

Appendix A  
Photo Set

# **Fish Habitat Inventory, Mattamy Richmond Lands, Spring 2009**

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**Submitted To:**

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## EXECUTIVE SUMMARY

The purpose of this study was to identify the use by Northern Pike of potential of spawning habitat along the eastern edge Mattamy's land holdings in Richmond, along the Arbuckle and Moore drains. Additionally, our survey tracked water levels in Moore Branch along and across the Mattamy's property. The floodplain within the meander belts of the Arbuckle Drain above the Fortune St. Bridge and of the lower Moore Branch near its confluence with the Arbuckle provides a broad, shallow grassy step that would likely provide ideal conditions for pike spawning when covered with spring flood waters. The RVCA observed young-of-the-year (YOY) pike in this area in 1999 and Kilgour & Associates Ltd. captured a YOY pike here in 2008.

Weekly site visits to the Arbuckle Drain and Moore Branch began March 19, 2009 and continued until April 26, 2009, with one final site visit on May 28 and included extensive searches for the presence of pike eggs. Adult pike were not observed in the Arbuckle Drain or Moore Branch on any site visit, while fish eggs were also not found in submerged vegetation on any site visit. There was, thus, no evidence of pike spawning in the vicinity of the Arbuckle Drain and Moore Branch, and the confluence of those two watercourses. Pike may not have used this area for spawning because of generally lower water levels and less suitable spawning habitat.

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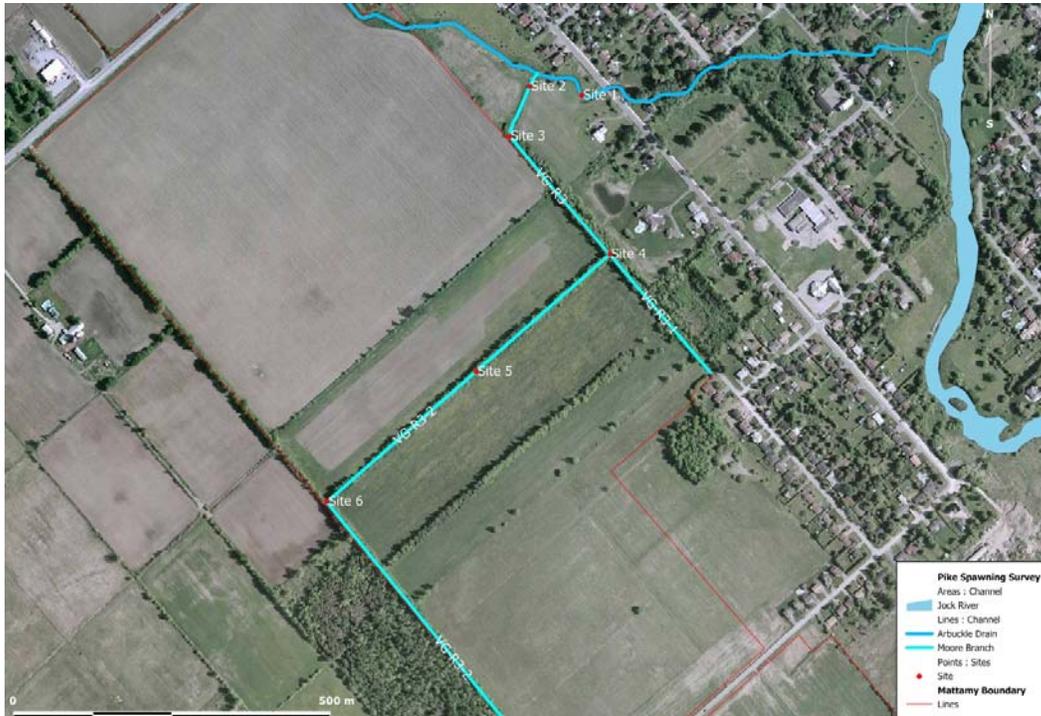
## 1.0 INTRODUCTION

The purpose of this study was to identify the use by Northern Pike of potential of spawning habitat along the eastern edge Mattamy's land holdings in Richmond, along the Arbuckle and Moore drains. Additionally, our survey tracked water levels in Moore Branch along and across the Mattamy's property.

Northern pike (*Esox lucius*) spawns along the marshy edges of lakes and along the spring flooded banks of streams where the pike's eggs can stick to the vegetation. While the main channels of the Arbuckle Drain above the Fortune St. Bridge and of the lower Moore Branch near its confluence with the Arbuckle are distinctly U shaped with steep sides and strong currents, the floodplain within the meander belt of these streams provides a broad, shallow grassy step that would likely provide ideal conditions for pike spawning when covered with spring flood waters (Figure 1). The RVCA observed young-of-the-year (YOY) pike in this area in 1999. Kilgour & Associates Ltd. captured a YOY pike here in 2008.

## 2.0 MATERIALS AND METHODS

Weekly site visits to the Arbuckle Drain and Moore Branch began March 19, 2009 and continued until April 26, 2009, with one final site visit on May 28. During each visit, Anthony Francis dip netted extensively along the overhanging grass of the main channel of the Arbuckle Drain and lower Moore Branch, searching for the presence of pike eggs. Additionally, five sites were marked with six-foot long rebar stakes driven into the stream bed to serve as location markers for consistent depth measurements (Figure 1). Site 1 included a second stake on the grassy bank, the only flooded grassy step of the sort to provide likely potential spawning habitat. However, even at the highest flood level year, the water level here was likely too shallow to be of use to pike (maximum 10 cm and cut off from the main channel by a ridge of grass). A sixth site (on the west side of the property) was also regularly monitored for temperature and photographed to observe how water levels varied. However, no consistent location was established here to monitor depth as the water flowed randomly across a dirt road over a collapsed culvert. Water temperatures were taken at these sites on each visit. Additionally, Hobo continuous-temperature monitoring sensors were installed at Sites 1 and 4.



**Figure 1. Map of the study area on Mattamy's Richmond property.**

### 3.0 RESULTS AND DISCUSSION

Pike spawning generally occurs in the early spring at ice-off once water temperatures reach 4-7°C (Scott and Crossman, 1973). While these conditions usually occur around mid April in the Ottawa area, this year's warm dry spring led to the early start date for our survey. By March 19 many of the surrounding fields were nearly snow free and the Arbuckle and lower sections of the Moore were already ice free (see photographs in Appendix A). By about April 5th, water temperatures in the both of these reaches were generally above 4°C (Figure 2). By April 26, temperatures were consistently above 10°C thus marking the likely end of pike spawning.

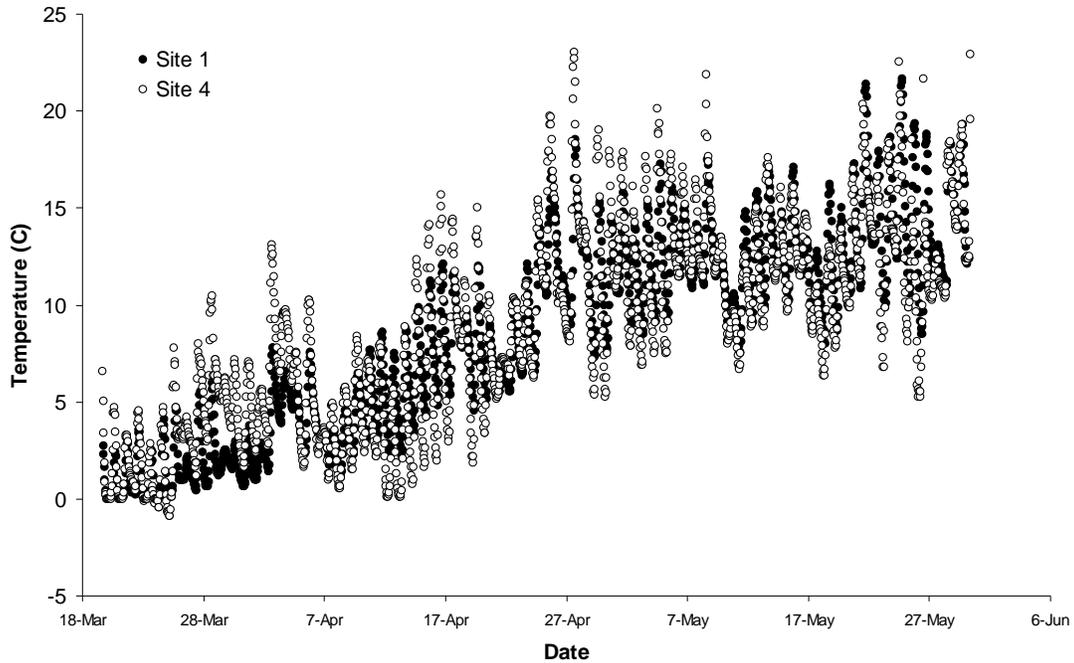
Adult pike were not observed in the Arbuckle Drain or Moore Branch on any site visit, while fish eggs were also not found in submerged vegetation on any site visit. There was, thus, no evidence of pike spawning in the vicinity of the Arbuckle Drain and Moore Branch, and the confluence of those two watercourses. Pike may not have used this area for spawning because of generally lower water levels and less suitable spawning habitat.

Last year's near record snowfall of 436 cm, including 117 cm in March alone, provided plenty of water to flood areas adjacent to the drains, thus providing a greater amount of potential pike spawning area. Pictures from previous years suggest that water backs up behind the Fortune Street culvert, increasing shallow but potential pike spawning areas upstream. The snow accumulation was less this year (220

cm total with only 17 cm through February and March). Informal polling of residents whose property is adjacent to the Arbuckle Drain suggested that water levels were lower throughout the late winter and spring and that the banks were never flooded in contrast to the spring of 2008. The highest recorded water level in the Arbuckle (Site 1) was 79 cm on March 19, 2009. This allowed for 10 cm of water on the grassy shelf next to the main channel. This was the only location where this minimal flooding occurred. By April 3, i.e., just before the water reached minimal spawning temperatures, the main channel was down to 69 cm while the shelf had just 4 cm of water and was cut off from the channel by a grassy ridge. Other sites all had very low water levels in their main channels and no water on the adjacent grassy steps (Table 1). Thus the low water levels likely eliminated the potential for spawning habitat this year.

While extensive dip netting of the creek failed to turn up any evidence of pike activity (i.e., eggs), other species previously observed in Arbuckle and Moore were found this year, including stickleback, fathead minnows, mud minnows, creek chub and dace.

Apart from the lack of pike in 2009, we have an additional general observation regarding the upper sections of the Moore Branch. The first observation concerns the point at which the east-west channel (VG-R3-2) changes from intermittent direct fish habitat to indirect fish habitat. Previous observations of this reach indicated a high spot along the channel located just east of the centre of the property. This high point causes the Moore Branch to dry such that fish east of this point are driven downstream by receding waters, while fish west of the point become stranded. Habitat west of the high point is considered indirect fish habitat. During the spring of 2009, this branch of the watercourse was wet for the first 30 m, and dry further upstream for at least short periods. That observation suggests that the split between direct and indirect fish habitat may be closer to VG-R3 than previously mapped (Kilgour & Associates and Parish Geomorphologic, 2009). The "high" point during this spring was caused only by a very small "bump" of vegetation, and was easily flooded over by subsequent rainfalls, suggesting the designations of direct and indirect fish habitat should remain as mapped previously (Kilgour & Associates and Parish Geomorphologic, 2009).



**Figure 2. Water temperature profile for Site 1 (Arbuckle) and Site 4 (Upper Moore) as recorded using Hobo automatic temperature sensors.**

Figure Note: An additional Hobo was set at Site 3 (Lower Moore), but disappeared at some point during the field study.

**Table 1. Summary of water depth (cm) at each station.**

Date	Location					
	1	2	3	4	5	6
March 19	79	61	45	17	Frozen	Frozen
March 27	70	52	40	11	27	Frozen
April 3	69	64	36	7	32	NR
April 10	59	45	32	3	24	NR
April 19	41	22	23	4	11	NR
April 26	46	26	23	dry	dry	NR

## **4.0 LITERATURE CITED**

Kilgour & Associates Ltd., and Parish Geomorphic Ltd. 2009. Mattamy Richmond Lands, Natural Environment & Impact Assessment Study. Prepared for Mattamy Homes, March 2009.

Scott, W.B. and E.J. Crossman. 1973. Freshwater Fishes of Canada. Fisheries Research Board of Canada, Bulletin 184.



**Site 1**



**Site 4, looking south**



**Site 2**



**Site 3**



**Site 4, looking west**

**March 19, 2009**



**Site 1**



**Site 4, looking south**



**Site 2**



**Site 5**



**Site 3**



**Site 6**



**Site 4, looking west**

**March 27, 2009**



**Site 1**



**Site 4, looking south**



**Site 2**



**Site 5**



**Site 3**



**Site 6**



**Site 4, looking west**

**April 3, 2009**



Site 1



Site 4, looking south



Site 2



Site 5



Site 3



Site 6



Site 4, looking west

April 10, 2009



Site 1



Site 4, looking south



Site 2



Site 5



Site 3



Site 6



Site 4, looking west

April 19, 2009



Site 1



Site 4, looking south



Site 2



Site 5



Site 3



Site 6



Site 4, looking west

April 26, 2009