

**Fish and Fish Habitat Assessment for Bovaird Drive Class Environmental
Assessment from Lake Louise Drive/Worthington Avenue to 1.45 km west of
Heritage Road**

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March 26, 2012

INTRODUCTION

The Regional Municipality of Peel is proposing to upgrade Bovaird Drive from Lake Louise Drive/Worthington Avenue to 0.75 km west of Heritage Road. C. Portt and Associates was retained, as part of a team led by AMEC Environment & Infrastructure (AMEC), to assess the fish and fish habitat within the study area in support for the Schedule "C" Class Environmental Assessment for the project. This report documents the existing conditions based on the background information that has been acquired and the results of field investigations conducted on March 30, 2010, June 6, 2011 and August 31, 2011. The existing conditions and the proposed works were assessed the potential risk to fish and fish habitat from the project.

Methods

C. Portt and Associates had compiled background information and conducted field investigations on the principal watercourses that are crossed by Bovaird Drive within the study area as part of the North West Brampton Phase 2 Urban Expansion Area Environmental Open Space Study. (Phase 2 Open Space Study; Dougan and Associates and others, 2005). Each watercourse crossed by Bovaird Drive was examined in the vicinity of the crossing by C. Portt on March 30, 2010 and June 6, 2011. Electrofishing was conducted in one watercourse, at the Heritage Road intersection, where it was unclear whether or not fish were present, on August 31, 2011. The information on existing culvert dimensions was provided by AMEC.

Based on the existing conditions and the proposed works, the proposed works at each watercourse crossing were evaluated using the Fisheries and Oceans Canada Risk Management Framework.

EXISTING CONDITIONS

The study area is drained by tributaries to the Credit River. Several of these tributaries are unnamed. All but the most easterly, a Springbrook Creek headwater feature, were examined during the Phase 2 Open Space Study. The nomenclature for unnamed tributary watersheds used in that study has been adopted for this report, and the tributary subwatershed names are, from west to east, 2A, 2B, 3A, 3B, Huttonville Creek and Springbrook Creek (Figure 1). The existing conditions at each watercourse crossing are described below. The photographs referred to in the text are provided in Appendix A.

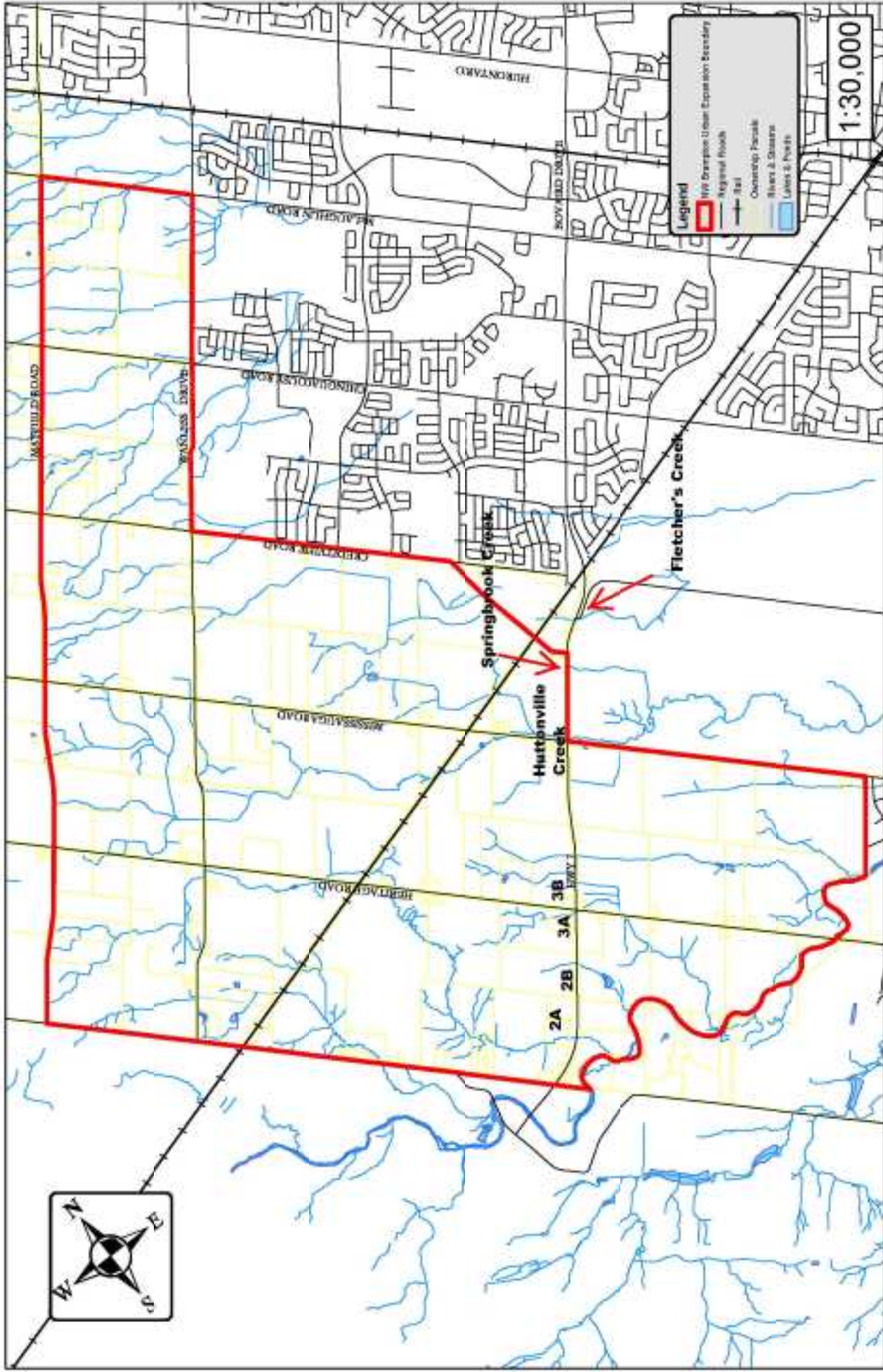


Figure 1. Subwatersheds within the study area. Nomenclature is from the North West Brampton Environmental Open Space Study (Dougan and Associates and others, 2005).

Subwatershed 2a

In late the summer of 2003, this watercourse was dry on the surface in some reaches upstream from Bovaird Drive and had flowing water in others. Surface flow was continuous from approximately 100 metres upstream from Bovaird to the confluence with the Credit River. The remains of an old dam approximately 100 m downstream from Highway 7 may be a barrier to upstream fish migration at low flows.

The 1.2 m concrete box culvert under Bovaird Drive is 95 m long. It is perched at normal flows, so non-jumping fish species would not be able to move upstream under any flow conditions, and the culvert itself is probably a barrier due to shallow water during low flows and high velocities during high flows (Photograph 1). In addition, although the upstream end was obscured by debris (Photograph 2), the sound of water falling into the culvert indicated that there is currently a vertical drop into the culvert at its upstream end. There appears to have been a substantial amount of sediment deposition in the valley immediately upstream from the culvert. On the south side of Bovaird Drive, and the east side of the watercourse, the steep ditch descent into the valley has been stabilized with stone.

Creek chub (*Semotilus atromaculatus*), blacknose dace (*Rhinichthys atratulus*) and brook stickleback (*Culaea inconstans*) were captured both upstream and downstream from Bovaird Drive in 2003. The property owner on the south side of Bovaird Drive (Mr. Crawford) stated that salmon (*Oncorhynchus* spp) sometimes migrate upstream as far as Highway 7 when flows are higher (Personal communication with C. Portt, 2003). This watercourse was considered to have potential to contain reddsides dace (*Clinostomus elongatus*), an endangered fish species in Ontario and additional sampling was recommended in the Phase 2 Open Space study (Dougan and Associates and others, 2005). Sensitivity at Bovaird Drive is high.

Subwatershed 2b

This small drainage feature passes beneath Bovaird Drive in a 35 m long, 0.91 m open footing concrete culvert. On March 30, 2010, flow originated from field tiles that discharge at the edge of the right-of-way (Photograph 3). The culvert is partially filled with fine sediment (Photograph 4). Downstream from Bovaird Drive the channel is wide and undefined for approximately 100 metres, and vegetated with cattails (Photograph 5).

Approximately 200 m downstream from Bovaird Drive there is a pond that is connected to the surface drainage feature, but with a bypass channel so that flow does not go directly through the pond. The downstream end of the bypass channel is a barrier to upstream fish migration, but the steep step-pool structure of this small watercourse further downstream, where the watercourse descends into the Credit River valley, probably already prevents most fish from migrating upstream to that point. Fish from the Credit River can access the lower reaches of this watercourse when flows are high.

As indicated above, the main source of flow in this watercourse in March, 2010, was field tiles that drain to the Bovaird Drive right-of-way (Photograph 3). The watercourse itself was dry upstream and downstream from the pond in the fall of 2003. There was standing water, but no discernable flow, immediately upstream and downstream of the Bovaird Road culvert on June 6, 2011. As this watercourse is dry during the summer of most

years, and there is no access from the permanently flowing reach in the Credit River valley, sensitivity at Bovaird Drive is considered low.

Subwatershed 3a

This watercourse is conveyed under Bovaird Drive just west of Heritage Road in a 1.2 m open footing culvert that has been extended on the downstream side with a corrugated steel pipe (Photographs 6 and 7), resulting in a total culvert length of 30 m. The road embankment has been stabilized with gabions on the downstream side of Bovaird Drive (Photograph 7). The watercourse flows along Heritage Road for approximately 35 metres (Photograph 8) and then is conveyed beneath Heritage Road in a 0.9 m diameter, 14 m long, corrugated steel pipe (Photograph 9).

Standing water was observed in the immediate vicinity of Highway 7, but the channel was dry for some distance downstream in the late summer of 2003. Based on the presence of standing water as far upstream as Highway 7, during a prolonged drought in 2003, this watercourse was considered to be permanent fish habitat from the Credit River upstream to that point (Dougan and Associates and others, 2005). Water striders and a whirligig beetle, were observed at Bovaird Drive on March 30, 2010, again suggesting permanent aquatic habitat, at least in the vicinity of the crossing. A trickle of flow was observed here on June 6, 2011.

This site was examined again on August 31, 2011. Water was present from the downstream end of the Bovaird Drive culvert to the downstream end of the Heritage Road culvert. The watercourse was dry downstream from the Heritage Road culvert. A trickle of flow was observed between the two culverts, but the water must percolate into the ground or the road base in the vicinity of the Heritage Road culvert. The reach between the two culverts was electrofished using a Halltech backpack electrofisher (150 volts, 60 Hertz). No fish were captured. Sensitivity of this watercourse is considered to be low, based on the absence of fish.

Subwatershed 3b

The surface drainage features in upper reaches of this subwatershed were dry when examined in the late summer of 2003. On March 30, 2010, and on June 6, 2011, water was flowing from three main drainage features from the agricultural land upstream from Bovaird Drive. One of these was approximately in line with the Bovaird Drive culvert, but water from the others flowed for some distance along the north Bovaird Drive ditch to the culvert (Photographs 10 and 11). The existing 45 m long, 1.2 m open footing concrete culvert under Bovaird Drive is partially filled with sediment. Downstream from Bovaird Drive the drainage feature flowed across a cultivated field (Photograph 12). There is an online pond approximately 1.2 km downstream from Bovaird Drive.

Fish sampling was conducted near the confluence of this watercourse with the Credit River in 2003. A section 59 metres long was electrofished, resulting in the capture of four juvenile rainbow trout, 1 YOY (young-of-the-year) rainbow trout, 2 YOY brown trout, 2 creek chub, and 3 blacknose dace. We would consider sensitivity of the habitat at Bovaird Drive to be low, due to its ephemeral flow, but caution should be taken to avoid downstream impacts to the coldwater fish habitat near the Credit River.

Huttonville Creek

Huttonville Creek has permanent flow at Bovaird Drive, and this reach of the watercourse receives groundwater discharge (North West Brampton Phase 1

Characterization Report; AMEC and others, 2008). The Bovaird Drive culvert has been recently replaced and extended at this location and coir cloth is visible along the banks, upstream and downstream from Bovaird Drive (Photographs 13 and 14).

Huttonville Creek supports the provincially endangered redbside dace and Bovaird Drive crosses a reach of Huttonville Creek that is currently occupied by the species (Letter from M. Heaton, Ministry of Natural Resources, to Hitesh Topiwala, Region of Peel. November 25, 2009). The species and its habitat are protected under the Endangered Species Act 2007. Other common fish species captured in the vicinity of Bovaird Drive include creek chub, blacknose dace and brook stickleback were captured here (Site B1) on October 16, 2003, as part of the Phase 2 Open Space Study (Dougan and Associates and others, 2005). Huttonville Creek at this location is considered highly sensitive.

Springbrook Creek

There is one Bovaird Drive culvert, a 33 m long, 0.9 m x 1.0 m concrete box, within the Springbrook Creek subwatershed. There is no defined drainage feature upstream from Bovaird Drive and there was no flow at this location on March 30, 2010 (Photograph 15). There was standing water present in the roadside ditch and the drainage feature upstream from Bovaird Drive and at some locations in the watercourse immediately downstream from Bovaird Drive (Photograph 16). On June 6, 2011, this feature was dry except for a puddle at the upstream end of the Bovaird Drive culvert. The sensitivity of this watercourse is considered to be low, although the presence of redbside dace in the lower reaches of Springbrook Creek must be considered during mitigation development.

Fletcher's Creek

A drainage feature originates from parking lot drainage via a storm sewer outfall at the GO station and flows on the surface for approximately 50 m before entering a concrete box culvert (Photograph 17) that conveys it to the ditch on the south side of Bovaird Drive. That ditch drains east to a 2400x1500mm concrete box culvert extends through the Creview Development and discharges to a stormwater management facility south of James Potter Road. There was standing water present here on March 30, 2010, and this feature was dry on June 6, 2011. This drainage feature is considered to have low sensitivity.

Proposed Works

The characteristics of the existing culverts and the proposed works at each watercourse crossing, as determined by AMEC, are summarized in Table 2. At watercourse 2a the proposed works are limited to possible reconstruction of the inlet. At watercourse 2b the existing culvert, if it is replaced, will be replaced with an identical structure. The two culverts for watercourse 3a, one beneath Bovaird Drive and one beneath Heritage Road, will both be replaced with new culverts that are 21 and 22 m longer, respectively. The preferred alternative at the Huttonville Creek is a 14.6 m precast arch structure. No works are proposed as part of this project at the drainage features in the Springbrook Creek and Fletchers Creek watersheds.

Table 1. Summary of flow status, channel form, fish communities and habitat and fish community sensitivity for each drainage feature.

Watercourse	Flow Status at Bovaird Drive	Channel form at Bovaird Drive	Fish community at Bovaird Drive	Fish community downstream	Habitat sensitivity	Fish community sensitivity	Overall Sensitivity
Watercourse 2a	permanent	natural	warmwater and migratory salmonids	coolwater	high	medium to high	high
Watercourse 2b	intermittent/ephemeral	none upstream; straight, constructed downstream	none	unknown	low	low	low
Watercourse 3a	permanent	natural upstream; naturalized but constructed along Heritage Road	none	unknown	medium to high	low	medium
Watercourse 3b	intermittent	straight, constructed upstream; across cultivated field downstream	none	coldwater	low	low	low
Huttonville Creek	permanent	natural	Endangered reidside dace	coldwater	high	high	high
Springbrook Creek	ephemeral	straight, constructed	none	coldwater	low	low	low
Fletcher's Creek	permanent or intermittent	constructed	none	warmwater baitfish?	low	low	low

Table 2. Characteristics of existing and proposed culverts within the study area.

Watercourse crossing	Existing material and size	Existing length (m)	Proposed material and size	Proposed length (m)	Change in length (m)	Remarks
Watercourse 2a	1.2 m concrete box	95	existing to remain	same as existing	0	Reconstruction of inlet may be required
Watercourse 2b	0.91 m concrete open footing	35	same as existing	same as existing	0	Structure may need to be reconstructed to mitigate structural deficiencies (subject to detailed design assessment)
Watercourse 3a (Heritage Road)	0.9 m csp	14	0.9 m csp	36	12 m U/S 10 m D/S	Existing culvert to be removed and replaced with longer culvert
Watercourse 3a (Bovaird Drive)	1.2 m concrete open footing, csp extension on downstream end	30	1.2 m concrete open footing	51	11 m U/S 10 m D/S	CSP section to be removed and replaced with open footing, plus extensions. Portion of existing watercourse in rights-of-way to be moved to new ditch.
Watercourse 3b	1.2 m concrete open footing	23	1.0 m x 6.0 m open footing	45	10 m U/S 12 m D/S	Replacement of existing culvert is required to meet hydraulic requirements
Huttonville Creek	5.53 m concrete open footing	60	14.6 m precast open footing arch culvert	83	14 m U/S 9 m D/S	MNR has agreed to this alternative
Springbrook Creek	0.9 m x 1.0 m concrete box	33	existing to remain	same as existing	0	No works proposed as part of this project
Fletcher's Creek	9x0.9m concrete box, 1.05m CSP extension on south end	47	0.9x0.9 concrete box	55	3 m U/S 5 m D/S	CSP section to be removed and replaced with concrete box extensions

Risk Management Assessment

The proposed works at each watercourse crossing, was evaluated using the Fisheries and Oceans Canada Risk Management Framework. This framework assesses the sensitivity of fish and fish habitat based on fish species sensitivity, species' dependence on the habitat, species and habitat rarity and habitat resiliency. The scale of negative effect of the proposed works is assessed based on the extent (size) of the disturbance, the duration of any anticipated negative residual effects, and the intensity of the disturbance, which is the amount of change from the base line condition.

The assessment for each evaluation criteria, is presented for each crossing where works are proposed in Table 3. The overall risk management assessments are illustrated in Figure 2. The sensitivity of fish and fish habitat is low, except for watercourse 2a where it is medium and for Huttonville Creek, where it is high due to the presence of the endangered redbside dace. In all cases the scale of negative effects is low. With the exception of Huttonville Creek, based on this assessment, and provided that best management practices (i.e. for sediment controls, timing restrictions, revegetation guidelines) are followed, the proposed works can be carried out under a letter of advice, or perhaps, in some cases, by following guidance in operational statements (Figure 2). These practices, which are subject to change over time, should be clearly described during detailed design.

A Fisheries Act authorization may be required, and an Endangered Species Act 17C permit will be required, for the Huttonville Creek crossing. The 17C permit, which is issued by the Ministry of Natural Resources, will require that a Redside Dace Overall Benefit proposal be developed prior to its issue.

Table 3. Evaluation of the proposed works based on the criteria used in the Fisheries and Oceans Canada risk management assessment.

	Sensitivity of fish and fish habitat					Scale of negative effect		
	Species Sensitivity	Species dependence on habitat	Species Rarity	Habitat Resiliency	Extent	Duration	Intensity	
Watercourse 2a	moderate	moderate	moderate	moderate	low	low	none	
Watercourse 2b	none	low	low	low	low	low	low	
Watercourse 3a (Heritage Road)	none	low	low	low	low	high	low	
Watercourse 3a (Bovaird Drive)	none	low	low	low	low	high	low	
Watercourse 3b	none	low	low	low	low	high	low	
Huttonville Creek	high	high	high	moderate	low	high	low	
Springbrook Creek	no works proposed							
Fletcher's Creek	low	low	low	high	low	high	low	

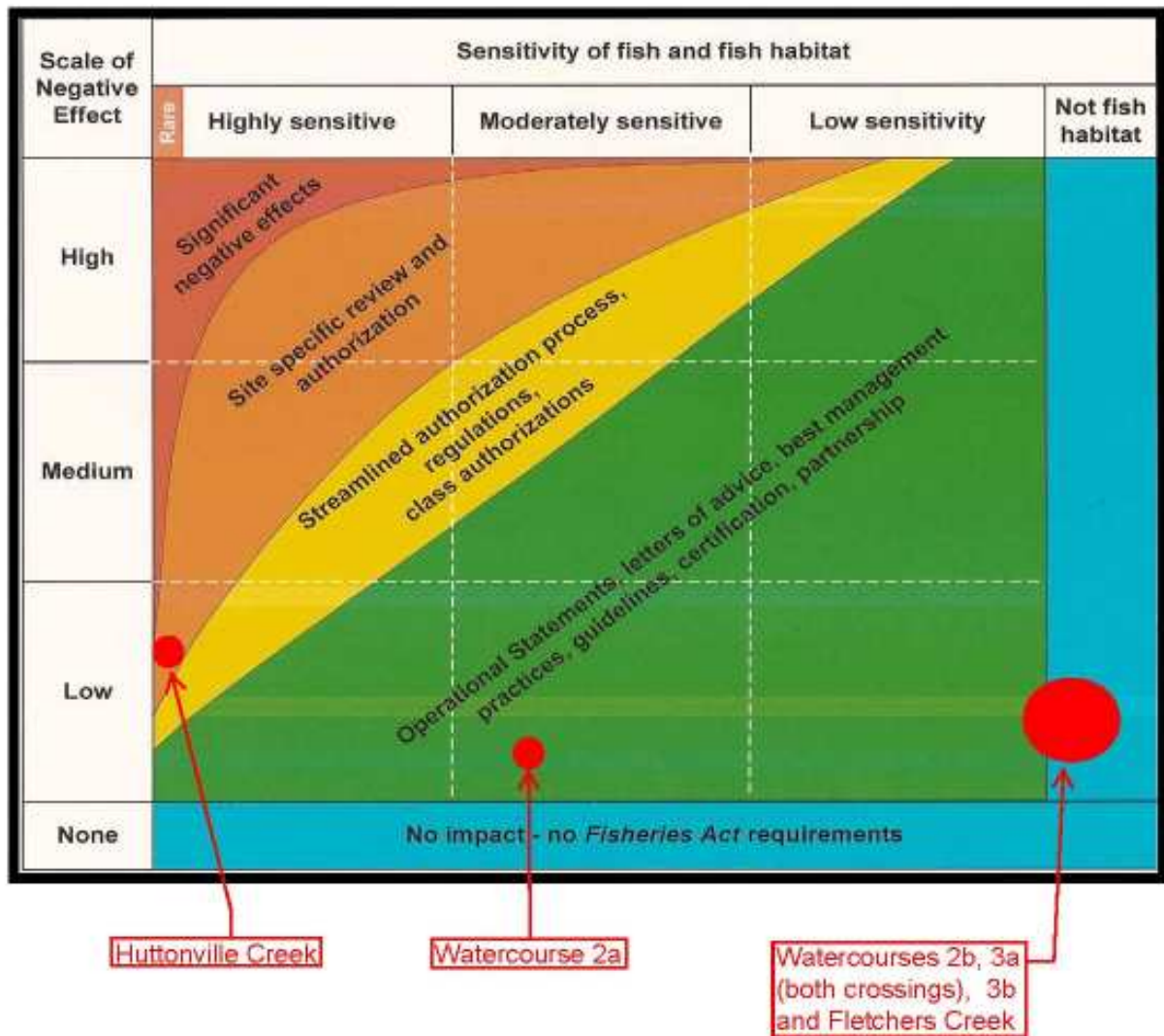


Figure 2. Risk management assessment for the proposed watercourse crossings.

Appendix A. Photographs



Photograph 1. Downstream end of culvert at watercourse 2a. March 30, 2010.



Photograph 2. Debris jam at upstream end of culvert at watercourse 2a. March 30, 2010.



Photograph 3. Field tiles that are source of upstream flow at watercourse 2b. March 30, 2010.



Photograph 4. Upstream end of Bovaird Drive culvert at watercourse 2b. March 30, 2010.



Photograph 5. Looking downstream at watercourse 2b. March 30, 2010.



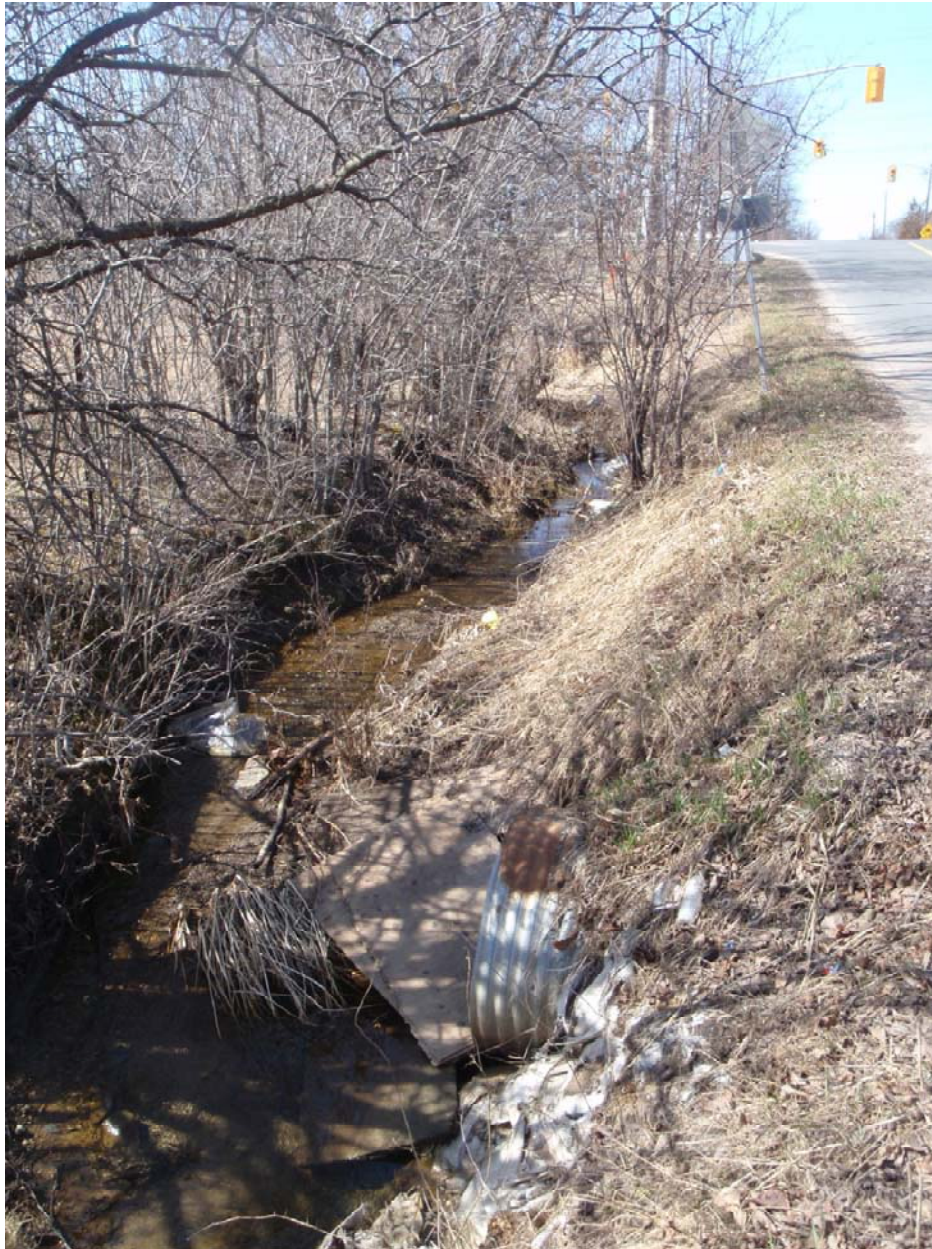
Photograph 6. Upstream end of Bovaird Drive culvert at watercourse 3a. March 30, 2010.



Photograph 7. Downstream end of Bovaird Drive culvert at watercourse 3a. March 30, 2010.



Photograph 8. Watercourse 3a downstream from Bovaird Drive culvert. March 30, 2010.



Photograph 9. Watercourse 3a, flowing along Heritage Road and the upstream end of the Heritage Road culvert. March 30, 2010.



Photograph 10. Ditch flowing westerly to watercourse 3b on upstream side of Bovaird Drive. March 30, 2010.



Photograph 11. Ditch flowing easterly to watercourse 3b on upstream side of Bovaird Drive. March 30, 2010.



Photograph 12. Watercourse 3b flowing across cultivated field downstream from Bovaird Drive. March 30, 2010.



Photograph 13. Huttonville Creek looking downstream from Bovaird Drive culvert. March 30, 2010.



Photograph 14. Huttonville Creek looking upstream from Bovaird Drive culvert. March 30, 2010.



Photograph 15. Upstream from Bovaird Drive culvert at Springbrook Creek headwater drainage feature. March 30, 2010.



Photograph 16. Downstream from Bovaird Drive culvert at Springbrook Creek headwater drainage feature. March 30, 2010.



Photograph 17. Drainage feature in Fletcher's Creek watershed upstream from Bovaird Drive. June 6, 2011.