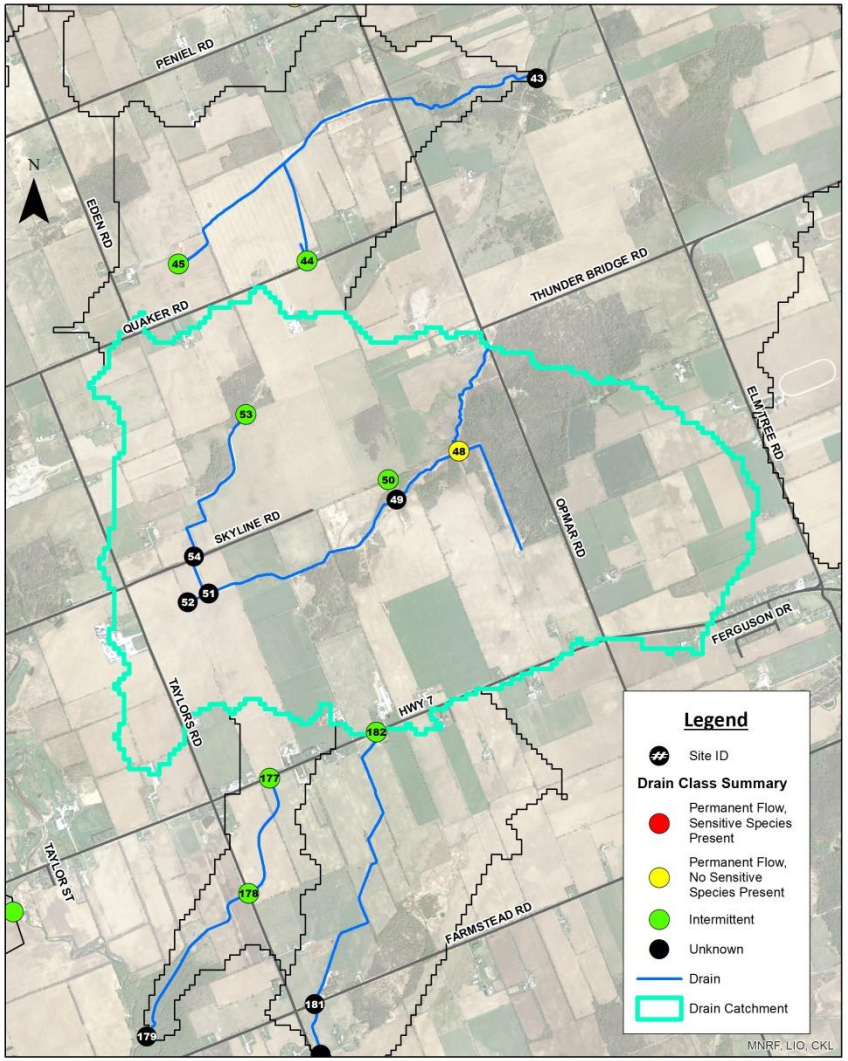
Appendix A: Drain Maps



Appendix A: Drain Maps



Appendix A: Drain Maps



3

4

5

6

7

8

10

12

14

16

18

19

34

35

37

38

39

40

41

42

44

45

48

57

58

60

61

62

63

64

65

66

67

68

69

70

71

74

75

80

83

85

86

87

88

89

90

91

92

97

98

104

106

114a

114b

115

116

117

118

119

120

121

122

123

125

126

128

129

130

132

133

135

136

137

138

139

140

142

144

146

147

149

152

153

157

159

165

166

169

170

171

173

175

177

178

182

191

193

195

196

198

199

200

201

203

209

210

211

212

213

215

216

217

219

225

226

228

229

230

231

233

237

239

242

243

244

246

248

Appendix C: Raw Data