



City Stream Watch 2023 Summary Report





City Stream Watch 2023 Summary Report MVCA RVCA

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GLOSSARY OF ACRONYMS

CSW	City Stream Watch	OBBN	Ontario Benthos Biomonitoring Network
DUC	Ducks Unlimited Canada	OFAH	Ontario Federation of Anglers and Hunters
MNRF	Ministry of Natural Resources and Forestry	OFS	Ottawa Flyfishers Society
NCC	National Capital Commission	OSAP	Ontario Stream Assessment Protocol
NHIC	Natural Heritage Information Centre	RVCA	Rideau Valley Conservation Authority
NRVIS	Natural Resources and Values Information System	MVCA	Mississippi Valley Conservation Authority

Introduction

The City of Ottawa encompasses three separate watersheds: Mississippi River to the west, South Nation River to the east, and the Rideau River in between. Each watershed is managed by its respective Conservation Authority. The City Stream Watch (CSW) program was established in 2003 by the Rideau Valley Conservation Authority (RVCA), along with a collection of community groups, and was later expanded to include the Mississippi Valley (MVCA) and the South Nation (SNCA) conservation authorities.

Under the program, a number of creeks and tributaries in each of the watersheds within the City of Ottawa are surveyed annually on a rotating basis by staff and volunteers.

The purpose of these surveys is to gather and document detailed data regarding characteristics and overall health of various waterways within the watersheds. Stewardship and restoration opportunities are identified and various rehabilitation and enhancement projects are carried out.

The City Stream Watch program would not be possible without the help of its dedicated volunteers, many of whom return year after year to assist with stream monitoring and stewardship projects.

The 2023 program included stream survey assessments, fish community sampling, headwater sampling, and water temperature monitoring. Stewardship and restoration activities included stream garbage cleanups, riparian planting, and invasive species removals. Detailed descriptions of our monitoring activities and a summary of projects follow.



Figure 1 Area monitored by City Stream Watch. Photo courtesy of South Nation Conservation (modified).



CSW volunteer completing a stream survey on Bilberry Creek.



Volunteers after completing a garbage cleanup at the Jock River Landing



CSW volunteers completing a garbage cleanup along Barrhaven Creek.

Stream Habitat Assessment Methodology

The City Stream Watch program uses a stream characterization assessment protocol for surveying streams. The protocol was originally developed by the Ontario Ministry of Natural Resources and Forestry (MNR) but was modified by the RVCA to increase monitoring efficiency and to be effectively used by staff and volunteers.

The program monitors creeks within the City of Ottawa. These creeks are monitored on a six-year cycle to track long term changes, measure the effectiveness of past stewardship or restoration projects, and identify new threats. Staff and volunteers survey 100 m segments of a stream at a time, starting from the mouth and ending at the headwater reaches. The following parameters are assessed and/or identified:

- General land use (agricultural, residential, forest, wetland, etc.)
- Stream morphology (wetted width, bankfull width, maximum depth, and flow velocity);
- Water chemistry (water temperature, dissolved oxygen, pH, and conductivity);
- Weather conditions (overhead cloud cover, air temperature);
- Photographs (upstream and downstream of section and any other notable features);
- Stream inputs (tributaries, groundwater indicators, storm water outlets and tile drain outlets);
- Habitat type (pool, riffle or run);
- Instream habitat (substrate type, vegetation community, presence of wood structure, bank undercutting, overhanging riparian vegetation, and shade cover);
- Riparian habitat (extent of vegetated buffer, vegetation type);
- Migratory obstructions (presence of beaver dams, man-made dams and weirs, perched culverts, and natural features that impede fish migration);
- Bank composition, steepness, and erosion;
- Human alterations/impacts (channelization, shoreline structures, culvert crossings, livestock access, garbage/pollution, etc.);
- Presence of fish and wildlife species;
- Presence of invasive species both instream and within the riparian zone;
- Identify enhancement and restoration opportunities (areas with garbage or invasive species to be removed, degraded shorelines in need of native vegetation, banks in need of erosion control, and areas requiring wetland/fish habitat enhancement).



RVCA staff measuring wetted width during a stream survey.



CSW volunteer measuring hydraulic head, a measurement of surface flow velocity.



RVCA staff member measuring a 100-meter section during a stream survey.

Headwater Drainage Feature Protocol

Headwater drainage features (HDFs) are depressions in the landscape in which water flows. HDFs include small streams, springs, wetlands, swales, and ditches, and they have variable flow conditions from perennial to ephemeral. Some HDFs are natural while others may be modified as with channelized drains. Regardless of their form, science is suggesting that they play an important role as the interface between land and water for water and sediment transport and as corridors for the migration of biota (Stanfield et al., 2017).

HDFs have not traditionally been a component of monitoring efforts, and as such, little is known about their form and function in the landscape (Stanfield et al., 2017). These features may directly provide habitat for fish by the presence of refuge pools, seasonal flow, or groundwater discharge. They also provide indirect habitat contributions through the export of food in the form of detritus and invertebrates (Wipfli and Gregovich, 2002). These features are important sources, conveyors, or stores of sediment, nutrients, and flow (Stanfield et al., 2017).

As a result of their importance and a lack of information for headwater drainage features, City Stream Watch has incorporated monitoring of these systems for each catchment starting in 2013. The HDF protocol is one of several modules in the Ontario Stream Assessment Protocol (OSAP), which provides a framework for standardized stream assessment throughout Ontario. The HDF protocol is a rapid assessment method which characterizes the amount of water, sediment transport, and storage capacity within HDFs. Sites are visited first in spring and then again in summer to determine if the feature is permanent, intermittent or ephemeral. RVCA is working with other Conservation Authorities and the MNRF to implement the protocol with the goal of providing standard datasets to support science development and monitoring on headwater drainage features.

Additionally, this module provides means of characterizing the connectivity, form, and unique features associated with each HDF (Stanfield et al., 2017). An initiative is underway to evaluate how these data can help in understanding the cumulative contributions of individual HDFs on the downstream watershed state (see Stanfield et al., 2013).



RVCA staff members measuring the wetted width of a headwater drainage feature



Volunteers using a multiparameter YSI probe to measure the water chemistry of a headwater drainage feature during a spring site visit



Difference between seasons for an HDF site in the Mud Creek catchment.

Fish Sampling Methodology

City Stream Watch staff and volunteers use a variety of fish sampling methods depending on the habitat. With all sampling types, fish that are collected are identified to the species level (or lowest taxonomic rank possible), counted, weighed, and game fish are measured for length. Fish sampling is done in accordance with protocols and best practices in order to live-release fish after sampling is complete.

The following types of sampling methods were used in 2023:

Seine Net (OSAP module)

- Rectangular, with a three-dimensional box, or “purse” in the middle;
- The net is actively moved through the water, creating a wall;
- Fish are directed toward the purse in the middle and collect there;
- Ideal for pool habitat.



Electrofishing (OSAP module)

- Effective way to sample fish in a variety of habitats;
- Using an electrofishing “backpack”, the crew leader creates an electrical field in the water which causes a muscle response in fish, temporarily stunning them;
- Netters collect these fish using dip nets and place them in a recovery bucket;
- Electrofishing very seldom kills fish if the correct procedures are used;
- Electrofishing is completed by staff that have been certified according to provincial standards.



RVCA staff members sampling fish community using a seine net



RVCA staff members sampling fish community via backpack electrofishing.

Thermal Classification Methodology (OSAP module)

Temperature is an important parameter in streams as it influences many aspects of physical, chemical, and biological health. Temperature data loggers are deployed in each of the monitored streams for the sample year from April to late October to give a representative evaluation of how water temperature fluctuates. Many factors can influence fluctuations in stream temperature, including: springs, tributaries, precipitation runoff, discharge pipes, land use change and stream shading from riparian vegetation. Water temperature is used along with the maximum air temperature (using the revised method in Stoneman and Jones, 1996) to classify a watercourse as either warm water, cool-warm water, cool water, cold-cool water or cold water.

Table 1 Water temperature range classification based on a standardized air temperature of 25 °C

Status	Water Temperature °C
Cold	< 15
Cold-cool	15-17
Cool	17-20
Cool-warm	20-23
Warm	> 23

Data Management and Users

All data collected is maintained in a CA database, and can be made available upon request. Data collected is used in a variety of applications. Various agencies and community organizations throughout the City of Ottawa use City Stream Watch data for:

- Watershed reporting;
- Subwatershed studies;
- Community design plans;
- Background data for planning and regulations reviews;
- Data sharing with other agencies (National Capital Commission, City of Ottawa, Fisheries and Oceans Canada, Ministry of Natural Resources and Forestry, Ministry of the Environment Conservation and Parks, etc.), community groups, and non-governmental organizations;
- Reports are shared with the public and private landowners;
- Identifying opportunities for potential compensation and restoration projects (wetlands, riparian and instream);
- Consultant information requests;
- Fish community and species at risk information sent to Ministry of Natural Resources and Forestry (MNRF); stored in National Heritage Information Centre (NHIC) and Natural Resource and Values Information System (NRVIS) databases;
- Academic partners.



RVCA staff members installing a temperature logger in Stillwater Creek in April.



HOBO temperature loggers.

RVCA City Stream Watch Monitoring Summary

The RVCA City Stream Watch program monitors 25 tributaries of the Rideau and Ottawa Rivers on a 6 year cycle. Approximately 36.1 kilometers of streams were surveyed and 29 fish sampling sites were assessed as part of the 2023 cycle on Mud Creek, Bilberry Creek, Stillwater Creek and Mosquito Creek. In addition, a total of 16 sites on these systems were surveyed for thermal regime. For more detailed findings for each catchment area monitored in 2023, please see their individual catchment reports that are shared on our website at rvca.ca (Monitoring & Reporting > Reporting > City Stream Watch Reports).

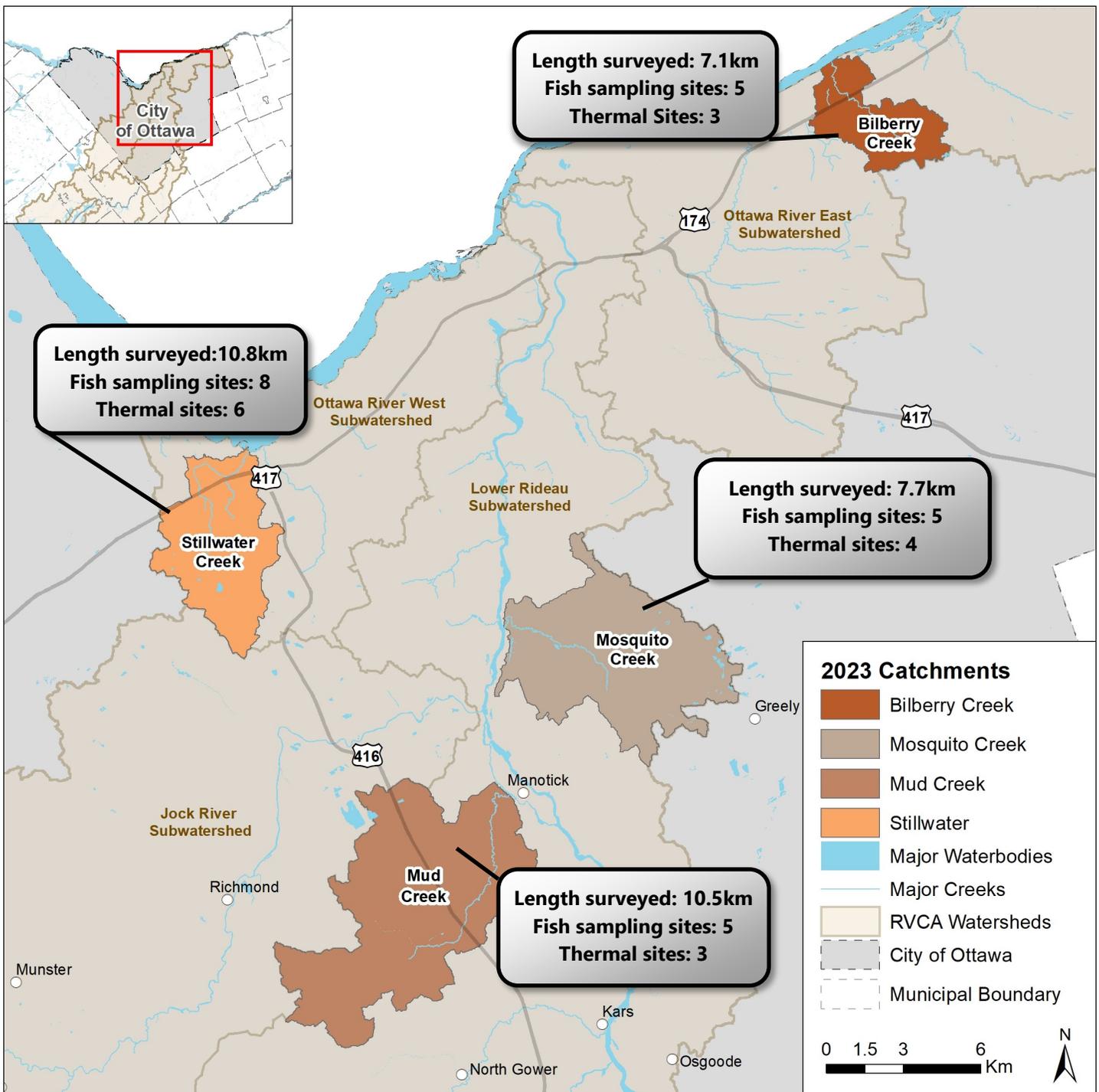


Figure 2 2023 RVCA CSW creek catchment areas with summary monitoring statistics.

RVCA City Stream Watch 2023 Summary Stream Study and Comparison

In 2023, two of the systems studied are tributaries of the Rideau River: Mud Creek and Mosquito Creek; and two are tributaries of the Ottawa River: Bilberry Creek and Stillwater Creek. Bilberry Creek, Mosquito Creek, and Stillwater Creek were all previously surveyed in 2004, 2009 and 2015; and Mud Creek was previously surveyed in 2003, 2008 and 2014. Table 2 is a comparison summary of monitoring activities for the reporting cycles. Monitoring protocols since 2003 have been modified and enhanced, therefore only the three most recent survey cycles were used for this comparison.

Each year the number of sections surveyed for each creek is different depending on the number of sections where permission to access the creek is granted by landowners, the number of tributaries and branches surveyed, as well as whether or not water is flowing in the upper reaches of the creek at the time of surveying. On Mud Creek, access permission was limited and some areas of the creek were not surveyed. Access along the creek has varied from year to year, resulting in more sections completed in 2023 than 2014

The number of fish sampling sites in 2023 is comparable with the number of sites sampled in 2008 and 2009 for each creek. These sites were increased in 2014 and 2015 before returning to original numbers in 2023. Since 2015, fish sampling sites have been re-evaluated and less sites are required to effectively evaluate fish community within these systems. The number of temperature probes has remained consistent with each survey year.

With the exception of Mosquito Creek, the number of volunteers and volunteer hours has decreased in 2023. This was likely due to residual impacts from COVID-19 restrictions. Since the RVCA resumed its City Stream Watch program in 2022, volunteer participation has been much lower when compared to pre-pandemic levels.

Table 2 Stream study comparison by cycle year.

Activities	Stillwater Creek			Mosquito Creek			Bilberry Creek			Mud Creek		
	2009	2015	2023	2009	2015	2023	2009	2015	2023	2008	2014	2023
Number of Sections Surveyed	79	100	108	85	75	77	75	71	71	95	78	105
Number of Volunteers	74	43	36	44	33	19	63	23	41	32	21	14
Total Volunteer Hours	318	152	126	210	117	72	267	87	133	164	90	63
Number of Fish Sampling Sites	4	16	8	6	17	5	5	15	5	9	16	5
Number of Temperature Probes	4	7	6	4	4	4	4	3	3	3	4	3



Volunteers measuring distance during stream survey (left), removing invasive species (center), and participating in a garbage cleanup (right)



City Stream Watch 2023 Summary Report

Program Highlight Summary

This year, 268* volunteers from the community participated in the program, contributing a total of 795 hours toward stream surveys, restoration activities, and workshops. The following table displays the distribution of volunteer effort in 2023.

Table 3 RVCA 2023 CSW program accomplishments

Metric	Bilberry Creek	Stillwater Creek	Mud Creek	Mosquito Creek	Sawmill Creek	Rideau River	Sandy Hill	Barrhaven Creek	Jock River	Graham Creek	RVCA Office	TOTAL
Number of Stream Sections Surveyed	71	108	105	77								361
Number of Fish Sampling Sites	5	8	5	5								23
Number of Temperature Probes	3	6	3	4								16
Demonstration/ Training Events						1					1	2
Number of Garbage Cleanup Events	1	1	1		6			1	2			12
Kilometers (km) of Stream Cleaned	0.6	0.2	0.1		1.639			0.32	0.129			2.99
Invasive Species Removal Events	3	0	1		3	2			1	1		15
Squared Meters (m ²) of Invasive Plants Cleared	9886	0	0		4874	1461			436	NA		16657
Number of Volunteers	41	36	14	19	94	15		7	15		27	268
Number of Volunteer Hours (hrs)	133	126	63	72	251	30		21	34		81	795

**Many volunteers engaged in more than one activity; 182 specific individuals participated.*



Volunteers engaged in stream surveys on Mosquito and Bilberry Creek.

RVCA Volunteer Projects

Volunteer projects are carried out for both educational or rehabilitation purposes. City Stream Watch in the Rideau Valley watershed carries out the following types of volunteer projects:

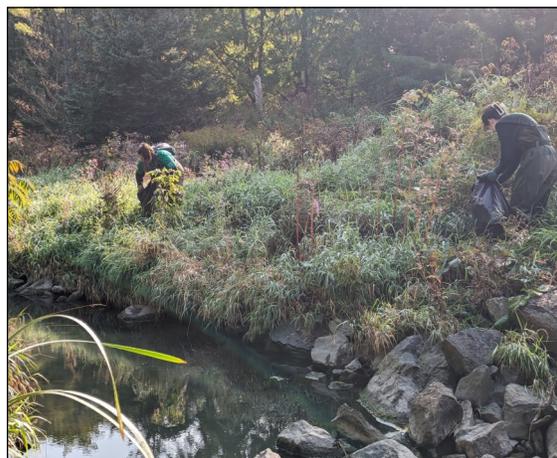
- Removing invasive species that will outcompete native plants;
- Stream garbage cleanup events;
- Planting trees and shrubs along stream corridors;
- Habitat restoration and rehabilitation (bioengineering, habitat creation, wetland restoration);
- Learning about and participating in fish sampling sessions and species identification;
- Learning about and participating in benthic invertebrate sampling sessions and taxonomic identification;
- Learning about fly fishing.

The following is a summary of volunteer projects carried out by the RVCA in 2023. Over the course of the field season, City Stream Watch ran 13 special events outside of regular sampling activities.

Invasive Species Concerns and Removals

Invasive species can be introduced into the environment through a variety of human and natural influences including aquarium and horticultural activities, pet trades, live bait industry, recreational boating, global shipping containers and ballast water. These species are known to have major implications for stream habitat as they can outcompete native species, thereby negatively effecting local wildlife, fish and plants (Ruttledge et al 2018).

There are a number of invasive species that have been observed along creeks in the City of Ottawa. Many are known to be very prolific and can be found along an entire stream length. In response to the growing number of invasive species observed during stream surveys, the City Stream Watch program began removing targeted species in 2010. Removal efforts have been focused on certain species in targeted areas where volunteer removal efforts can halt the spread along the shoreline and make a significant difference in stream habitat. A native seed mix and in some cases trees and shrubs are planted to establish native vegetation as a replacement for the removed invasive plants. Special effort is made to return to targeted areas for additional removals in subsequent years and to encourage repopulation of the area by native plant species by spreading native seed mixes where appropriate.



CSW volunteers and staff removing invasive species (left to right): Buckthorn removal on Graham Creek; Himalayan Balsam removal on Bilberry Creek; and Japanese knotweed removal on Sawmill Creek.

RVCA City Stream Watch Targeted Invasive Species in Ontario

European Water Chestnut (*Trapa natans*)

Originating from Eurasia and Africa, it was introduced in North America as an ornamental plant in 1874 (Hummel and Kiviat 2004). Aside from displacing native floating plants, dense mats block sunlight and prevent growth of submerged vegetation. It has detrimental effects on wildlife that relies on submerged plants as a food source and shelter; and it depletes dissolved oxygen which can negatively impact sensitive fish species (Hummel and Kiviat 2004). Management includes chemical, biological and physical control. Physical removal considered to be the most effective means of control since it also eliminates heavy metals it has absorbed.



Japanese Knotweed (*Fallopia japonica*)

An indigenous plant of Eastern Asia, Japanese knotweed was brought over to North America as an ornamental and livestock forage in the late 18th century (Anderson 2012). Although its distribution has not been extensively documented in Canada until recent years, there have been many confirmed sightings in Ottawa. This perennial plant degrades riparian habitats resulting in not only reduced native plant diversity, but also a decline in invertebrate, amphibian, reptile, bird and mammal communities (Anderson 2012). Knotweed is one of the most aggressive plant invaders, so its control requires substantial amounts of labor and commitment often with a multi year response.

Himalayan Balsam (*Impatiens glandulifera*)

Native to the western Himalayas, Himalayan balsam is a prolific invasive species found throughout many Ottawa creeks. Introduced as a garden ornamental, this aggressive annual is highly capable of out-competing many native riparian plants. It is also a bountiful nectar producer, and could be detracting pollinators from surrounding native flowering species (Clements et al 2008). This, along with the displacement of native riparian plant species, has negative ecological impacts resulting in a reduced biodiversity in riparian plant communities. When dense patches of Balsam die off in the fall, large areas of soil are exposed, contributing to bank erosion in higher winter and spring flows (Clements et al 2008).



Common Buckthorn (*Rhamnus cathartica*)

Occurring naturally throughout Europe, northwest Africa, western Asia, Common Buckthorn was first established in north America in the 1880s, and is now prevalent in southern Ontario where it is found along fences and roadsides, open woods, and well-drained soils adjacent to lakes and streams (Archibold et al. 1997). Common Buckthorn can harm biodiversity by altering soil chemistry, and impacting plant communities and wildlife. It can change the nitrogen levels in the soil, encouraging its own growth and making it harder for native species to survive. Their fruits also have a laxative property which ensures that wildlife consumption rapidly digest and disperse their seeds. This helps the rapid spread of the invasive plant and limits the animals' ability to absorb nutrients.

If you find an invasive species, report your findings to the Ontario Federation of Anglers and Hunters Invading Species Hotline (1-800-563-7711) or download the smartphone app to directly upload photos and location data. For more information on invasive species and how to identify them, please visit

<http://www.invadingspecies.com/>.

RVCA Invasive Species Removals

June 26 and August 12

Japanese Knotweed Removal, Sawmill Creek at Towngate Mall

This is the seventh year that CSW volunteers and staff have tackled this patch of Japanese knotweed, and progress has been made. In 2018, we observed that the patch no longer appeared to be spreading. However, after a two year pause in the program, the Japanese knotweed came back aggressively. Two removal events took place along Sawmill Creek in June and August 2023. In total, an area of 1654.5 m² was cleared of knotweed twice throughout the summer. During the first removal, a total of 13 compost bags (130 kg) of Japanese knotweed was removed from the area. The second removal collected an additional 10 bags (95 kg) of Japanese knotweed. CSW staff will continue to monitor this patch in the coming years in the hope of removing it completely.



A large number of compost bags of Japanese knotweed and volunteers after a removal along Sawmill Creek.



CSW volunteers after an invasive removal on Bilberry Creek

July 22 and September 23

Himalayan Balsam Removal, Bilberry Creek

Through stream surveys, it was determined that Himalayan Balsam had dominated much of the shoreline along many sections of Bilberry creek in 2023. Three removal events took place along Bilberry Creek in July and September. A total of 815 m of shoreline was cleared and a total area of 9886 m². While the first event only removed 6 bags of combined Himalayan Balsam and garbage, the second removed 31 bags (230 kg) of the invasive plant.

September 15

Himalayan Balsam Removal, Bilberry Creek with Modern Niagara

In the early fall, RVCA teamed up with Modern Niagara to do a special event to remove Himalayan balsam on Bilberry Creek. This is the second year that Modern Niagara has worked with the City Stream Watch program. With the help from the 8 volunteers and RVCA staff, 13 bags, (90 kg), of garbage and of the invasive plant was cleared from about 500 m of the creek and the banks.



Modern Niagara volunteers and RVCA staff removing garbage and Himalayan balsam from Bilberry Creek.

RVCA Invasive Species Removals continued

June 3

European Frogbit and Garlic Mustard Removal, Jock Embayment

The Jock Embayment was an RVCA project in 2014 which involved an existing grassy area being converted into a small wetland embayment to provide new spawning and feeding habitat for fish that reside in the Jock River. While there are many native species thriving here, invasive European frogbit and garlic mustard have also managed to move their way into the area. In 2023, CSW volunteers and staff removed all visible European frogbit and garlic mustard to stop their spread and make room for native species. An area of 924 m² was cleared.



CSW staff and volunteers at Jock Landing clearing European frogbit and garlic mustard.



Large number of bags full of Yellow Iris removed along Stanley Park.

October 11

Yellow Iris removal at Stanley Park, Rideau River

Yellow iris can form dense stands with very thick mats of rhizomes that not only displace native plants but can also dry out wet environments and change habitats completely. City Stream Watch hosted a yellow iris removal at Stanley Park just off of the Rideau River in conjunction with RVCA's Shoreline Naturalization Program and the New Edinburgh Community Alliance. This is a particularly tough plant to remove due to its extensive rhizomes, but volunteers and staff were still able to clear 524 m², and remove 685 kg of yellow iris from the area. To help restore the shoreline, live stakes of native plants were planted along the bank once the yellow iris was removed.

October 18

Common Buckthorn removal at Melfia Crescent, Rideau River

A large patch of common buckthorn was detected on Melfia Crescent near Hog's Back Dam. In conjunction with Watersheds Canada and Carleton Memorial United Church, volunteers and RVCA staff members removed any visible plants within the area. A total of 125 kg was cleared. Post removal, planting took place with RVCA's Shoreline Naturalization Program to help restore the area with live stakes of native plants, in order to reestablish native species within the area.



CSW volunteers and removed Buckthorn from along the Rideau River.

RVCA Invasive Species Removals continued

July 5 and August 2

European Water Chestnut Removal, Rideau River and Tay River

RVCA and Parks Canada joined forces once again this year to prevent the spread of European water chestnut (EWC) on the Rideau River. The invasive plant was first found along the Rideau in 2014. The next few summers, City Stream Watch assembled staff to help pull out as many plants as possible. By 2018, there was a noticeable decline in the number of plants found along this section of the Rideau River. This year, the trend continued and fewer plants were found compared to 2018. On July 13th, staff members in canoes scoured the river and cleared any remaining plants. On August 24th, staff members returned to the site, however no plants were found during the second site visit. EWC has significantly declined within the original target area.

While completing shoreline surveys in 2022, Parks Canada observed a new sighting of the invasive plant upstream near Lower Rideau Lake. Thus, the mouth of Tay River, which feeds into the Lower Rideau, was targeted this year for monitoring and removal of EWC.

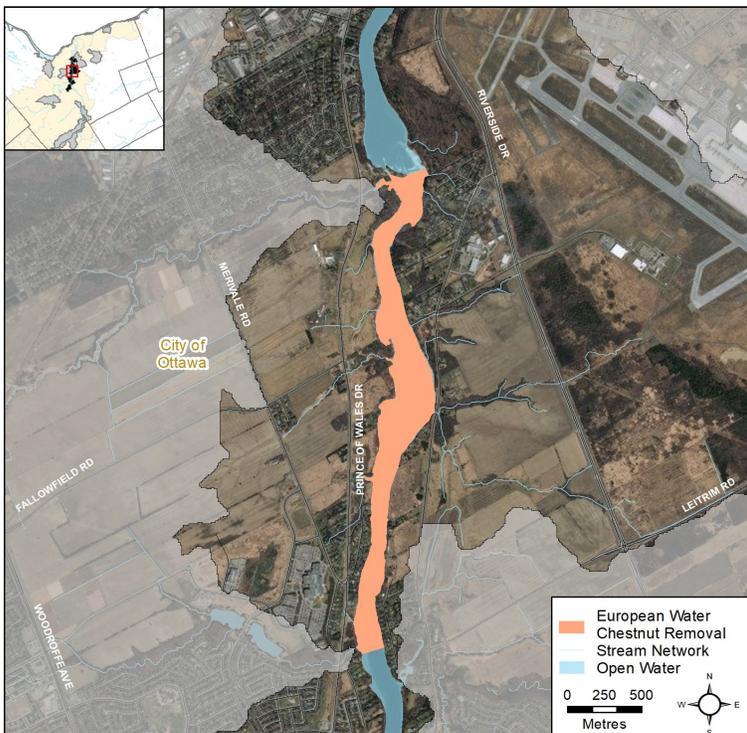


Figure 3 Area along the Rideau that was inspected for European water chestnut.

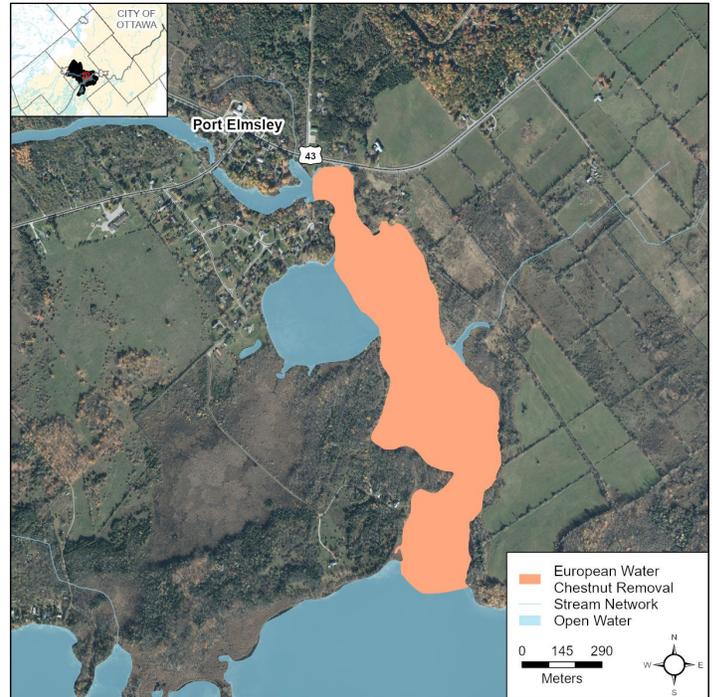


Figure 4 Area along the Tay River that was inspected for European water chestnut.

On July 5th 2023, about 146000 m² was surveyed using canoes and boats, where 20.73 kg of EWC rosettes were pulled from the river. On August 2nd 2023, staff members returned to the site to clear any remaining plants, however they found various new patches of EWC hidden among other native plants. This removal collected an additional 583 EWC rosettes weighing 51.56 kg over an area of 185000 m². City Stream Watch will have to continue monitoring this new targeted area in 2024.



An RVCA summer student with some of the European water chestnut removed from the Tay River

RVCA Garbage Cleanups

April 22 Sawmill Creek Cleanup at Towngate Mall

Once again, City Stream Watch hosted a spring cleanup on Sawmill Creek. This is a highly urbanized tributary of the Rideau River that has been notorious for dumping and can always use a cleanup. Volunteers cleaned over 0.3 km from Hunt Club Road to Albion Road, removing a variety of garbage such as plastics, cardboard, and food packaging. They collected 155 kg of garbage from the stream bed and riparian zone of the creek.



Sawmill Creek cleanup at Towngate Mall

April 29 Sawmill Creek Cleanup in the Capital at South Keys Mall

This spring, the City Stream Watch program returned to another hotspot area along Sawmill Creek. Seventeen volunteers cleared away 31 garbage bags of plastics, cardboard, styrofoam, shopping carts and metal scraps from Sawmill Creek at the South Keys Mall. Volunteers and staff cleaned 300 m of shoreline from Bank Street to Daze Road, collecting 160 kg of accumulated garbage.



Sawmill Creek South Keys cleanup.

May 6 Sawmill Creek Cleanup in the Capital at Chalmers Road

The Adopt-a-Stream Altavista Community Group held a cleanup along Sawmill Creek at Chalmers Road. The four volunteers cleared 300 m of garbage from the riparian zone and bed of Sawmill Creek. They collected 20 bags of plastics, metal, clothing, cardboard, and a fire extinguisher. Having groups such as the Adopt-a-Stream Community Group allows RVCA to hold more cleanup events with the help from these individuals.



Adopt-a-Stream Sawmill Creek cleanup.

May 12 Bilberry Creek Cleanup at Pierre Roque Park

A small group of volunteers removed a large amount of garbage from this location of Bilberry Creek. Four individuals spent 12 volunteer hours in total removing garbage from the stream bed, bank, and riparian zone of the creek. A large variety of garbage was removed including many plastics, signs, metals, and food wrappers. A total of 75 kg in 12 bags was collected in the 600 m that was cleared.



Bilberry Creek cleanup at Pierre Roque Park

RVCA Garbage Cleanups continued

May 13

Sawmill Creek Cleanup at Brookfield Pathway

A group of 11 scouts with five parents met with the City Stream Watch program at Brookfield Pathway at Sawmill Creek to help clean up the garbage in the riparian zone and bank of the creek. The 16 volunteers gathered a total of 10 kg in four garbage bags full of plastics, aerosol cans, glass bottles and other waste, clearing almost 200 m. This was a great opportunity to teach youth about pollution and environmental stewardship.



Volunteers after the cleanup on Sawmill Creek

August 23

Sawmill Creek Cleanup at Towngate Mall

The Canon group cleanup event for employees was organized as an opportunity to volunteer with the City Stream Watch Program. Sixteen volunteers cleared 300 m along Sawmill Creek where it flows behind Towngate Shopping Centre. Volunteers collected 175 kg of waste in 20 garbage bags including shopping carts, a bike, and tires. Unfortunately, Sawmill Creek is a location that the City Stream Watch program visits multiple times a year due to the amount of waste each year.



Volunteers from Canon and RVCA staff after the cleanup along Sawmill Creek

August 26

Barrhaven Creek Cleanup

City Stream Watch volunteers and staff completed a cleanup on Barrhaven Creek. The group of seven volunteers cleared just over 300 m of shoreline. The focus of the cleanup effort was along the creek itself and in the adjacent pathway network along the bank. Eighteen garbage bags were collected full of broken glass, plastics, and packaging weighing 45 kg.



Garbage along the bank of Barrhaven Creek prior to the cleanup



Volunteers after the cleanup at Barrhaven Creek

RVCA Garbage Cleanups continued

May 19

Jock River Landing Cleanup and Benthos Workshop

A class of 11 from John McCrae Secondary School partnered with RVCA's City Stream Watch program at the Jock River Landing to participate in a garbage cleanup and a benthos workshop. The benthos workshop allowed students to learn about the Ontario Benthos Biomonitoring Networking (OBBN), and the methods of identifying water quality from the benthic invertebrates. The students then had the opportunity to try the 'kick-and-sweep' method of collection. Afterward, the students cleared 100 m of garbage at the Jock River Landing Park and along the Jock River, totaling 20 kg.



Students from John McCrae Secondary School with the collected garbage.



RVCA staff member giving a live demonstration of the 'kick and sweep' method of OBBN collection.



Staff running a benthos workshop with live benthic invertebrates.

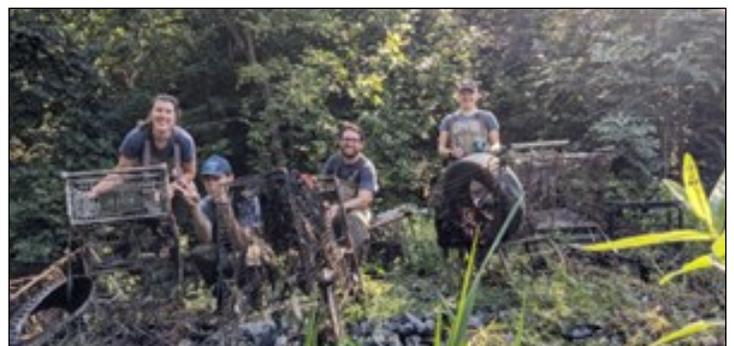
August 31

Stillwater Creek Shopping Cart Cleanup

During a stream survey at Stillwater Creek, RVCA staff observed several shopping carts that had been pushed into the creek. A group of staff members from the City Stream Watch program went out to Stillwater Creek to collect and remove shopping carts from within the creek. They were able to clear 200 m and gather 280 kg of metal weight from 13 shopping carts and three tires all from the creek.



Some of many shopping carts removed from Stillwater Creek.



RVCA City Stream Watch staff with the removed shopping carts and tires at Stillwater Creek.

RVCA CSW Adopt-A-Stream

September 6

Dog Strangling Vine Removal,

Sawmill Creek

Adopt-A-Stream allows for certain individuals or organizations to become certified “City Stream Watchers” where they take responsibility for either a defined stream or stream portion. The “Watchers” work with the CSW Coordinator to monitor their defined stream (or stream portion) during non-survey years and identify areas of concern such as new erosion sites or areas that are in need of a cleanup or planting event. A brief summary report is submitted to the CSW Coordinator for consideration and/or action. Currently, sections of Sawmill Creek are being monitored by certified City Stream Watchers from the Alta Vista Community Association (AVCA).

This year, a team of five Adopt-A-Stream members of the Greenspace Stewardship Committee of AVCA volunteered to help monitor the mouth of Sawmill Creek for invasive species and garbage buildup for a 6-month period. By rotating in two-hour shifts on Thursdays and Saturdays for a total of 35 work sessions and an estimated 180 volunteer hours. Volunteers distributed bilingual flyers to the local public to help inform them about the importance of managing invasive species and collecting garbage along Sawmill Creek. The flyers also encouraged the recruitment of new volunteers.

AVCA Adopt-A-Stream volunteers also participated in multiple clean-ups and invasive species removals along Sawmill Creek, and teamed up with RVCA staff to tackle dog strangling vine (DSV) near Brookfield Park. A total of 8 bags full of DSV weighing 35 kg was removed from the area.



Volunteer removing dog strangling vine on Sawmill Creek



Adopt-A-Stream team on Sawmill Creek



Volunteers after the removal of dog strangling vine along-Sawmill Creek

RVCA Restoration Projects

Stillwater Creek Wetland Project

2023 Monitoring Results

In the fall of 2018, the Rideau Valley Conservation Authority (RVCA) partnered with the National Capital Commission (NCC) and created 10 000 square meters of wetland habitat in the Stillwater Creek catchment area, just south of the new DND headquarters off Moodie Drive and Highway 417. The Ottawa-Carleton Wildlife Centre, which is located nearby, observed that the wetland habitat in the area was suffering annually from extreme low water conditions. The project involved expanding the previous habitat by creating three large, wetland cells and installing wood structure within them. The project constructed three wetland cells (West, Central, and East Cell) along the Watts Creek pathway system in the fall of 2018. In the fall of 2022, an additional cell (Willow Cell) was constructed and the East Cell underwent an expansion.

This year was the third year of post-effective monitoring for the project. Stillwater Creek wetland is visited once a month by RVCA staff. Monitoring for wildlife observations, amphibian surveys and the collection of water chemistry data is conducted for each of the four wetland cells. Although the wetlands are only about 5 years old, animal and plant species have quickly started to establish. The wetland is currently home to several species of birds, fish, amphibians, and pollinators. This year, a turtle (midland painted turtle) was observed for the first time since starting this project in 2018.



Stillwater Creek Wetland, August 2023; (a) West, (b) Willow (c) Central and (d) East cells



Wildlife observed at Stillwater Creek wetland in 2023; top from left to right: painted turtle, killdeer; bottom from left to right: least sandpiper, least weasel

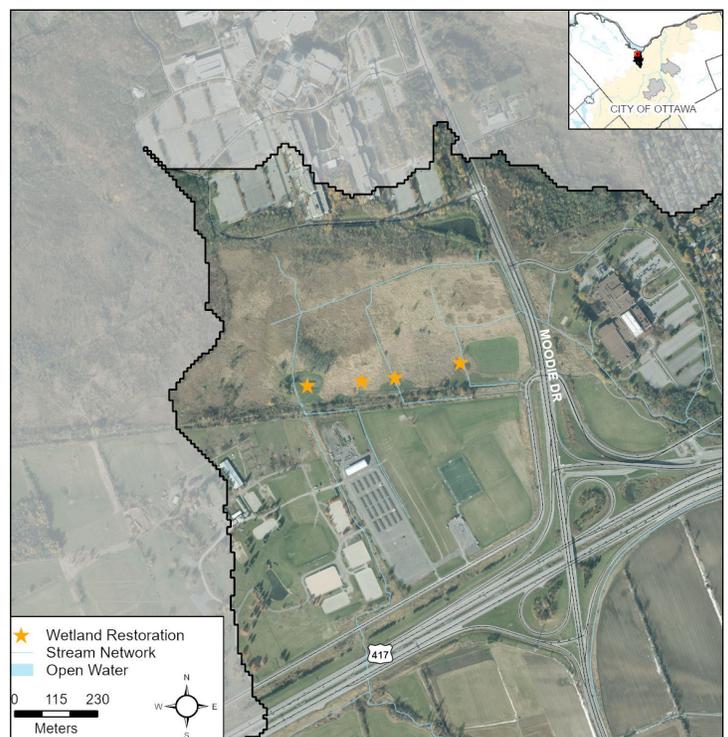


Figure 5 Location of Stillwater Creek wetland cells

RVCA Workshops

Workshops and demonstrations are an important and popular part of the City Stream Watch program because they give volunteers the opportunity to learn about the importance of the monitoring and stewardship within our watershed with our held events in which they can participate.

May 13 Sandy Hill EcoFair

The Sandy Hill EcoFair featured exhibits by both non-profit organizations and public agencies showcasing a variety of environmental topics and promoting opportunities for public involvement in environmental initiatives. The RVCA booth promoted the City Stream Watch program and some aspects of the OBBN (Ontario Benthos Biomonitoring Networking) program by holding a live demonstration of macroinvertebrates that had been caught within the RVCA watershed. This also included invasive species such as the rusty crayfish (*Faxonius rusticus*).

These events allow us the opportunity to share informational documents on invasive species so that we can continue to help educate the public in an effort to curb their spread. The event was well received by the public and the City Stream Watch program hopes to continue to participate in workshops like this again in the future.



Staff member giving a live demonstration to the public on the types of macroinvertebrates we have within our watershed.



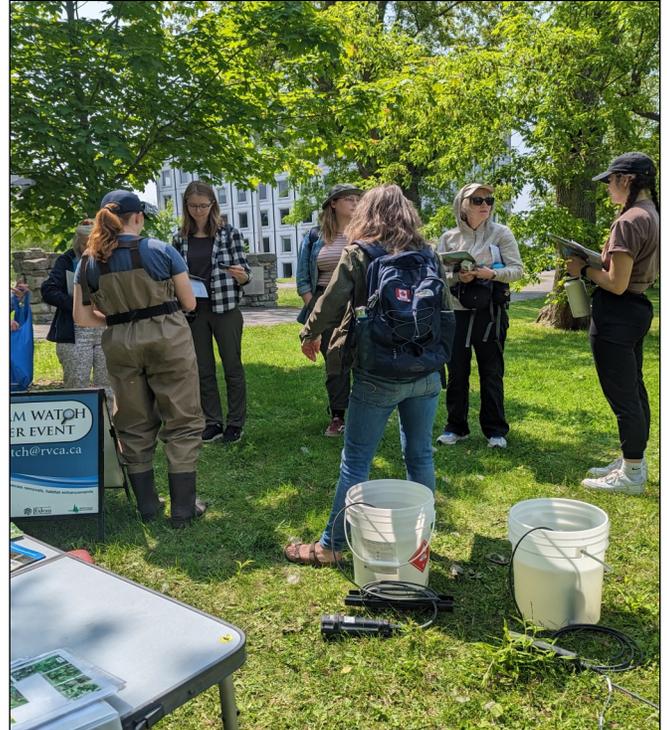
Some of the informational documents shared at the RVCA booth.

RVCA Workshops Continued

May 27 Spring Volunteer Orientation

In the spring, City Stream Watch held the annual pre-season volunteer orientation where volunteers are taught about the program and are introduced to the survey equipment and protocol they will be using in the field. This is a great event for first-timers of the program, as well as those who have little to no experience with field work. Training covered topics that included instream and riparian condition, watershed health, best management practices, and stewardship opportunities.

This year, the orientation was held at Sawmill Creek where it empties into the Rideau River. The process for measuring and documenting various stream characteristics under the CSW stream survey protocol were explained and demonstrated, including the use of a Yellow Springs Instrument (YSI) for completion of water quality measurements.



Volunteers participating in the 2023 Spring Orientation.

July 29 Invasive Species Workshop

In July, the City Stream Watch program held an Invasive Species Workshop for the public to gather and listen to a seminar held by a staff member about the invasive species that are within the watershed.

During this presentation, the group was taught about the characteristics of invasive species, how they can spread, how they impact the environment, how they can be identified, the management and rapid response, as well as how to report any sightings.

It was a very successful workshop with around 40 members of the public gathering to watch, ask questions, and gain further knowledge on the topic of invasive species. As result of the positive feedback from participants, CSW will hold this workshop again in 2024.



Staff member presenting at the invasive species workshop held at RVCA main office.

RVCA Plans for 2024

In 2024 as part of our City Stream Watch program we will be monitoring the following creeks:

- Graham Creek
- Brassils Creek
- Green's Creek
- McEwan Creek

There will be opportunities to assist with:

- Stream habitat assessment surveys
- Fish community sampling
- Stream garbage cleanups
- Invasive species removals
- Riparian tree and shrub planting
- Workshops and demonstrations
- Habitat enhancement and restoration

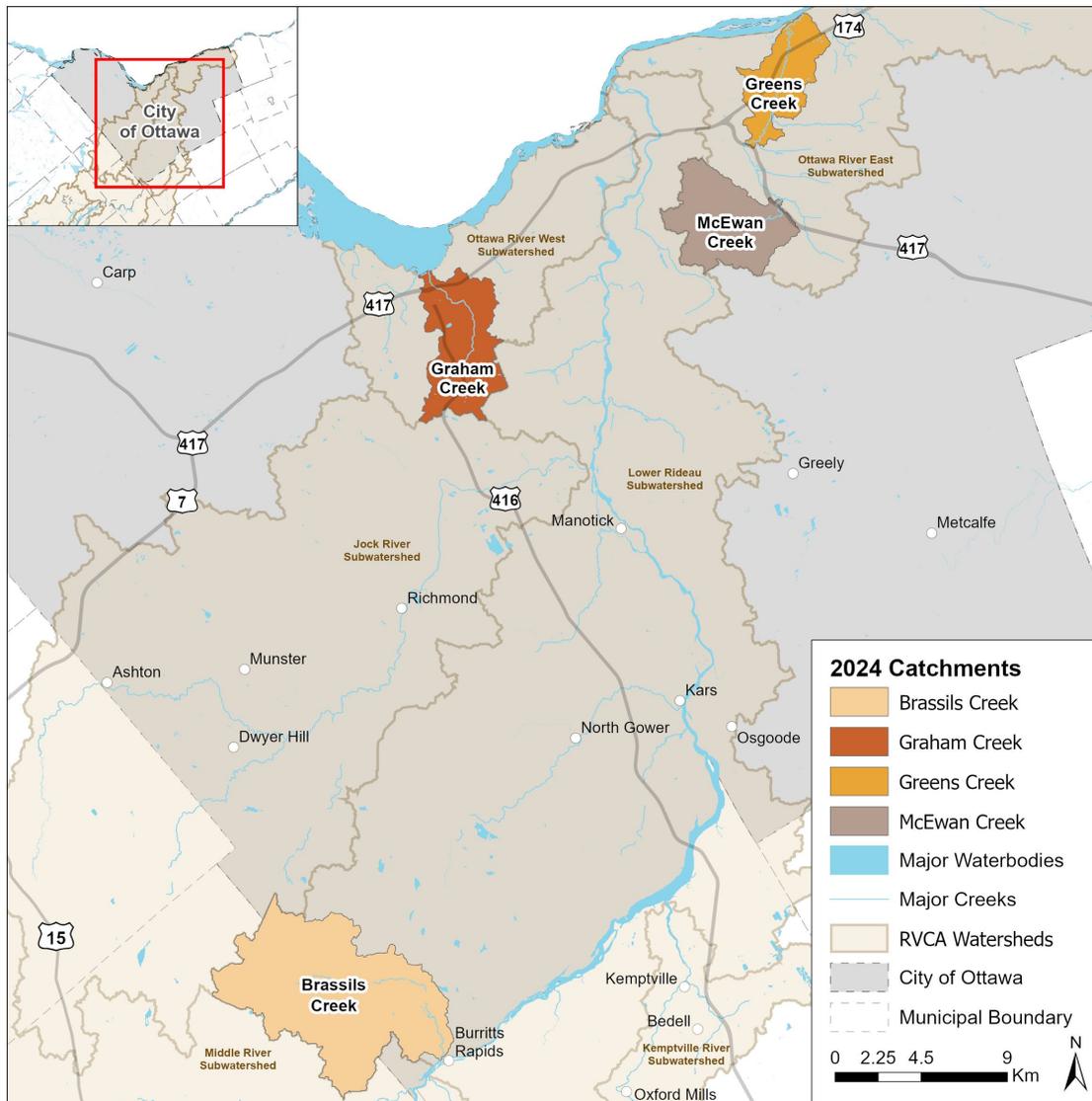


Figure 6 Catchments to be monitored by RVCA City Stream Watch in 2024.

To volunteer with RVCA's City Stream Watch program, please visit rvca.ca or contact:

City Stream Watch Coordinator

(613) 692-3571

citystreamwatch@rvca.ca

<https://www.rvca.ca/volunteer/city-stream-watch>

RVCA City Stream Watch Monitoring Schedule

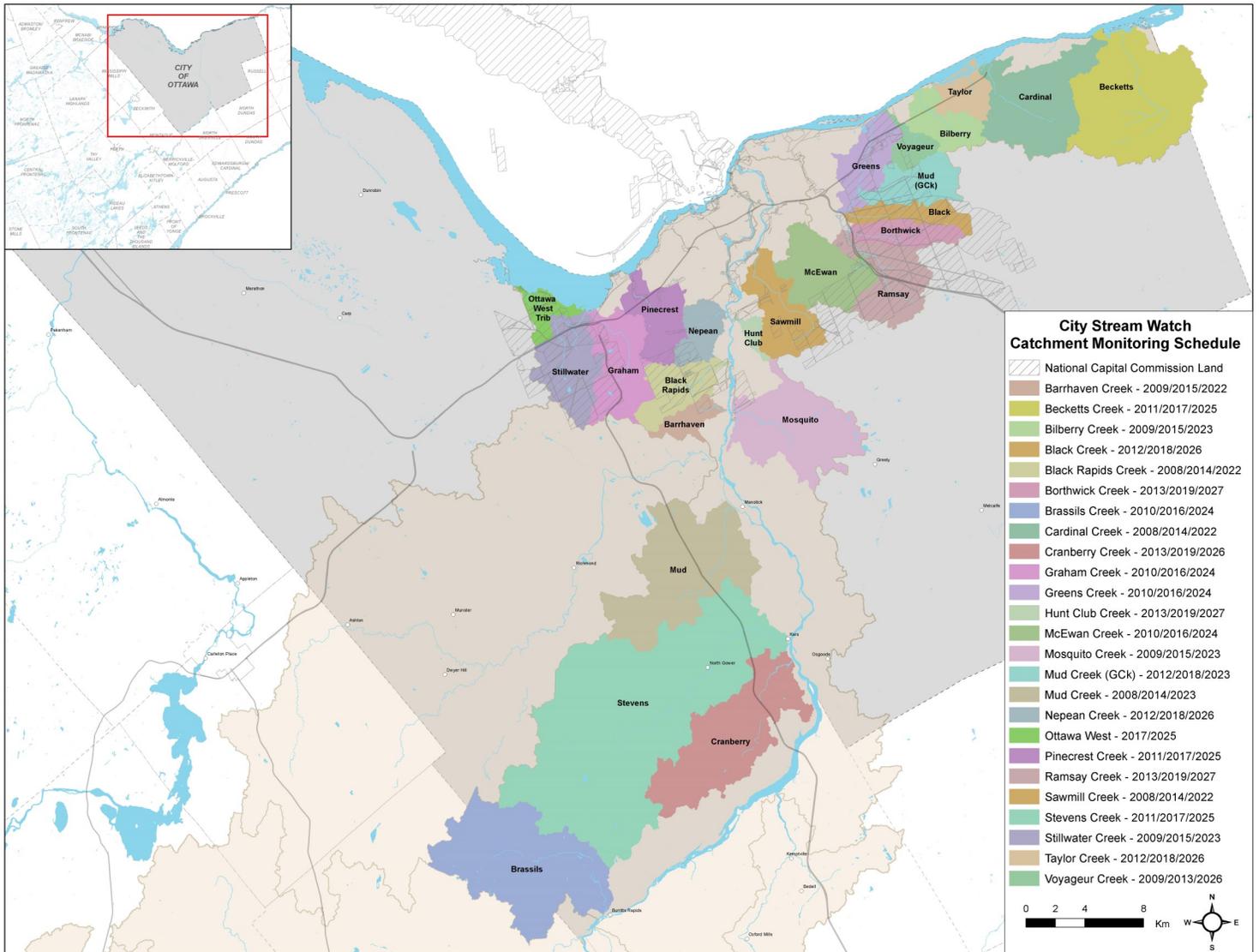


Figure 7 RVCA City Stream Watch catchment locations and monitoring schedule.

MVCA City Stream Watch Monitoring 2023 Summary

The MVCA City Stream Watch (CSW) program monitors watercourses within the City of Ottawa boundaries in detail by wading the stream where possible and filling out survey sheets every 100 m. Our CSW rotation involves visiting seven tributaries to the Carp River, four tributaries to the Ottawa River and one tributary to the Mississippi River within a five-year rotation.

In 2023, MVCA returned to using the CSW protocols post-covid restrictions and sampled 4.3 km of Watt's Creek and 2.1 km of Carp Creek. To support these surveys, three temperature loggers were launched and three sites were electrofished. Additional temperature loggers were also launched at seven sites in three other CSW catchments.

For more detailed information on the sampling conducted in 2023, please refer to the individual catchment reports found on our website (mvc.on.ca/city-stream-watch/).

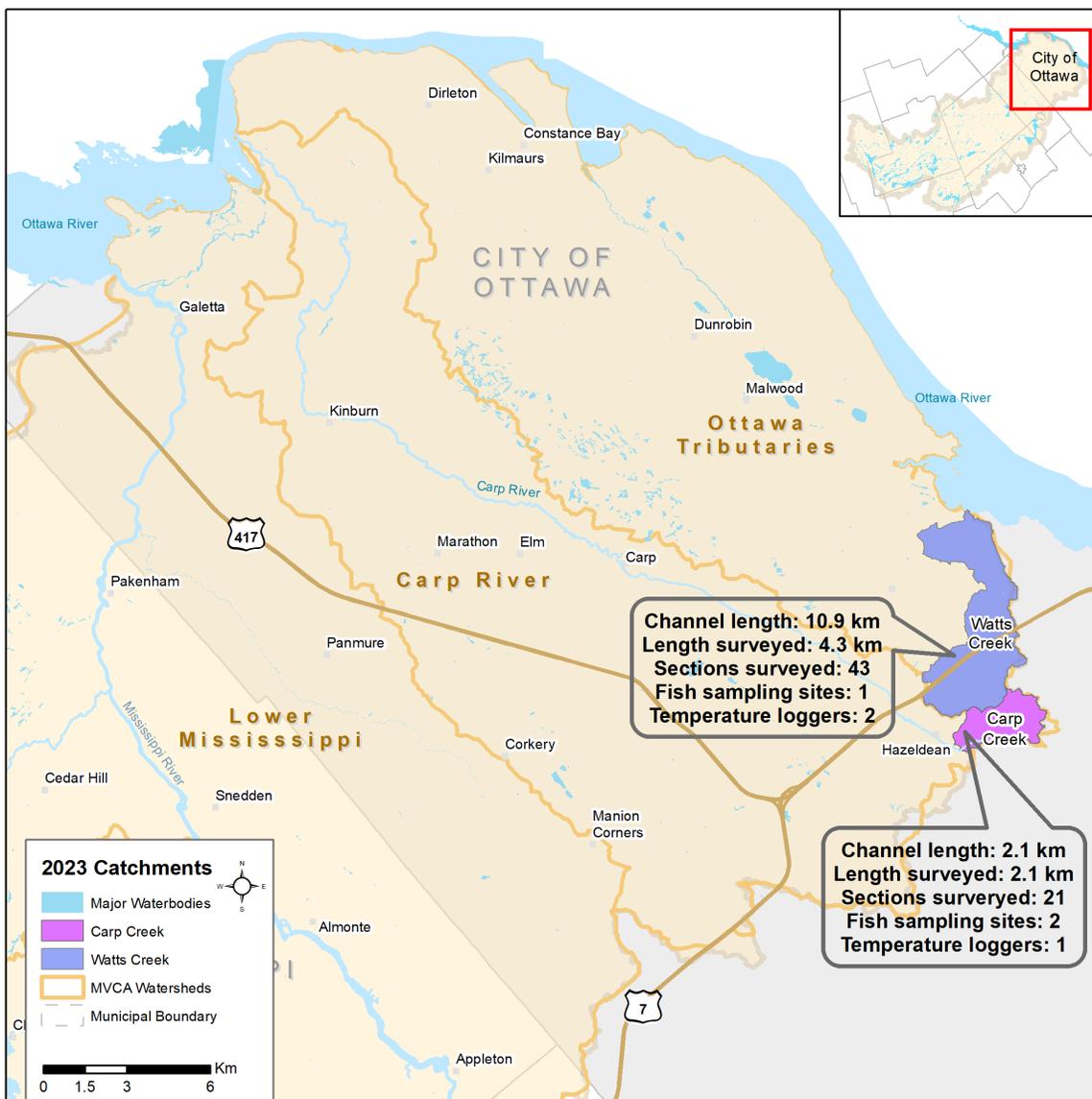


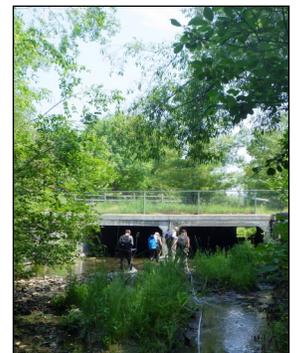
Figure 8 2023 MVCA CSW creek catchment areas with summary monitoring statistics.



MVCA staff during a stream survey.



Young snapping turtle found in the field.



Staff/volunteers on a MVCA creek.

MVCA City Stream Watch 2023 Summary



MVCA staff electrofishing.



Macroinvertebrates found while in the field.

Biological Surveys

Fish

Three sites within this year's City Stream Watch catchments were electrofished in 2023.

In Carp Creek, two sites were sampled and across them seven species of minnows were captured, including two that had not been collected previously from this watercourse.

In Watt's Creek one site was sampled and eight species of minnows were collected.

Additionally, three sites in Shirley's Brook, and two on Poole Creek were sampled this year.

Benthics

Benthic macroinvertebrates are the insects that live on the stream bottoms and require an aquatic environment for part or all of their lives. They are an important link in the food webs around a water body and are good indicators of ecosystem health.

MVCA collected benthic samples at 1 site in each monitored catchment this year. Additional samples were collected in 2023 representing two other CSW catchments. These samples will be processed over the winter and results will contribute to a better understanding of the biological diversity within our City streams.

Temperature Monitoring

10 seasonal temperature loggers were successfully launched in City Stream Watch catchments in 2023.

Unfortunately due to an equipment failure we are not able to assess the condition of Carp Creek during the hottest parts of the 2023 summer. The water temperature reading during our survey dates indicate that the stream is likely cool which is consistent with its classification in 2017.

Similarly the 4 loggers launched in Poole Creek failed to read out when returned to the office.

Table 4 Thermal Classification by creek.

Creek	Location	Thermal Classification
Carp Creek	Terry Fox Drive	N/A estimate Cool
Watt's Creek	By NCC Path	Cool
Watt's Creek	Outlet	Cool-Warm
Shirley's Brook	Klondike	Cool
Shirley's Brook	Maxwell Bridge	Cool
Corkery Creek	Vaughan Sd Rd	Cool



A blacknose dace captured during fish sampling

MVCA City Stream Watch 2023 Summary



Abandoned bike found in a creek.



Garlic mustard removal along Poole Creek



Staff and volunteers participating in a stream survey

Stewardship

MVCA undertook two litter clean up events at Poole Creek thanks to the help of dedicated local volunteers. Staff members also took on invasive species removals at Poole Creek, continuing the effort to remove stands of Garlic Mustard. Staff intend to continue this work in the spring of 2024.

Table 5 A summary of Stewardship Activities within MVCA City Stream Watch Catchments in 2023.

Project	Details	# Volunteers	Volunteer hours
Garbage Removal	10 bags of garbage removed	12	25
Invasive Species Removal	5 bags of Garlic Mustard		

Volunteers

Four volunteers attended multiple days of stream surveys and contributed a total of 14 days monitoring our streams.

MVCA plans to work with volunteers on maintaining and furthering invasive species removals and stewardship projects in the coming years.

Invasive Species

Nine invasive species were identified within Carp Creek and nine invasive species were identified within Watts Creek during the 2023 CSW surveys.

Species identified include; common buckthorn, dog-strangling vine, flowering rush, garlic mustard, glossy buckthorn (only identified in Watt's Creek), himalayan balsam, manitoba maple, poison parsnip, purple loosestrife, and rusty crayfish (only identified in Carp Creek).



Garbage cleaned up along Poole Creek



Rusty crayfish found in Carp Creek.



Flowering rush found in Watt's Creek.

MVCA Plans for 2024

Our plans for 2024 will be to survey Poole and Feedmill Creeks. The surveys will be enhanced with water temperature loggers and fish sampling as well as headwater drainage feature assessments where possible. It is also our intent to engage the local community to help us with a number of stewardship tasks as we continue to re-establish this program in our watershed.

There will be opportunities for volunteers to help with stream surveys, shoreline planting, as well as possible invasive species removal and garbage clean up events.

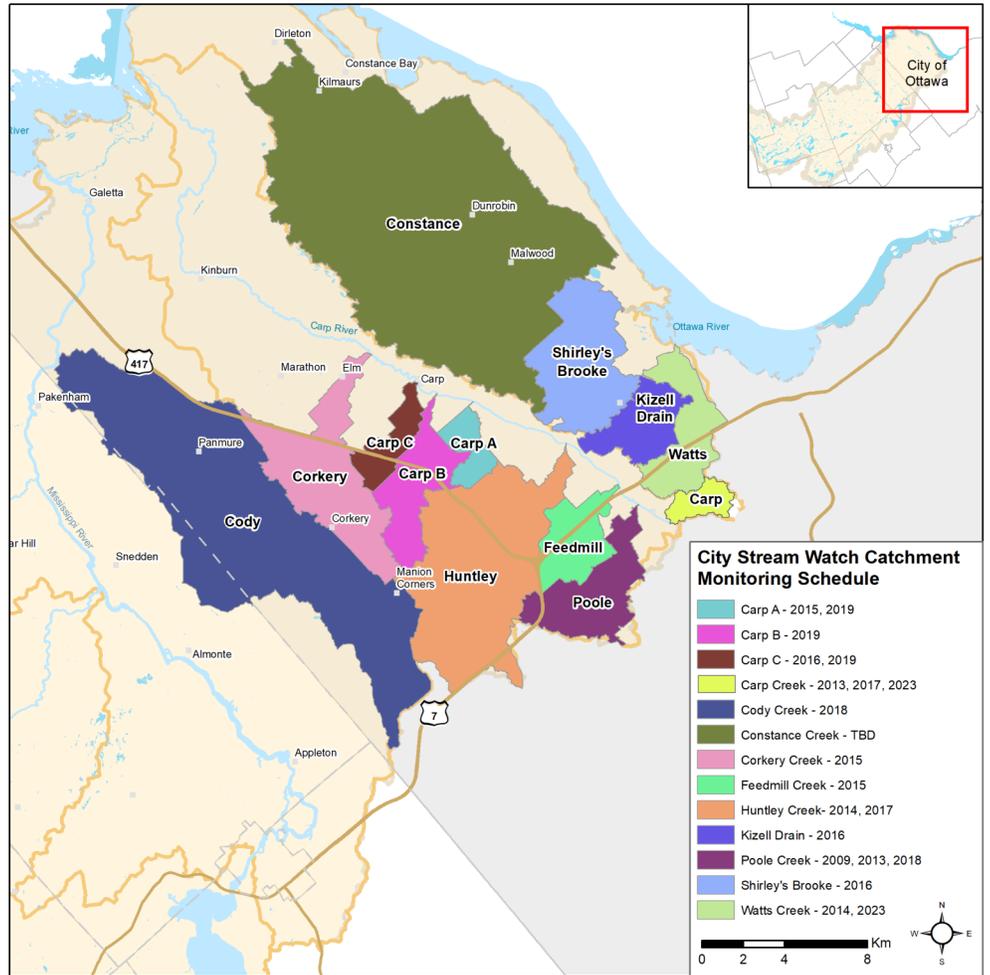
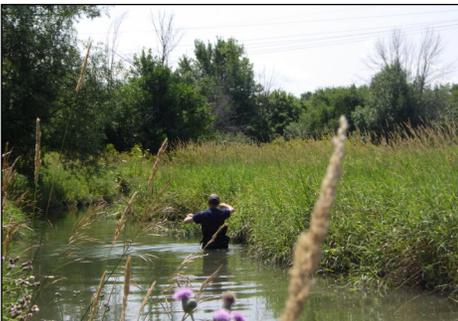


Figure 9 MVCA's past CSW catchment monitoring cycle.



MVCA member measuring a 100 m section.



American Toad found in a surveyed creek.



MVCA staff taking YSI measurements.

For more information or to volunteer with MVCA's City Stream Watch program, please contact Kelly Stiles at:

kstiles@mvc.on.ca

613-253-0006

<http://mvc.on.ca/city-stream-watch>



Acknowledgements

A big thank you to all of our 2023 **volunteers**. You continue to make the program a success and contribute to important data collection and rehabilitation projects along our urban and rural streams within the City of Ottawa.

Thank you to all the **landowners** that granted us access to the creeks that flow through their properties.

Thank you to the **City Stream Watch collaborative** for continuing with their program guidance, ideas, volunteer recruitment, and general help.

Thank you to all partners for helping to spread the word about the City Stream Watch program and events.

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