Black Rapids Creek 2014 Summary Report

Watershed Features	
Area	16.32 square kilometres 0.39% of the Rideau Valley watershed
Land Use	63% agriculture 16% urban/rural 10% wooded area 10% transportation 1% wetland
Surficial Geology	62% clay 27% sand 7% Paleozoic bedrock 3% diamicton 1% organic deposits
Watercourse Type	*Watercourse Type:* 68% natural 32% channelized *Flow Type:* 75% permanent 25% intermittent
Invasive Species	There were 9 invasive species observed in 2014: purple loosestrife, common buckthorn, glossy buckthorn, Himalayan balsam, honey suckle, Manitoba maple, garlic mustard, Japanese knotweed, European frogbit
Fish Community	29 fish species have been captured in Black Rapids Creek including four game fish species: black crappie, largemouth bass, rock bass and walleye

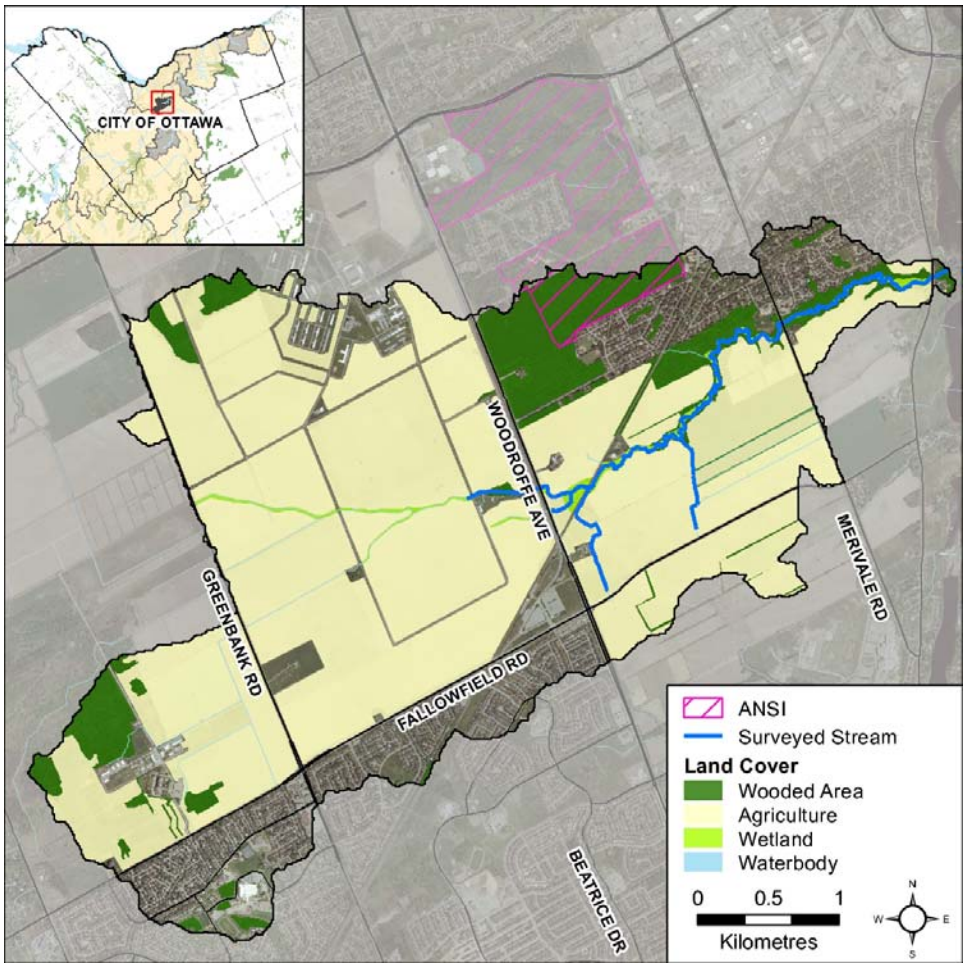

Figure 1 Land cover in the Black Rapids Creek catchment

Vegetation Cover		
Types	**Hectares**	**% of Cover**
Wetlands	21	11
Wooded Areas	110	58
Hedgerow	10	6
Plantation	48	25
TOTAL COVER		**100%**

Woodlot Cover		
Size Category	**Number of Woodlots**	**% of Woodlot Cover**
10-30 ha	3	5
>30 ha	1	2

Wetland Cover
1% of the watershed is wetland
Wetlands make up 11% of the vegetation cover

The Rideau Valley Conservation Authority, in partnership with seven other agencies in Ottawa (City of Ottawa, Heron Park Community Association, Ottawa Flyfishers Society, Ottawa Stewardship Council, Rideau Roundtable, National Defence HQ - Fish and Game Club, and the National Capital Commission) form the 2014 City Stream Watch collaborative.

Black Rapids Creek 2014 Summary Report

Introduction

Black Rapids Creek is approximately six kilometres long, not including its tributaries. The creek flows east, beginning in the headwaters around Greenbank Road, crossing Woodroffe Avenue, Merivale Road and Prince of Wales Drive before emptying into the Rideau River south of the Black Rapids Lock Station. Black Rapids Creek is an important ecological link to other areas such as the Rideau River for fish and wildlife (Del, Degan and Masse, 2007). From Prince of Wales Drive until close to Woodroffe Avenue the creek has natural meanders and wide forested riparian buffers. Around Woodroffe Avenue land use adjacent to the creek changes to active agriculture and riparian buffers are reduced.

In 2014, 55 sections (5.5 km) of the main stem of Black Rapids Creek and 18 sections (1.8km) of the tributaries were surveyed as part of the City Stream Watch monitoring activities. The following is a summary of observations made by staff and volunteers along those 73 sections.

Black Rapids Creek Overbank Zone

Riparian Buffer Width Evaluation

The riparian or shoreline zone is that special area where the land meets the water. Well-vegetated shorelines are critically important in protecting water quality and creating healthy aquatic habitats, lakes and rivers. Natural shorelines intercept sediments and contaminants that could impact water quality conditions and harm fish habitat in streams. Well established buffers protect the banks against erosion, improve habitat for fish by shading and cooling the water and provide protection for birds and other wildlife that feed and rear young near water. A recommended target (from Environment Canada's Guideline: How Much Habitat is Enough?) is to maintain a minimum 30 meter wide vegetated buffer along at least 75 percent of the length of both sides of rivers, creeks and streams. Black Rapids Creek does not quite meet the target above. It has a buffer of greater than 30 meters along 53 percent of the right bank and 56 percent of the left bank. Figure 2 demonstrates the buffer conditions of the left and right banks separately.

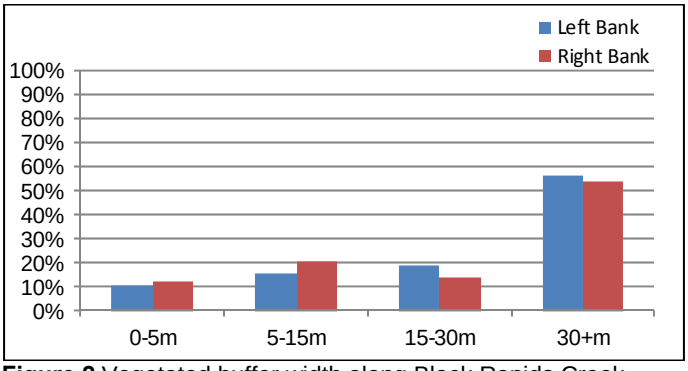

Figure 2 Vegetated buffer width along Black Rapids Creek

Adjacent Land Use

The RVCA's Stream Characterization Survey Program identifies nine different land uses beside Black Rapids Creek (Figure 3). Surrounding land use is considered from the beginning to end of each survey section (100m) and up to 100m on each side of the creek. Land use outside of this area is not considered for the surveys but is nonetheless part of the subwatershed and will influence the creek. Natural areas made up 46 percent of the surveyed stream, characterized by forest, scrubland, and meadow. Another fourty six percent of the land use was made up of active agriculture and pasture. The remaining eight percent of the land use was residential, industrial/commerical, infrastructure and recreation.

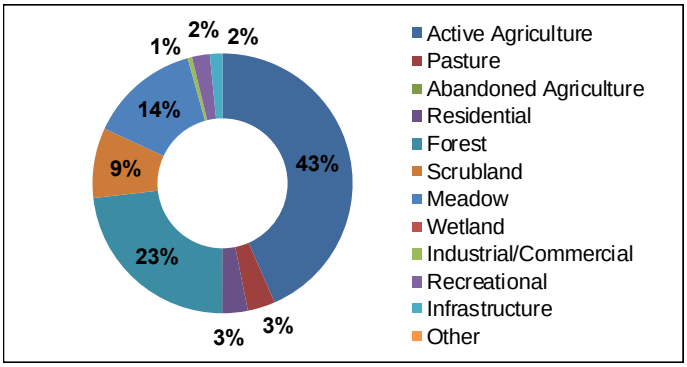

Figure 3 Land use along Black Rapids Creek

Black Rapids Creek Shoreline Zone

Erosion

Erosion is a normal, important stream process and may not affect actual bank stability; however, excessive erosion and deposition of sediment within a stream can have a detrimental effect on important fish and wildlife habitat. Poor bank stability can greatly contribute to the amount of sediment carried in a waterbody as well as loss of bank vegetation due to bank failure, resulting in trees falling into the stream and the potential to impact instream migration. Figure 4 shows that overall low to moderate levels of bank erosion were observed along the main stem of Black Rapids Creek. High levels of erosion were observed on both the tributaries to Black Rapids Creek which flow from Fallowfield Road.

Undercut Stream Banks

Undercut banks are a normal and natural part of stream function and can provide excellent refuge areas for fish. Figure 5 shows that the bank undercutting on Sawmill Creek was low to moderate overall. Many sections of the creek had no bank undercutting but there were some areas with high levels of undercutting observed upstream of Prince of Wales Drive.

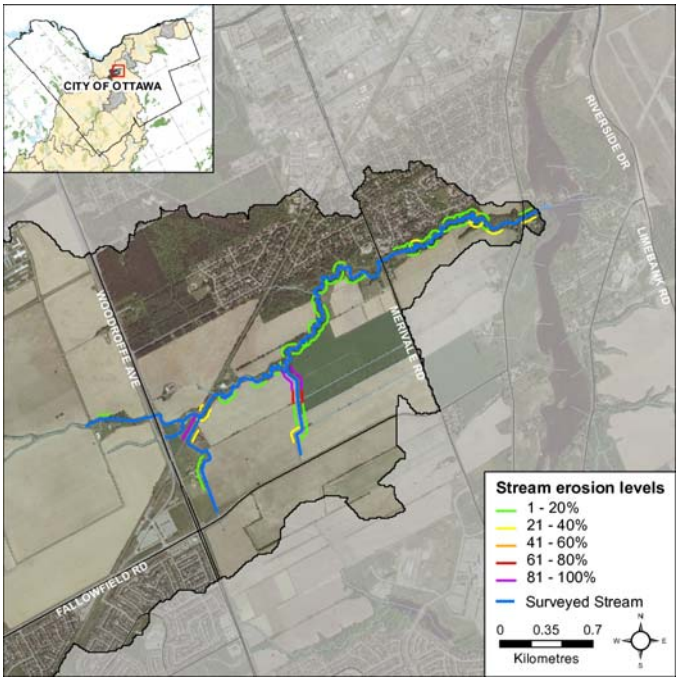

Figure 4 Erosion along Black Rapids Creek

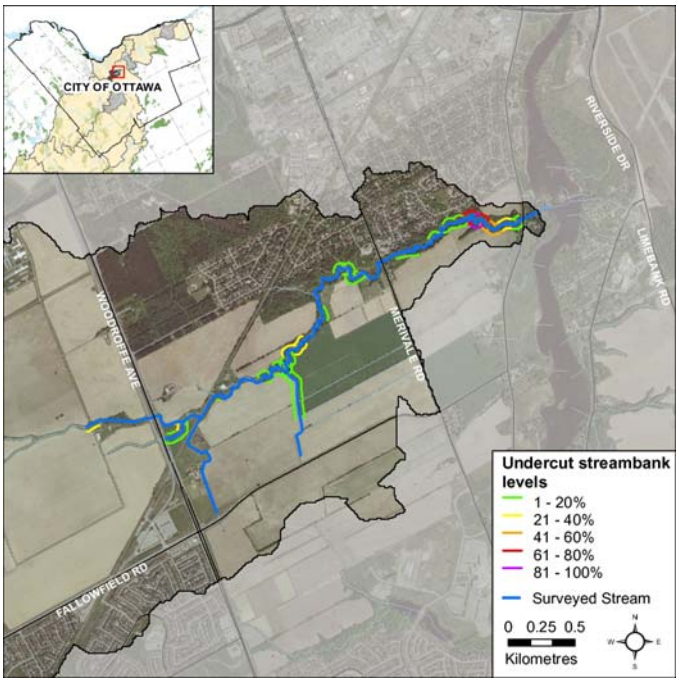

Figure 5 Undercut stream banks along Black Rapids Creek

Moderate stream bank erosion along Black Rapids Creek

Low level bank undercutting along Black Rapids Creek

Stream Shading

Grasses, shrubs and trees all contribute towards shading a stream. Shade is important in moderating stream temperature, contributing to food supply and helping with nutrient reduction within a stream. Figure 6 shows stream shading along Black Rapids Creek. Moderate to high levels of shading were seen along most of the creek. Very high levels of stream shading were seen along the tributaries of Black Rapids Creek which was resulting from long grasses overhanging the creek and minimal channel width.

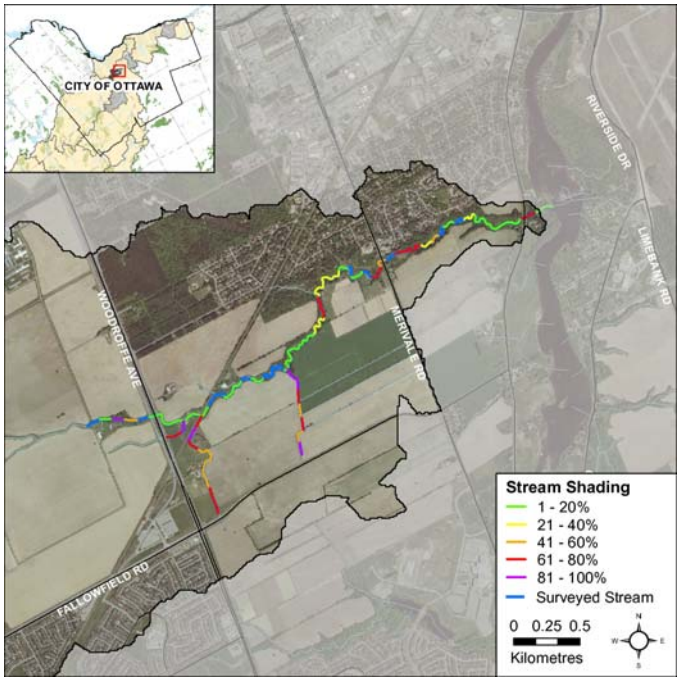

Figure 6 Stream shading along Black Rapids Creek

Stream shade along Black Rapids Creek

Instream Woody Debris

Figure 7 shows that overall, the surveyed sections along Sawmill Creek had moderate levels of instream woody debris in the form of branches and trees. Instream woody debris is important for fish and benthic habitat, by providing refuge and feeding areas. Some areas with high levels of instream woody debris were observed downstream of Merivale Road and along one of the tributaries of the creek.

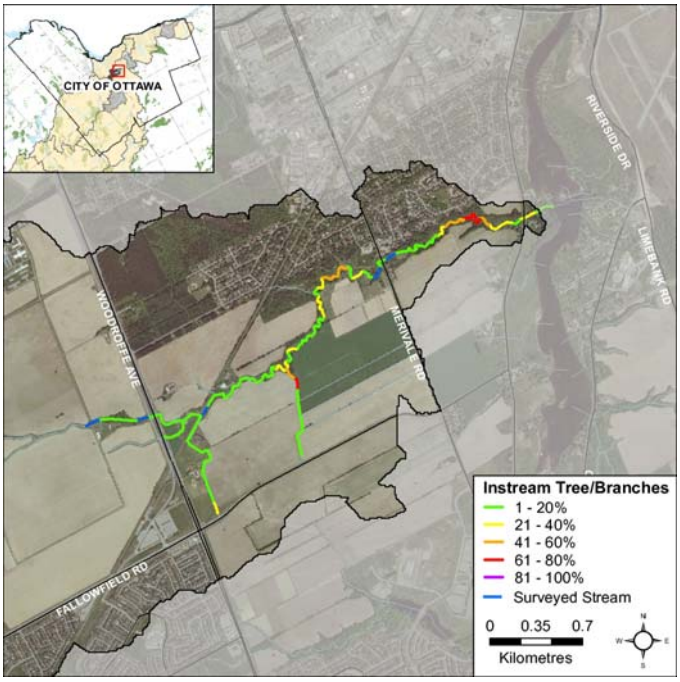

Figure 7 Instream woody debris along Black Rapids Creek

Instream woody debris along Black Rapids Creek

Overhanging Trees and Branches

Figure 8 shows that overall, Black Rapids Creek had moderate to high coverage from overhanging branches and trees. Trees and branches that are less than one meter from the surface of the water are defined as overhanging. At this proximity to the water branches and trees provide a food source, nutrients and shade which helps to moderate instream water temperatures.

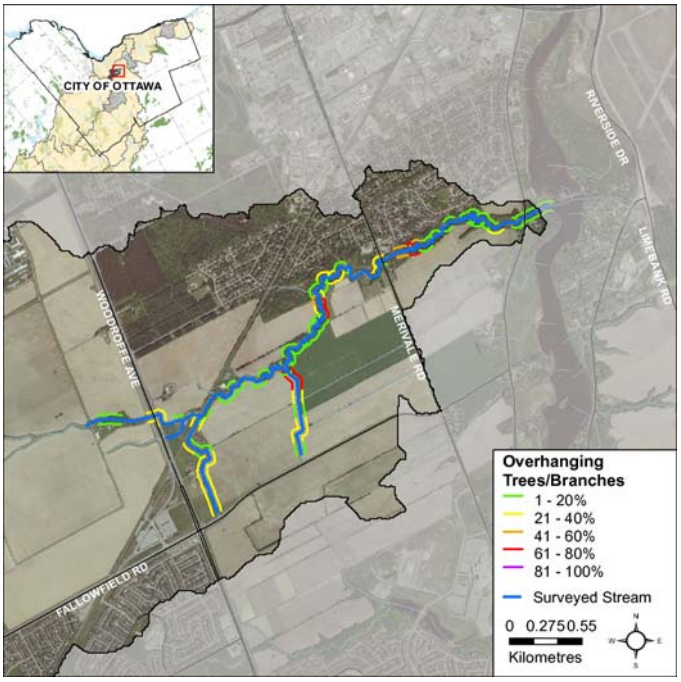

Figure 8 Overhanging trees and branches along Black Rapids Creek

Overhanging trees and branches on Black Rapids Creek

Anthropogenic Alterations

Figure 9 shows that 59 percent of the sections on Black Rapids Creek remain “unaltered” or "natural". Sections considered "altered" account for five percent of the stream, while 36 percent of the sections sampled were considered “highly altered”. Black Rapids Creek crosses multiple roads and is channelized where it flows through agriculture fields in the upper reaches and the tributaries, which accounts for the high percentage of highly altered sections.

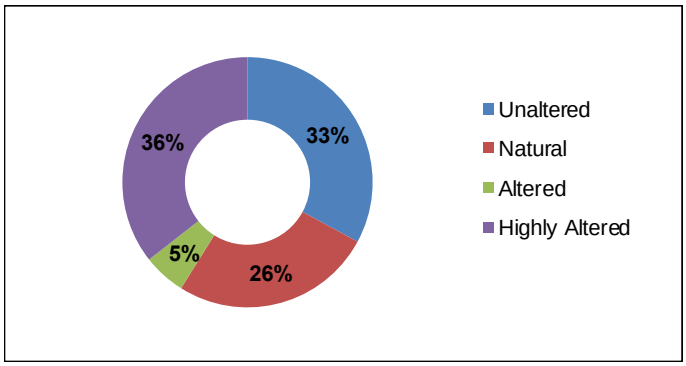

Figure 9 Anthropogenic alterations along Black Rapids Creek

A highly altered section of Black Rapids Creek where it crosses Merivale Road.

Black Rapids Creek Instream Aquatic Habitat

Habitat Complexity

Streams are naturally meandering systems and move over time; there are varying degrees of habitat complexity, depending on the creek. Examples of habitat complexity include variable habitat types such as pools and riffles as well as substrate variability and woody debris structure. A high percentage of habitat complexity (heterogeneity) typically increases the biodiversity of aquatic organisms within a system. The complexity of Black Rapids Creek varies between homogeneous and heterogeneous throughout the creek although there was a significantly less complexity upstream of Merivale Road. This area corresponds to the dominance of clay substrate seen in Figure 12. Sixty percent of the system was considered homogeneous and forty percent of the system was considered heterogeneous.

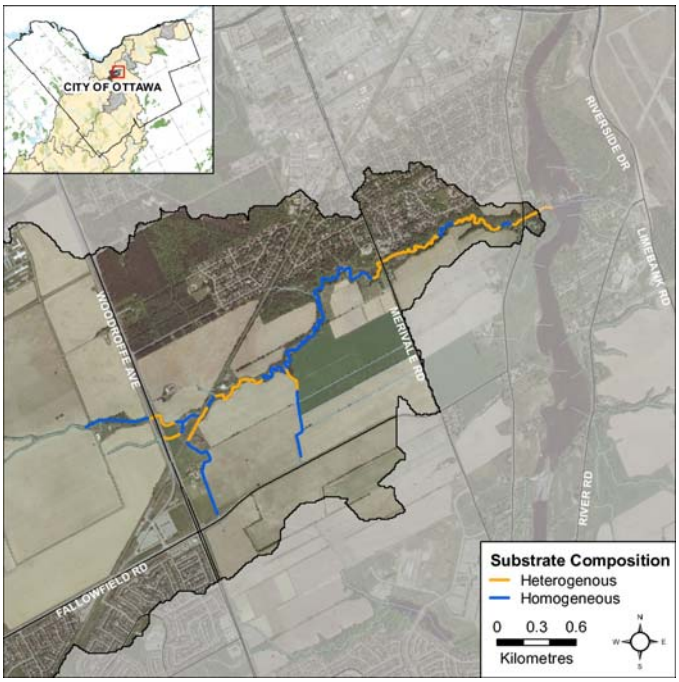

Figure 10 Instream habitat complexity in Black Rapids Creek

Habitat complexity on Black Rapids Creek

Instream Substrate

Diverse substrate is important for fish and benthic invertebrate habitat because some species have specific substrate requirements and, for example, will only reproduce on certain types of substrate. Figure 11 shows that 52 percent of the instream substrate observed on Black Rapids Creek was clay. Twenty three percent of the substrate was recorded as silt, while 14 percent was recorded as sand and gravel. The remaining 11 percent was recorded as cobble, boulders and bedrock. Figure 12 shows the distribution of the dominant substrate types along the system. Clay substrates dominate overall especially upstream of Merivale Road. Areas of bedrock, cobble and boulders are concentrated around Merivale Road and at the mouth of the creek.

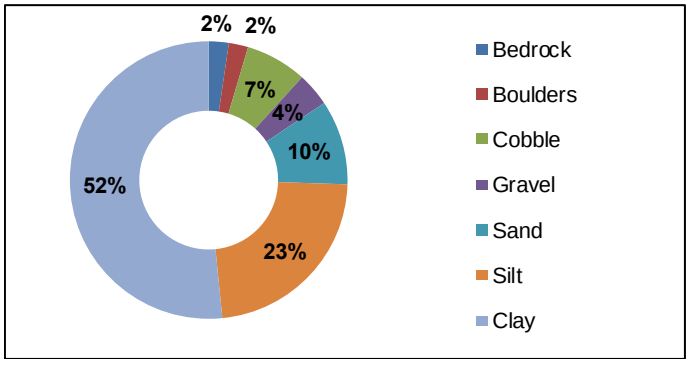

Figure 11 Instream substrate along Black Rapids Creek

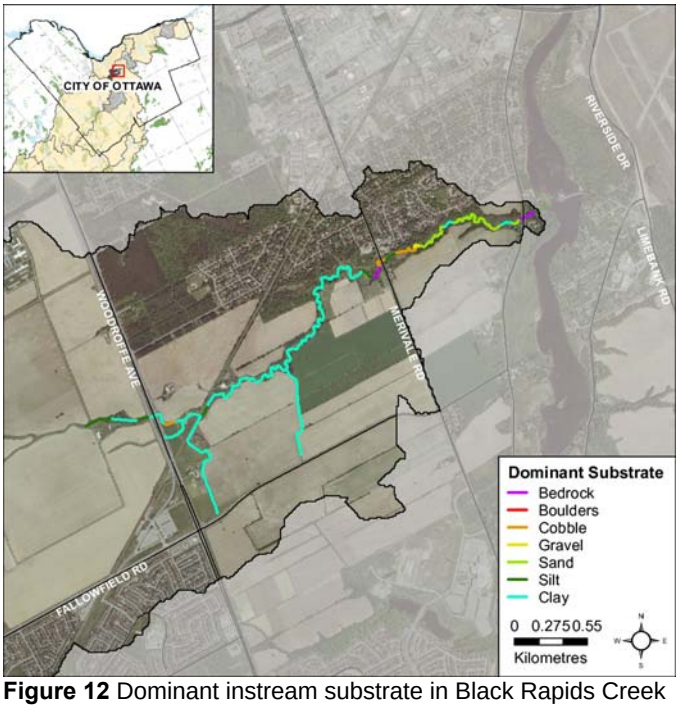

Figure 12 Dominant instream substrate in Black Rapids Creek

Cobble and Boulder Habitat

Boulders create instream cover and back eddies for large fish to hide and/or rest out of the current. Cobble provides important over-wintering and/or spawning habitat for small or juvenile fish. Cobble can also provide habitat conditions for benthic invertebrates that are a key food source for many fish and wildlife species. Figure 13 shows the distribution of cobble and boulder habitat along Sawmill Creek. Areas of cobble and boulder habitat are found primarily downstream of Merivale Road and near the railway and road crossing around Woodroffe Avenue.

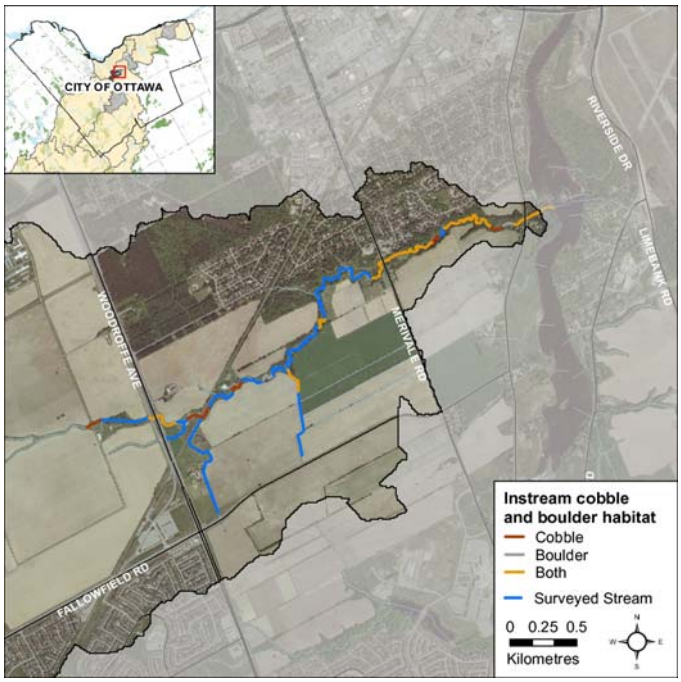

Figure 13 Cobble and boulder habitat in Black Rapids Creek

Cobble and boulder habitat observed along Black Rapids Creek

Instream Morphology

Pools and riffles are important habitat features for fish. Riffles are areas of agitated water and they contribute higher dissolved oxygen to the stream and act as spawning substrate for some species of fish, such as walleye. Pools provide shelter for fish and can be refuge areas in the summer if water levels drop and water temperature in the creek increases. Pools also provide important over-wintering areas for fish. Runs are usually moderately shallow, with unagitated surfaces of water and areas where the thalweg (deepest part of the channel) is in the center of the channel.

Figure 14 shows that Black Rapids Creek has some variability in instream morphology; 83 percent consists of runs, 5 percent consists of riffles and 12 percent consists of pools. Figure 15 shows where areas of riffle habitat was observed in Black Rapids Creek. Areas of riffle habitat were found in the highest concentration around Merivale Road and at the mouth of the creek.

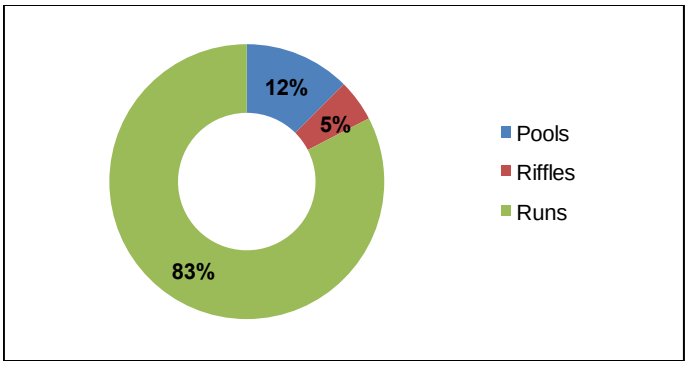

Figure 14 Instream morphology along Black Rapids Creek

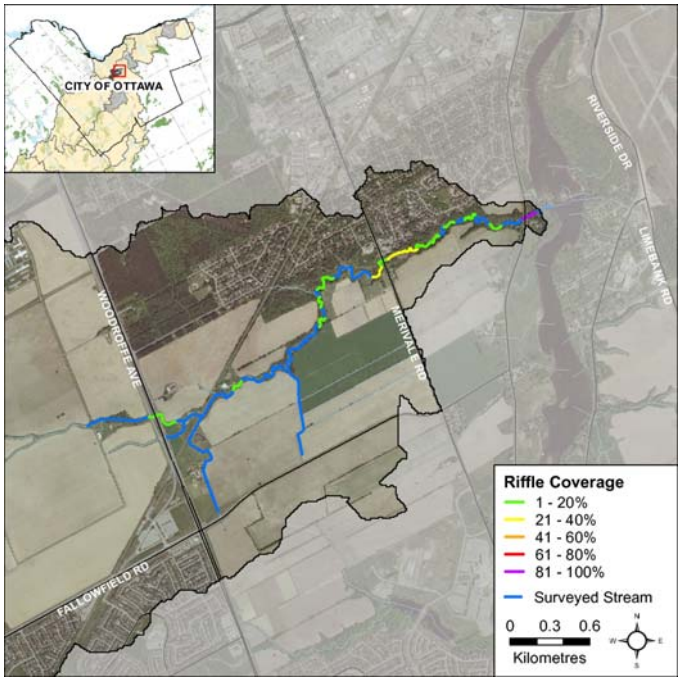

Figure 15 riffle coverage in Black Rapids Creek

Vegetation Type

Instream vegetation provides a variety of functions and is a critical component of the aquatic ecosystem. For example emergent plants along the shoreline can provide shoreline protection from wave action and important rearing habitat for species of waterfowl. Submerged plants provide habitat for fish to find shelter from predator fish while they feed. Floating plants such as water lilies shade the water and can keep temperatures cool while reducing algae growth. Figure 16 depicts the diversity of plant community structure in Black Rapids Creek. Submerged plants, algae and narrow leaved emergents were all recorded in high percentage at 27 percent, 23 percent and 23 percent respectively. The distribution of overall dominant types of instream vegetation is reflected in Figure 17 where submerged plants, algae and narrow leaved emergents stand out as the dominant vegetation types.

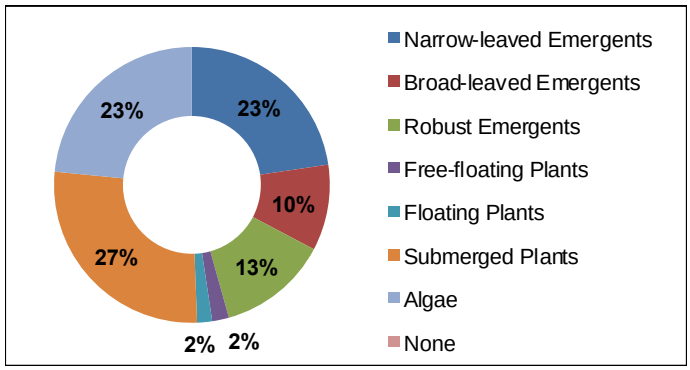

Figure 16 Vegetation types along Black Rapids Creek

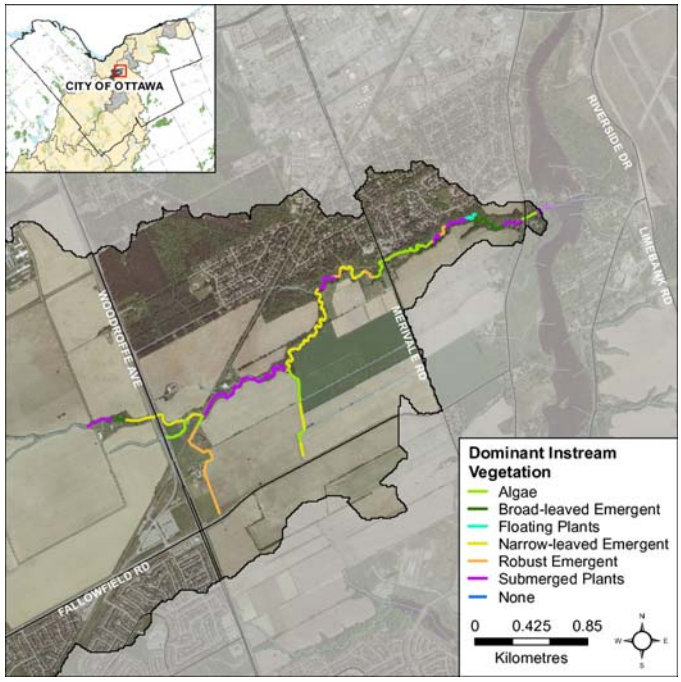

Figure 17 Dominant instream vegetation types

Instream Vegetation Abundance

Instream vegetation is an important factor for a healthy stream ecosystem. Vegetation helps to remove contaminants from the water, contributes oxygen to the stream, and provides habitat for fish and wildlife. Too much vegetation can also be detrimental. Figure 18 demonstrates that overall Black Rapids Creek had normal levels of instream vegetation. Areas with normal levels of vegetation accounted for 35 percent. Low and rare levels accounted for 32 percent, common levels accounted for 15 percent and finally extensive levels accounted for 18 percent.

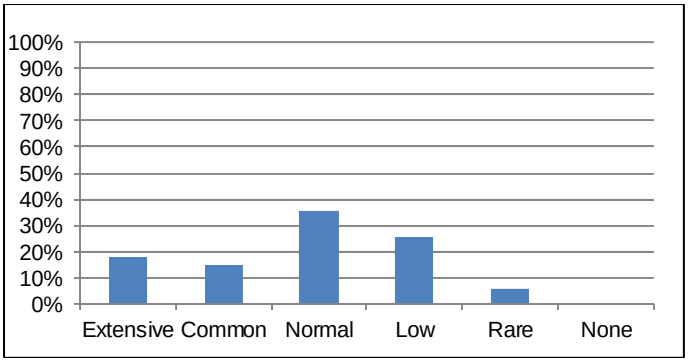

Figure 18 Instream vegetation abundance in Black Rapids Creek

Instream vegetation in Black Rapids Creek

Black Rapids Creek Stream Health

Invasive Species

Invasive species are one of the largest threats to ecosystems throughout Ontario and can outcompete native species, having negative effects on local wildlife, fish and plant populations. Invasive species were observed along 85 percent of Black Rapids Creek (Figure 19). Figure 20 shows the variety of invasive species observed along Black Rapids Creek. The invasive species that were observed most often were purple loosestrife (*Lythrum salicaria*) which was observed in 79 percent of the sections with invasive species, common buckthorn (*Rhamnus cathartica*) which was observed in 51 percent of the sections with invasive species, Manitoba maple (*Acer negundo*) which was observed in 40 percent of the sections with invasive species, and glossy buckthorn (*Rhamnus* frangula) which was observed in 33 percent of the sections with invasive species.

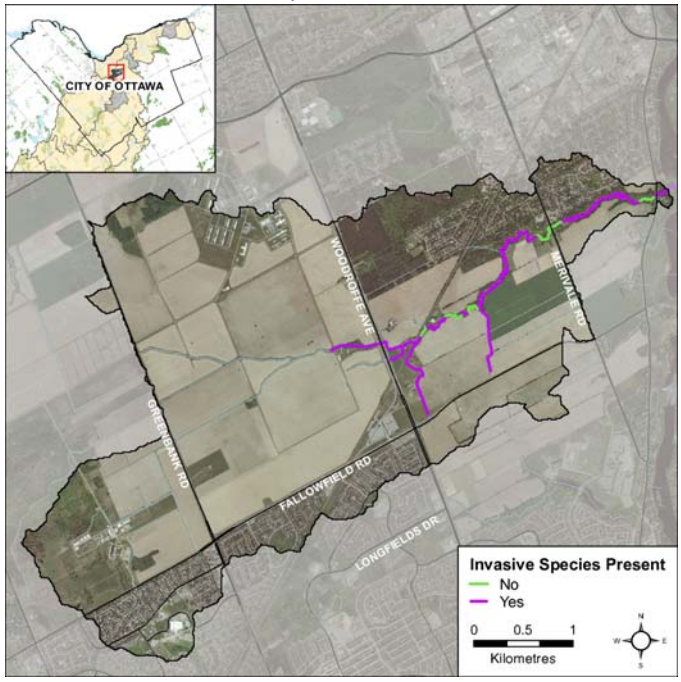

Figure 19 Presence of invasive species along Black Rapids Creek

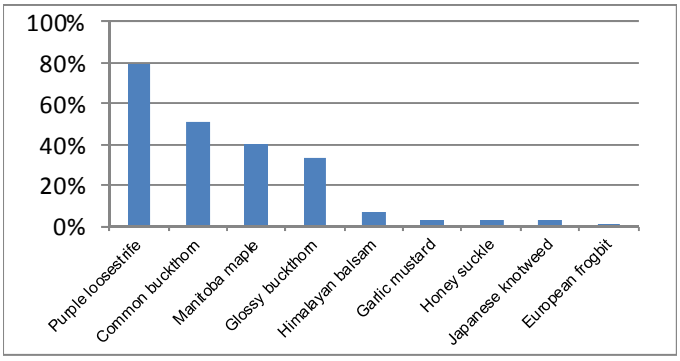

Figure 20 Invasive species observed

Pollution

Figure 21 demonstrates the incidence of pollution/ garbage in Black Rapids Creek. Sixty eight percent of the sections surveyed on Black Rapids Creek did not have any observable garbage. Garbage on the stream bottom was seen most often at 22 percent followed by floating garbage at 19 percent.

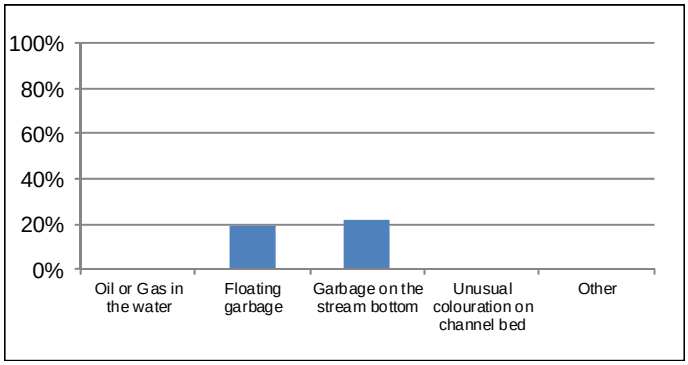

Figure 21 Pollution observed along Black Rapids Creek

Wildlife

The diversity of fish and wildlife populations can be an indicator of water quality and overall stream health.

Wildlife	Observed
Birds	black-capped chickadee, bluejay, cardinal, catbird, gull, kingfisher, mallard, mourning dove, red-eyed vireo, red-winged blackbird, robin, song sparrow, woodpecker spp, yellow waxwing
Mammals	dead vole, deer tracks, raccoon tracks, red squirrel
Reptiles Amphibians	american toad, bullfrog, green frog, leopard frog, painted turtle, wood frog
Aquatic Insects	bivalves, gastropods, isopods, molluscs, trichoptera, water striders
Other	admiral butterfly, blackflies, bumblebee, cabbage whites, crickets, dragonflies, ebony jewelwing, european skipper, familiar bluet, honeybee, monarch, mosquitoes, moth spp, shadfly, spiders, terrestrial snail

Table 1 Wildlife observed along Black Rapids Creek

Sawmill Creek Water Chemistry

Water Chemistry Measurement

During the stream characterization survey, a YSI probe is used to collect water chemistry information. Dissolved oxygen, conductivity and pH are measured at the start and end of each section.

Volunteers measuring water chemistry using a YSI

Dissolved Oxygen

Dissolved oxygen is a measure of the amount of oxygen dissolved in water. The Canadian Environmental Quality Guidelines of the Canadian Council of Ministers of the Environment (CCME) suggest that for the protection of aquatic life the lowest acceptable dissolved oxygen concentration should be 6 mg/L for warmwater biota (red line in Figure 22) and 9.5 mg/L for coldwater biota (blue line in Figure 22) (CCME, 1999). Figure 22 shows that all of the stretches of the main stem of Black Rapids Creek meet the standard for coldwater biota. The dissolved oxygen in the tributaries of Black Rapids Creek was significantly lower. Two of the tributaries were well below the threshold for warmwater biota, and the third tributary met the threshold for warmwater biota but was still well below the levels recorded for the main stream of the creek.

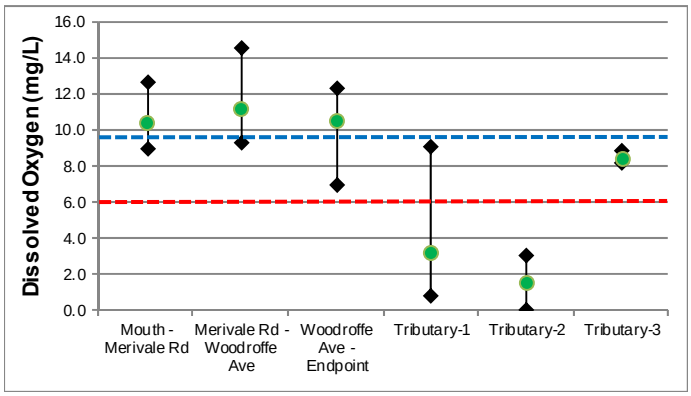

Figure 22 Dissolved oxygen ranges in Black Rapids Creek

Conductivity

Conductivity in streams is primarily influenced by the geology of the surrounding environment, but can vary drastically as a function of surface water runoff. Currently there are no CCME guideline standards for stream conductivity, however readings which are outside the normal range observed within the system are often an indication of unmitigated discharge and/or stormwater input. The average conductivity observed within the main stem of Black Rapids Creek was 577 µs/cm. Figure 23 shows that the conductivity readings in two of the tributaries of Black Rapids Creek was significantly higher than the readings in the main stem of the creek. In Tributary 1 the average conductivity was 1681 µs/cm. In tributary 2 the average conductivity was 1293 µs/cm. The high conductivity in these tributaries is likely heavily influenced by runoff from Fallowfield Road as well as adjacent agricultural fields.

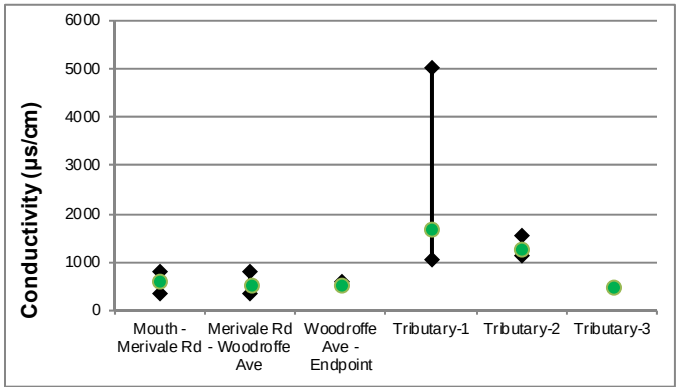

Figure 23 Conductivity ranges in Black Rapids Creek

pH

Based on the PWQO for pH, a range of 6.5 to 8.5 should be maintained for the protection of aquatic life. Average pH values for black Rapids Creek ranged between 7.0 and 8.3, thereby meeting the provincial standard.

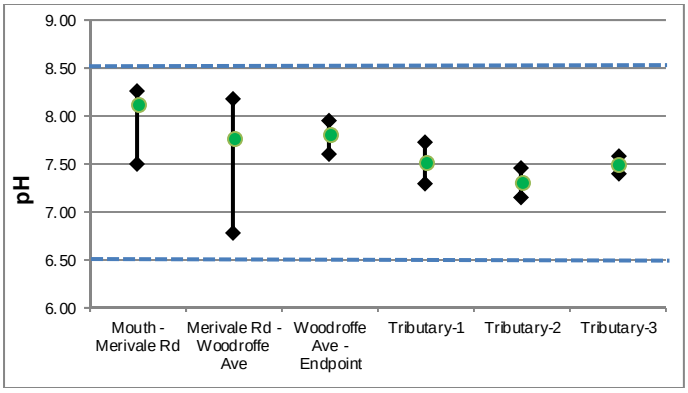

Figure 24 pH ranges in Black Rapids Creek

Black Rapids Creek Thermal Classification

Thermal Classification

Many factors can influence fluctuations in stream temperature, including springs, tributaries, precipitation runoff, discharge pipes and stream shading from riparian vegetation. Three temperature loggers were deployed in late April to monitor water temperature in Black Rapids Creek. Water temperature is used along with the maximum air temperature (using a revised Stoneman and Jones method) to classify sampling reaches into one of five categories that correspond to the thermal preferences of local fish communities (Figure 27). Figure 25 shows the locations where temperature loggers were installed on Black Rapids Creek. Analysis of the data collected indicates that Black Rapids Creek is a cool-warmwater system (Figure 27).

Groundwater

Groundwater discharge areas can influence stream temperature, contribute nutrients, and provide important stream habitat for fish and other biota. During stream surveys, indicators of groundwater discharge are noted when observed. Indicators include: springs/seeps, watercress, iron staining, significant temperature change and rainbow mineral film. Figure 26 shows areas where one or more of the above groundwater indicators were observed during stream surveys.

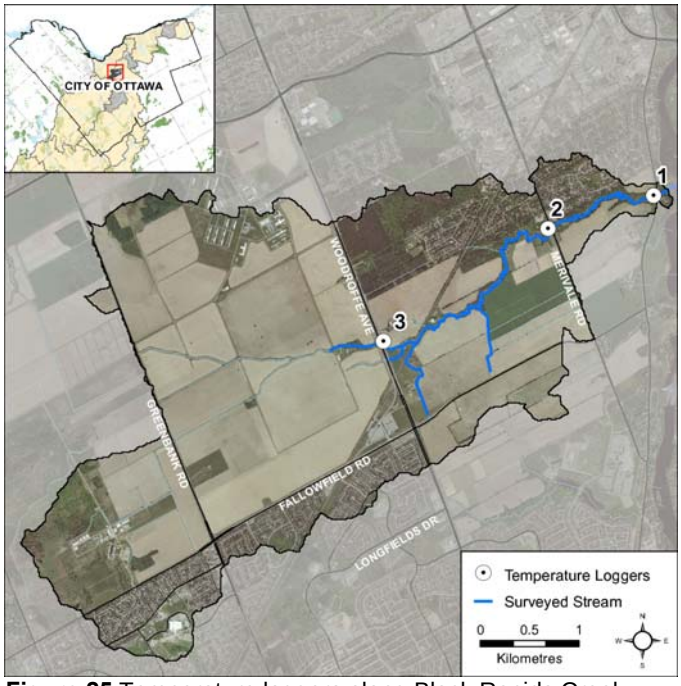

Figure 25 Temperature loggers along Black Rapids Creek

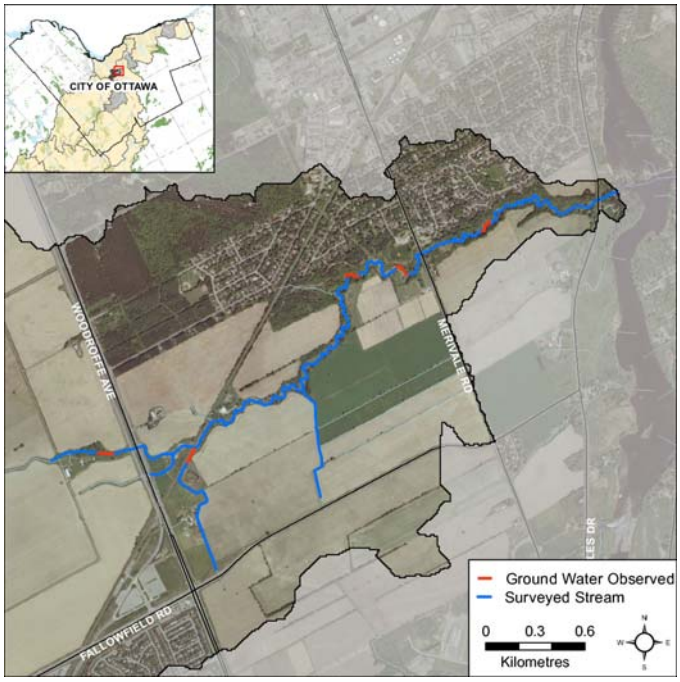

Figure 26 Groundwater indicators observed

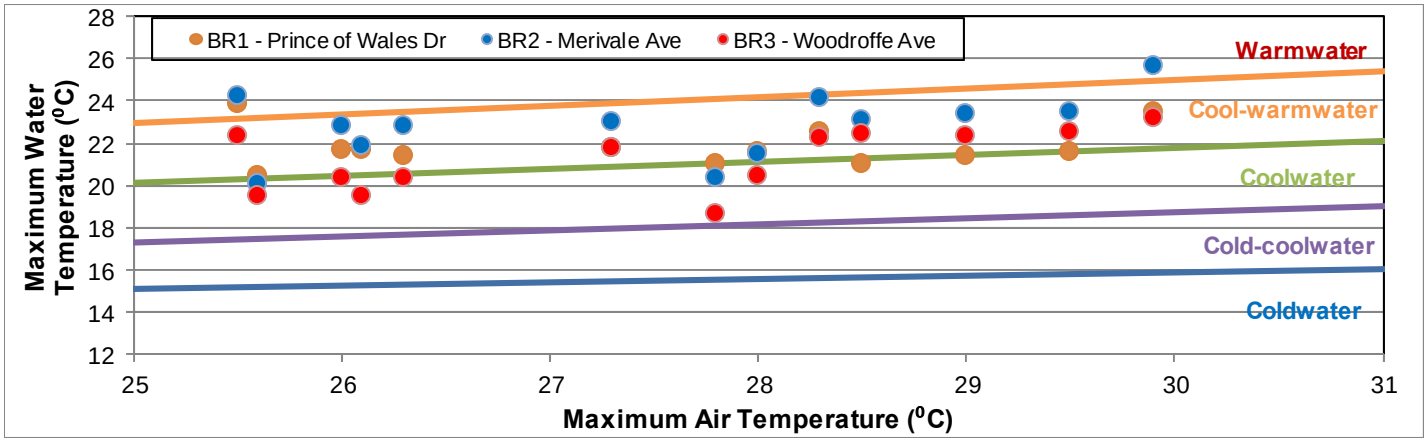

Figure 27 Thermal Classification for Black Rapids Creek

Black Rapids Creek Fish Community

Fish Community

Fish sampling sites located along Black Rapids Creek are shown in Figure 28. The provincial fish codes shown in Figure 28 are listed (in Table 2) beside the common name of those fish species identified in Black Rapids Creek. The thermal classification of Black Rapids Creek is cool-warmwater. Twenty nine fish species have been observed.

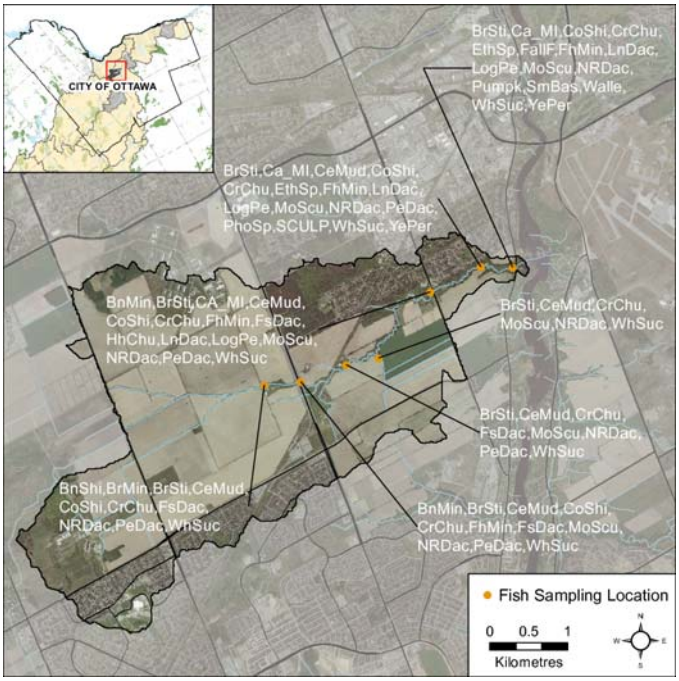

Figure 28 Black Rapids Creek fish community

Species observed in Black Rapids Creek (with fish code)			
black crappie	BlCra	largemouth bass	LmBas
blackchin shiner	BcShi	logperch	LogPe
blacknose shiner	BnShi	longnose dace	LnDac
bluntnose minnow	BnMin	mottled sculpin	MoScu
brassy minnow	BrMin	northern redbelly dace	NRDac
brook stickleback	BrSti	pearl dace	PeDac
central mudminnow	CeMud	pumpkinseed	Pumpk
common shiner	CoShi	rock bass	RoBas
cottus spp	CotSp	slimy sculpin	SlScu
creek chub	CrChu	smallmouth bass	SmBas
cyprinid spp	Ca_MI	tesselated darter	TeDar
etheostoma spp	EthSp	walleye	Walle
fallfish	Fallf	white sucker	WhSuc
fathead minnow	FhMin	yellow perch	YePer
finescale dace	FsDac		

Table 2 Fish species observed in Black Rapids Creek

Pearl dace captured on Black Rapids Creek

Brassy minnow captured on Black Rapids Creek

Common shiner captured on Black Rapids Creek

Migratory Obstructions

It is important to know locations of migratory obstructions because these can prevent fish from accessing important spawning and rearing habitat. Migratory obstructions can be natural or manmade, and they can be permanent or seasonal. Figure 29 shows that one debris dam was observed along Black Rapids Creek.

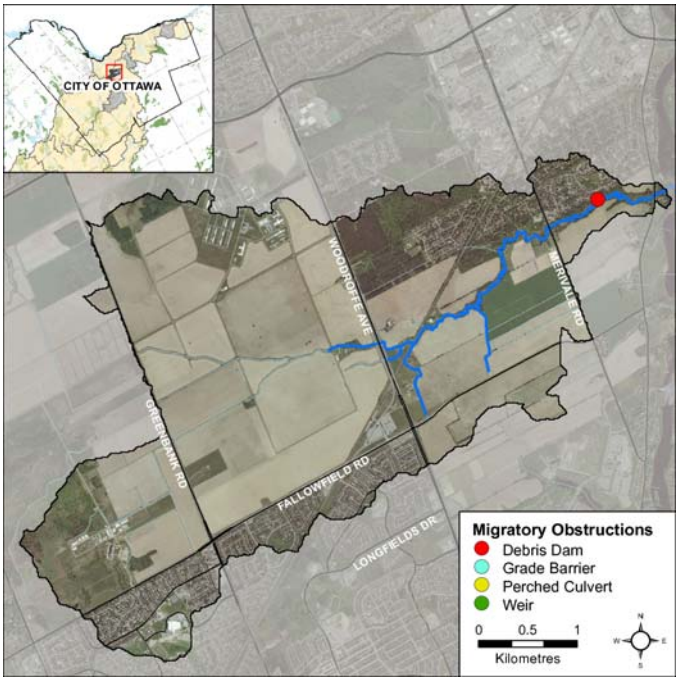

Figure 29 Black Rapids Creek migratory obstructions

A debris dam observed along Black Rapids Creek

Headwater Drainage Feature Sampling

The Headwater Drainage Feature sampling protocol is a rapid assessment method characterizing the amount of water, sediment transport, and storage capacity within headwater drainage features (HDF). An HDF is a depression in the land that conveys surface flow. These features may provide direct, both permanent and seasonal, habitat for fish by the presence of refuge pools, seasonal flow, or groundwater discharge. They may also provide indirect habitat through the contribution of exported food (detritus/invertebrates) (Wipfli and Gregovich 2002).
As a result of their importance and a lack of existing information for headwater drainage features, the City Stream Watch program incorporated monitoring of these systems at four sites in the Black Rapids Creek catchment in 2014 (Figure 30).

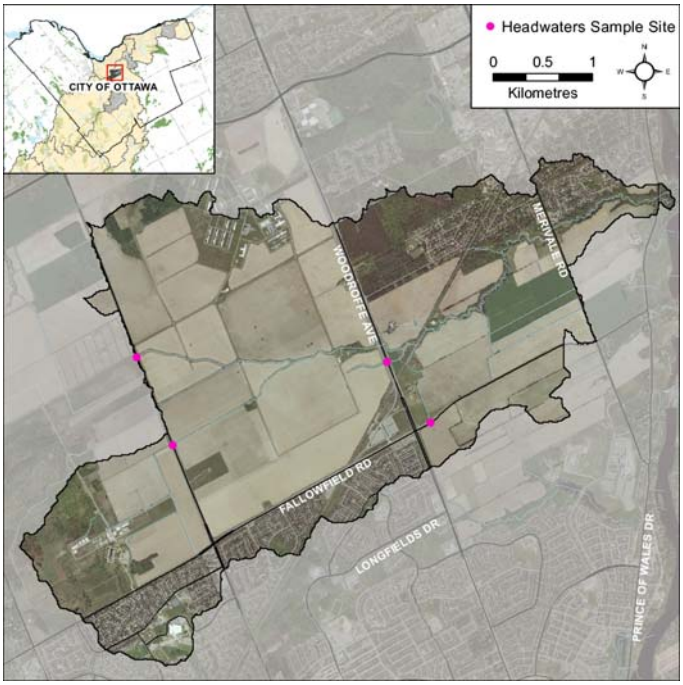

Figure 30 HDF sampling sites on Black Rapids Creek

A headwaters site at Fallowfield Road

Stream Comparison Between 2008 and 2014

The following tables provide a comparison of observations on Black Rapids Creek between the 2008 and 2014 survey years. Black Rapids Creek was also surveyed in 2003, but the surveying protocol has changed significantly since that time so data from 2003 cannot be compared to data from 2008 and 2014. The sections surveyed in 2014 were different from the sections surveyed in 2008 so the comparison is only done for those sections that were surveyed in both years.

Anthropogenic Changes

Table 3 shows that between 2008 and 2014 anthropogenic alterations along Black Rapids Creek have increased. In 2008, 56 percent of the sections had no anthropogenic alterations, in 2014 that number has decreased to 33 percent. This change many be caused by changes in the stream survey protocol and the classification of channelization. In 2010 anthropogenic alterations were further defined in the protocol, which has caused some land uses to shift categories.

Anthropogenic Alterations	2008 (%)	2014 (%)
No anthropogenic alterations	56	33
"Natural" conditions with minor human alterations	29	26
"Altered" with considerable human impact but significant natural portions	8	5
"Highly altered" by humans with few natural portions	6	36

Table 3 Comparison of anthropogenic alterations along Black Rapids Creek between 2008 and 2014

An anthropogenic alteration on Black Rapids Creek

Bank Stability Changes

According to observations bank stability on Black Rapids Creek has improved slightly overall since 2008. In 2008, 85 percent of the left bank was considered stable. In 2014, 91 percent of the left bank was stable. The bank stability of the right bank was 89 percent in both survey years. In 2014 the areas where the highest amount of erosion was observed was along the tributaries. The tributaries were not surveyed in 2008 so they are not included in this analysis.

Bank Stability	2008 (%) Left Bank	2008 (%) Right Bank	2014 (%) Left Bank	2014 (%) Right Bank
Stable	85	89	91	89
Unstable	15	11	9	11

Table 4 Comparison of bank stability along Black Rapids Creek

Changes in Instream Vegetation

Table 6 shows that there has been a considerable decrease in instream vegetation in Black Rapids Creek since 2008. The amount of common levels of vegetation totaled 37 percent in 2008, and that number has decreased to 15 percent in 2014. Conversely, in 2008 the amount of area classified as having normal levels of vegetation totaled 19 percent, that number increased to 35 percent in 2014. The decrease in instream vegetation may be in part attributed to increased sedimentation in the system but vegetation growth is also dependent on climatic variables as well as the stage of the growing season when observations took place.

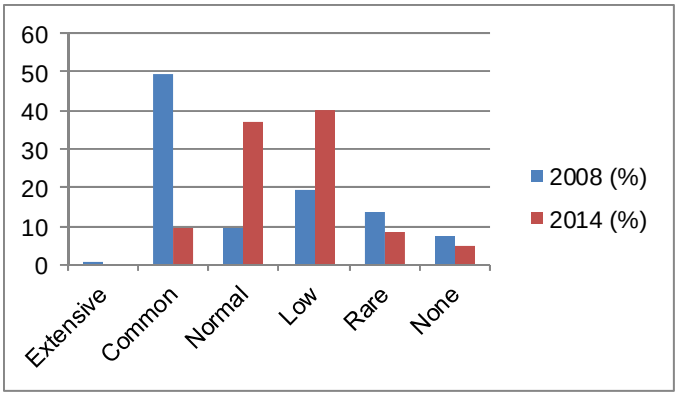

Figure 32 Comparison of instream vegetation levels

Changes in Pollution and Garbage

Overall the amount of pollution and garbage in Black Rapids Creek has decreased since 2008. Table 5 shows that the number of sections surveyed that were free from garbage was 38 percent in 2008 and that number has climbed to 52 percent in 2014. The amount of garbage in Black Rapids Creek is generally low so no stream cleanups have been required since 2008.

Pollution/Garbage	2008 (%)	2014 (%)
None	38	52
Floating garbage	35	31
Garbage on stream bottom	23	20
Oil or gas trails	0	0
Discoloration of channel bed	0	0

Table 5 Comparison of pollution/garbage levels between 2008 and 2014

Black Rapids Creek upstream of Prince of Wales Drive

Black Rapids Creek upstream of Woodroffe Avenue

Fish Community

Fish sampling was conducted on Black Rapids Creek by the City Stream Watch program in 2003, 2008 and 2014. In total, 29 species of fish have been captured through City Stream Watch fish sampling efforts.
In 2003, eight species were captured by seining at one site. In 2008, sampling effort was significantly increased resulting in 23 species being captured by seining at seven sites and electrofishing at three sites. In 2014, 20 species were caught seining at one site and electrofishing at eight sites. Eight species caught in 2008 were not found in 2014. This does not mean the species have disappeared from Black Rapids Creek but could be influenced by location, weather conditions, time of sampling and sampling method.

Species	Code	2003	2008	2014
black crappie	BlCra		X	
blackchin shiner	BcShi		X	
blacknose shiner	BnShi	X		X
bluntnose minnow	BnMin	X		
brassy minnow	BrMin			X
brook stickleback	BrSti	X	X	X
central mudminnow	CeMud		X	X
common shiner	CoShi		X	X
Cottus spp	CotSp			X
creek chub	CrChu	X	X	X
Cyprinid spp	Ca_MI		X	X
Etheostoma spp	EthSp		X	X
fallfish	Fallf			X
fathead minnow	FhMin		X	X
finescale dace	FsDac		X	X
largemouth bass	LmBas	X	X	
logperch	LogPe		X	X
longnose dace	LnDac		X	X
mottled sculpin	MoScu	X	X	X
northern redbelly da	NRDac	X	X	X
pearl dace	PeDac		X	X
pumpkinseed	Pumpk		X	
rock bass	RoBas		X	
slimy sculpin	SlScu			X
smallmouth bass	SmBas		X	
tesselated darter	TeDar		X	
walleye	Walle		X	X
white sucker	WhSuc	X	X	X
yellow perch	YePer		X	
Total		**8**	**23**	**20**

Table 6 Comparison of fish species caught in 2008 and 2014

Monitoring and Restoration

Monitoring and Restoration Projects on Black Rapids Creek

Table 7 below highlights the monitoring and restoration work that has been done on Black Rapids Creek to date by the Rideau Valley Conservation Authority. Potential restoration opportunities are listed on the following page.

Accomplishment	Year	Description
City Stream Watch Monitoring	2003	57 stream surveys were completed on Black Rapids Creek
	2008	56 stream surveys were completed on Black Rapids Creek
	2014	73 stream surveys were completed on Black Rapids Creek
City Stream Watch Fish Sampling	2003	One fish sampling session was conducted on Black Rapids Creek
	2008	Ten fish sampling sessions were conducted on Black Rapids Creek
	2014	Fourteen fish sampling sessions were conducted on Black Rapids Creek
City Stream Watch Termal Classification	2008	Three temperature loggers were deployed
	2014	Three temperature loggers were deployed
City Stream Watch Headwater Drainage Feature Sampling	2014	4 headwater drainage feature sites were sampled in the Black Rapids Creek catchment
Shoreline Naturalization Program	2010	Shoreline Naturalization Program staff and volunteers planted 560 shrubs and trees along one of the tributaries to Black Rapids Creek
City Stream Watch Invasive Species Removal	2014	City Stream Watch volunteers removed Himalayan Balsam from Black Rapids Creek at two sites

Table 7 Monitoring and Restoration on Black Rapids Creek

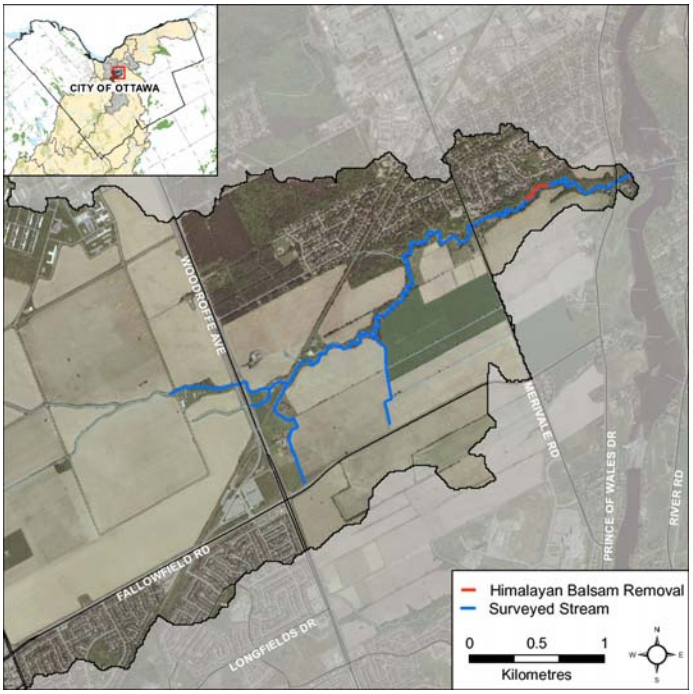

Figure 33 2014 Himalayan Balsam Removal on Black Rapids Creek

Black Rapids Creek Himalayan Balsam Removal

Patches of Himalayan Balsam were observed along Black Rapids Creek during stream surveys in 2014. A removal effort was planned to stop the spread of this prolific species along the shoreline. Three volunteers spent nine volunteer hours removing the invasive species from 300m of shoreline.

Volunteers at the Black Rapids Creek Himalayan balsam removal

Potential Riparian Restoration Opportunities

Figure 34 depicts the locations where City Stream Watch staff and volunteers observed areas where the riparian zone could be restored or enhanced using one or more of the following techniques: riparian planting, erosion control, invasive species control and wildlife habitat creation.
The majority of the opportunities listed were riparian planting and erosion control in the upper reaches of the creek and its tributaries. There was also Japanese knotweed observed at the mouth of the creek and Himalayan Balsam downstream of Merivale Road. An invasive species removal event took place in 2014 targeting the patch of Himalayan Balsam.

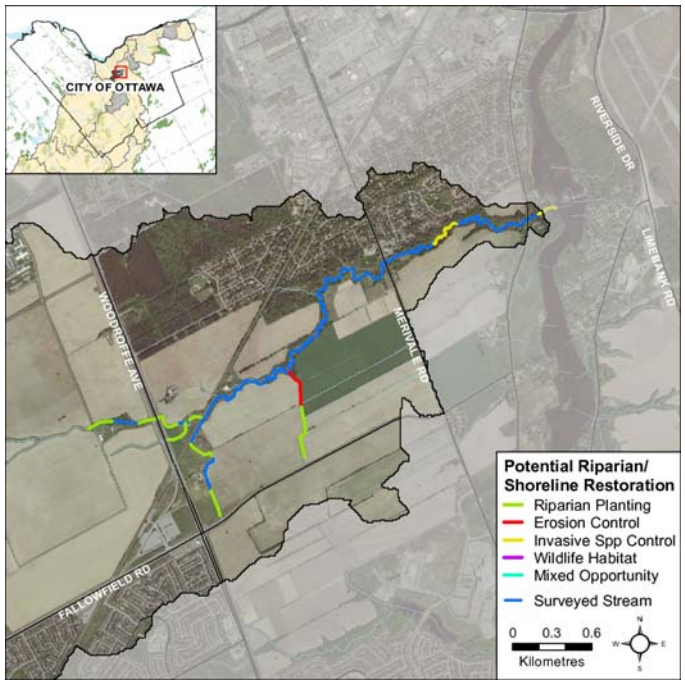

Figure 34 Potential riparian/shoreline restoration opportunities

Riparian planting opportunity downstream of Woodroffe Avenue

Potential Instream Restoration Opportunities

Figure 35 depicts the locations where City Stream Watch staff and volunteers made note of areas where there were one or more of the following instream restoration opportunities: fish habitat enhancement, garbage cleanup and channel modification.
All the opportunities for instream restoration were observed in the upper reaches of Black Rapids Creek in areas around Woodroffe Avenue. Opportunities included channel modification where there was channelization, fish habitat enhancements and a combination of the two types of restoration.

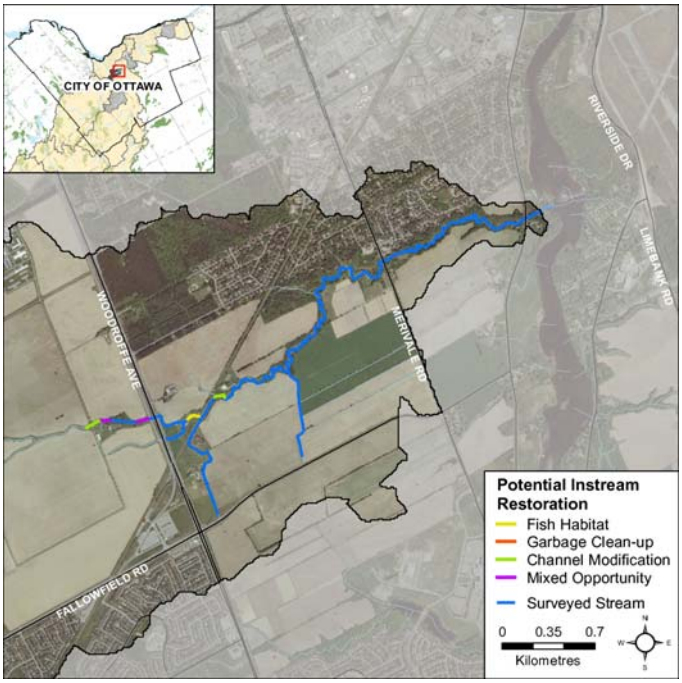

Figure 35 Potential instream restoration opportunities

A fish habitat enhancement opportunity where there has been significant silt accumulation upstream of Woodroffe Avenue



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For more information on the overall 2014 City Stream Watch Program and the volunteer activities, please refer to the City Stream Watch 2014 Summary Report.