



# City Stream Watch 2022 Summary Report





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## Prepared By:

**Jennifer Lamoureux**  
Aquatic and Fish Habitat Biologist  
Manager, Aquatic Monitoring Programs  
Rideau Valley Conservation Authority

### City Stream Watch Collaborative:

- Amy MacPherson, City of Ottawa
- John Flack, Ottawa Flyfishers Society
- Alex Stone, National Capital Commission
- Dr. Frances Pick, Rideau Roundtable
- Isabelle Turcotte, Ottawa Stewardship Council
- Tara Redpath, City of Ottawa
- Jennifer Lamoureux, Rideau Valley Conservation Authority
- Peter Stewart-Burton, Canadian Forces Ottawa Fish and Game Club



La table ronde sur la Rivière  
**Rideau**  
River Roundtable



## GLOSSARY OF ACRONYMS

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

## 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.

After a two-year pause due to COVID-19 restrictions, the RVCA resumed its City Stream Watch program in the Rideau River watershed within the City of Ottawa boundary. The 2022 program included stream survey assessments, fish community sampling, and water temperature monitoring.



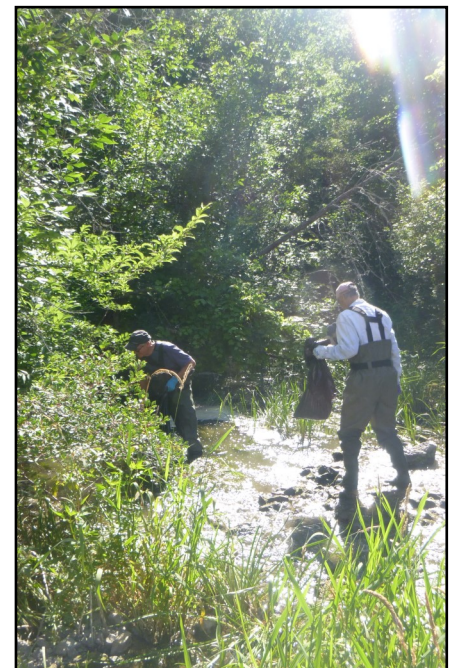
Area monitored by City Stream Watch. Photo courtesy of South Nation Conservation (modified).



CSW volunteer completing a stream survey on Sawmill Creek.



Jock River Landing garbage cleanup where the Jock River flows into the Rideau River.



CSW volunteers completing a garbage cleanup on 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 in the Rideau Valley watershed. 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 100m 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).



CSW volunteers measuring a 100 meter section for the survey.



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



RVCA staff member recording measurements during a canoe survey.

## 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 are used:

### 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.



### Fyke Net

- Modified hoop net (series of hoops covered in mesh), with a lead line and wings that funnel fish inside;
- Depending on size, can be used in shallow or deeper waters and is a good alternative in places that are difficult to seine or electrofish;
- Nets can be set up from 24 hours to multiple weeks, but are checked every 24 hours to release any fish that have been caught.



## 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.

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

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

## Data Management and Users

All data collected is maintained in an RVCA 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 (MNR); stored in National Heritage Information Centre (NHIC) and Natural Resource and Values Information System (NRVIS) databases;
- Academic partners.



An RVCA staff member installing a temperature logger in Black Rapids Creek in August.



HOBO temperature logger.

## 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 25.3 kilometers of streams were surveyed and 17 fish sampling sites were assessed as part of the 2022 cycle on Sawmill Creek, Black Rapids Creek, Cardinal Creek and Barrhaven Creek. In addition, a total of 14 sites on these systems were surveyed for thermal regime. For more detailed findings for each catchment area monitored in 2022, please see their individual catchment reports that are shared on our website at [rvca.ca](http://rvca.ca) (Monitoring & Reporting > Reporting > City Stream Watch Reports).

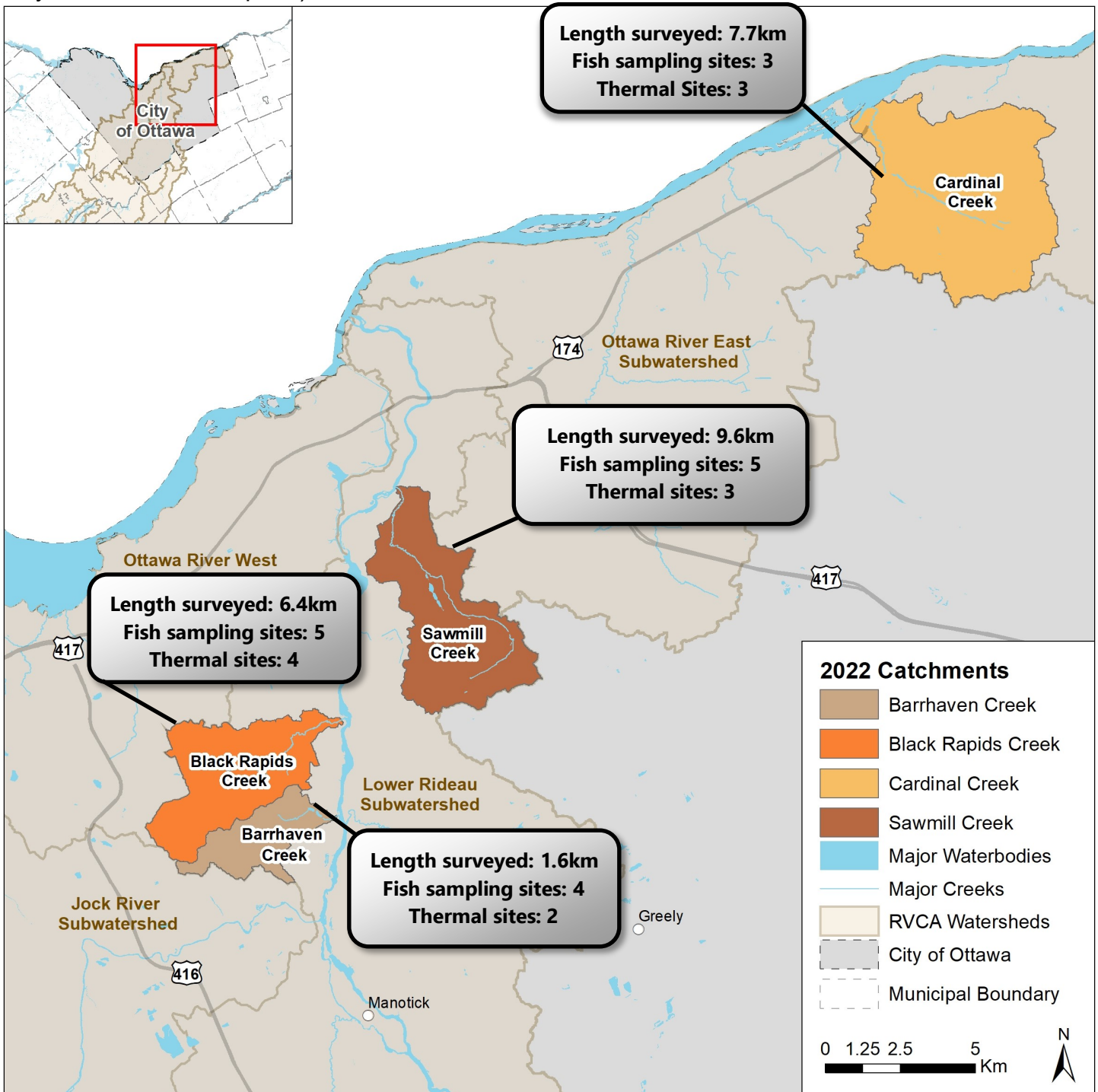


Figure 1 2022 RVCA CSW creek catchment areas with summary monitoring statistics.

## RVCA City Stream Watch 2022 Summary

### Stream Study and Comparison

In 2022, three of the systems studied are tributaries of the Rideau River: Barrhaven Creek, Black Rapids Creek and Sawmill Creek; and one tributary of the Ottawa River: Cardinal Creek. Sawmill Creek, Black Rapids Creek and Cardinal Creek were previously surveyed in 2014; and Barrhaven Creek was previously surveyed in 2015. Table 1 is a comparison summary of monitoring activities for the reporting cycles.

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.

The number of volunteers and volunteer hours was lower in all creeks except for Sawmill Creek in 2022, due to a late start for the program as there was uncertainty about the ability to resume work with volunteers. The total number of volunteer hours was much higher in 2022 over 2014 due in large part to the pandemic pause which led to a substantial amount of stream garbage and invasive species buildup, particularly on Sawmill Creek.

**Table 1** Stream study comparison by cycle year.

Activities	Sawmill Creek		Black Rapids Creek		Cardinal Creek		Barrhaven Creek	
	2014	2022	2014	2022	2014	2022	2015	2022
Number of Sections Surveyed	98	96	43	64	47	77	101	16
Number of Volunteers	63	120	26	18	28	16	26	10
Total Volunteer Hours	215	364.5	92	61	124	56	52	30
Number of Fish Sampling Sites	6	5	7	5	7	3	5	4
Number of Temperature Probes	2	3	3	4	3	3	2	2



Measuring hydraulic head on (left) and a beaver dam location (right), both on Black Rapids Creek.





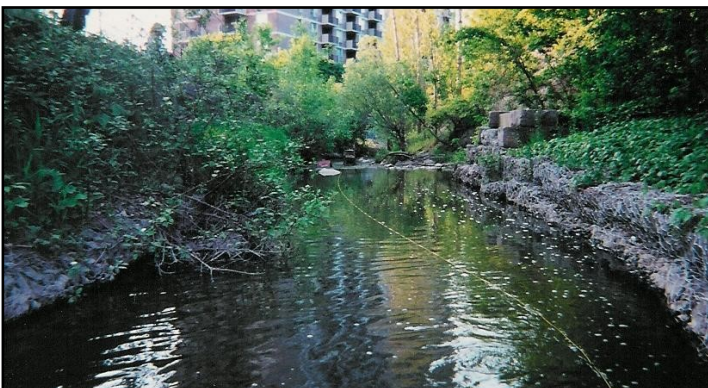
## Program Highlight Summary

This year, 187\* volunteers from the community participated in the program, contributing a total of 580.5 hours toward stream surveys, restoration activities, and the orientation training event. The following table displays the distribution of volunteer effort in 2022.

**Table 2** RVCA 2022 CSW program accomplishments

Metric	Sawmill Creek	Barrhaven Creek	Black Rapids Creek	Cardinal Creek	Jock River	TOTAL
Number of Stream Sections Surveyed	96	16	64	77		253
Number of Fish Sampling Sites	5	4	5	3		17
Number of Temperature Probes	3	2	4	3		12
Demonstration/ Training Events	1					1
Number of Garbage Cleanup Events	5	1			2	8
Kilometers (km) of Stream Cleaned	2.14	0.25			0.28	2.67
Invasive Species Removal Events	2				1	3
Squared Meters (m <sup>2</sup> ) of Invasive Plants Cleared	2471				924	3395
Number of Volunteers	120	10	18	16	23	187*
Number of Volunteer Hours (hrs)	364.5	30	61	56	69	580.5

\*Many volunteers engaged in more than one activity; 118 specific individuals participated.



Sawmill Creek near the mouth of the Rideau River looking upstream in 2014 and in 2022.

## 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 2022. 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): Water Chestnut in the Rideau River; European frogbit at the Richmond Conservation Area (Jock River); and Japanese knotweed at 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).



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

### August 13th Japanese Knotweed Removal, Sawmill Creek at Towngate Mall

This is the sixth 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, Japanese knotweed came back aggressively. In total, an area of 2000 m<sup>2</sup> was cleared of knotweed. CSW staff will continue to monitor this patch in the coming years in the hope of removing it completely.



Large number of compost bags of Japanese knotweed removed along Sawmill Creek.

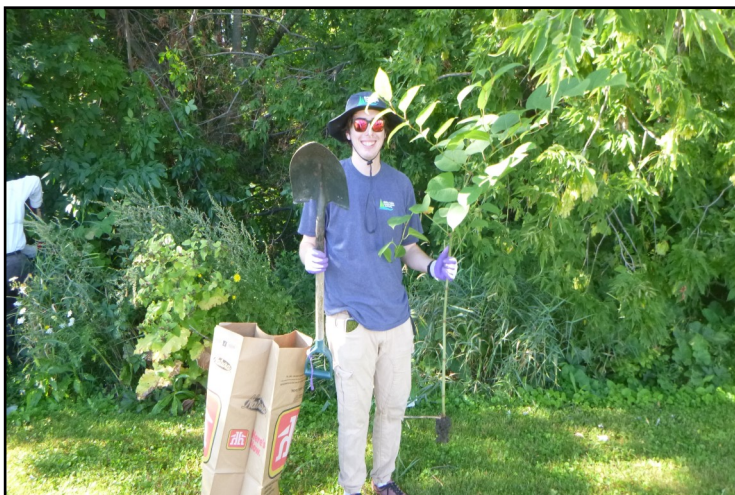
### September 24th Himalayan Balsam Removal, Sawmill Creek

This is the first year that CSW volunteers and staff have removed Himalayan Balsam on Sawmill Creek at Gloria Avenue after observations of it being widespread in this location during the 2022 surveys.

This area showed displacement of native plants, as the Himalayan Balsam had taken over as the dominant plant. Seven CSW volunteers and RVCA staff cleared 471m<sup>2</sup> within the riparian zone.



CSW volunteers working along Sawmill Creek.



Volunteers digging up Japanese knotweed along Sawmill Creek.



CSW volunteers and removed plants from Sawmill Creek.

## RVCA Invasive Species Removals continued

### August 10th 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. CSW volunteers and staff removed all visible European frogbit and garlic mustard to stop their spread and make room for



Jock River embayment pre-removal of European frogbit.



Jock River embayment post-removal of European frogbit.



Volunteers at the invasive species removal event on the Jock River.



Volunteers working in the Jock River to remove European frogbit.



**Figure 3** Location and range of invasive removal at the Jock River.

## RVCA Invasive Species Removals continued

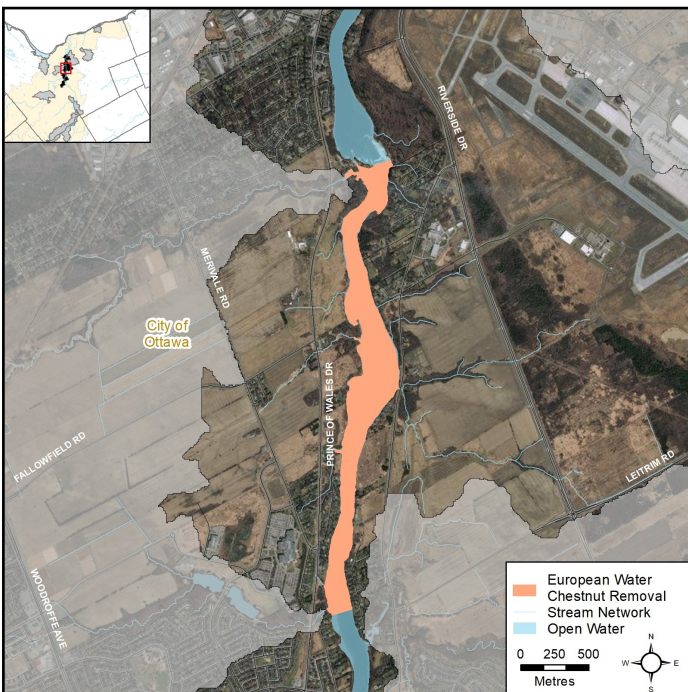
July 13th and August 24th

### European Water Chestnut Removal, Rideau River

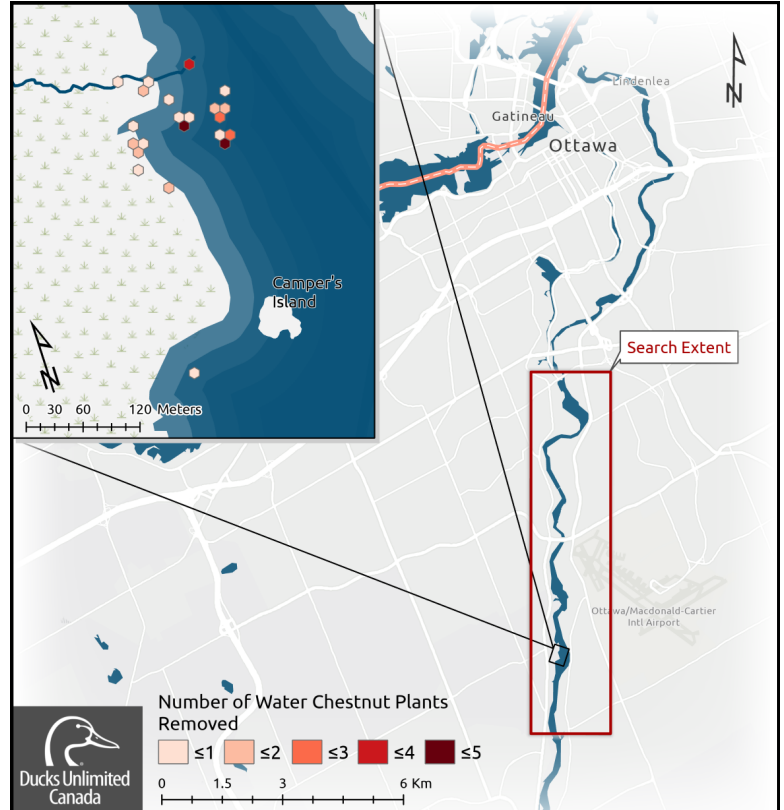
RVCA and Parks Canada joined forces once again this year to prevent the spread of European water chestnut on the Rideau River. The invasive plant was first found along the Rideau in 2014. The next few summers, City Stream Watch assembled volunteers and staff to help pull out as many plants as possible. 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 remaining plants. On August 24th, staff members returned to the site to clear any remaining plants, however no plants were found during the second site visit. The plants have significantly declined within the target area. Parks Canada staff while completing shoreline surveys observed a new sighting of the invasive plant upstream near Lower Rideau Lake. This area will be targeted for monitoring and removals in 2023.



An RVCA summer student removing European water chestnut from the Rideau River.



**Figure 4** Area along the Rideau that was inspected for European water chestnut.



**Figure 5** Location and range of European water chestnut. (Map courtesy of Ducks Unlimited Canada).



European water chestnut after first 2022 removal from the Rideau River.



## RVCA Garbage Cleanups

**May 15th**

### Sawmill Creek Cleanup at South Keys - 1st event

After a two year pause in the City Stream Watch program this area of Sawmill Creek had a substantial amount of garbage on the banks and within the creek. Unfortunately, this part of Sawmill Creek requires annual instream and riparian cleanups to manage the amount of garbage that is washed and blown in to the system. Staff and volunteers were able to clear a total of 300m of the shoreline. A total of 12 large garbage bags were filled with a variety of garbage consisting of plastics, cardboard, food wrappers, etc. A second cleanup was required to finish the job later in the summer.

**May 30th**

### Jock River Cleanup at Stonebridge Trail

This spring, a local Girl Guide group joined City Stream Watch for a spring cleanup at the Stonebridge Trail, which runs adjacent to the Jock River in Barrhaven. This was not the first year for this partnership, as previous years focused on the Chapman Mills Conservation Area. Twenty five local Pathfinders came out to cleanup garbage that had accumulated. In total, the group cleared 600m of an area along the Stonebridge pathway, removing accumulated garbage that consisted of plastics, cardboard, tires, etc.

**June 11th**

### Sawmill Creek Cleanup at South Keys - 2nd event

The City Stream Watch program returned to the same area of Sawmill Creek as a second cleanup was required to remove the remaining garbage that was unable to be collected from the May event. A smaller group of volunteers cleaned the remaining garbage along the banks of the creek. Nine individuals spent 18 volunteer hours in total removing the remaining garbage. The garbage included shopping carts, plastics, cardboard, etc.

**June 25th**

### Sawmill Creek Cleanup at Towngate Plaza

A small group of volunteers removed a large amount of garbage from this location of Sawmill Creek. Four individuals spent 8 volunteer hours in total removing garbage from the stream bed and riparian zone of the creek. A large variety of garbage was removed including many plastics, a shopping cart, bicycle, cardboard and food wrappers. It's important to remove this material to improve water quality and protect fish and wildlife living in Sawmill Creek.



Volunteers at Sawmill Creek cleanup.



Pathfinders at the cleanup on the Stonebridge Trail.



Sawmill Creek South Keys Cleanup.

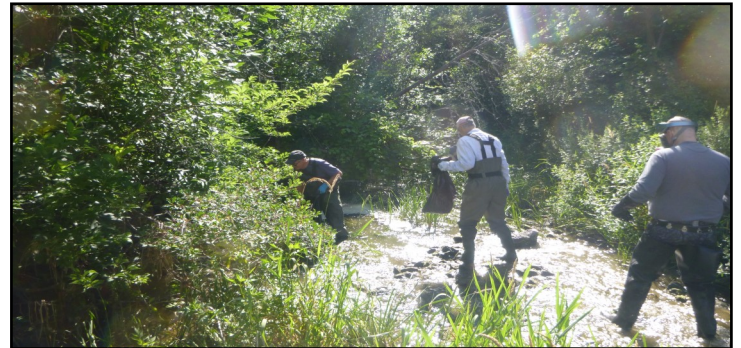


CSW volunteers and staff after the cleanup on Sawmill Creek.

## RVCA Garbage Cleanups continued

### July 9th Barrhaven Creek Cleanup

A group of volunteers with City Stream Watch completed a cleanup of Barrhaven Creek and the areas along the stormwater management facility. A small group spent 21 volunteer hours removing garbage from this location of Barrhaven Creek. In total, 250m of shoreline was cleared and 95kg of garbage was removed.



Volunteers in the Barrhaven Creek cleanup.

### July 30th Sawmill Creek Cleanup at Gloria Avenue

A large group of City Stream Watch volunteers and staff completed a cleanup. A group of 20 volunteers and two staff members cleared 900m of shoreline near Heron Park adjacent to Gloria Avenue. The focus of the cleanup effort was along the creek itself and in the adjacent pathway network along Sawmill Creek. Individuals spent 60 volunteer hours in total cleaning up the system with the goal of improving water quality and habitat for fish and wildlife.



Volunteers and garbage removed by the cleanup of Sawmill Creek.

### August 17th Jock River Cleanup at the Landing - Hilco Group

The Hilco group cleanup event for employees was organized as an opportunity to volunteer with the City Stream Watch program. They selected a cleanup opportunity on the Jock River where it flows into the Rideau River. Fifteen employees spent a total of 45 volunteer hours removing multiple bags of garbage. A 280m of shoreline was cleared of garbage along the Jock River.



Hilco group members removing garbage at the cleanup along the Jock River.

### September 23rd Sawmill Creek Fall Cleanup at Towngate Mall

The Moderna Niagara Cleanup event was organized as a special event at the Towngate Mall as an employee volunteer event. Thirteen individuals spent a total of 26 volunteer hours clearing 300m of shoreline behind the Towngate Mall. A significant amount of garbage was removed from the creek and the banks. Garbage including several tires and a large amount of plastics was pulled out of the creek.



Moderna Niagara employees and garbage removed from the cleanup at Sawmill Creek.



## 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 events in which they participate.

### May 28th Spring Volunteer Orientation

In the spring, City Stream Watch held its 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. Thirty one volunteers, the largest number in recent years, attended the event. Due to its size, the group was divided into two sections. 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.



Discussion on how to complete a stream survey with volunteers during the spring volunteer orientation on Sawmill Creek.

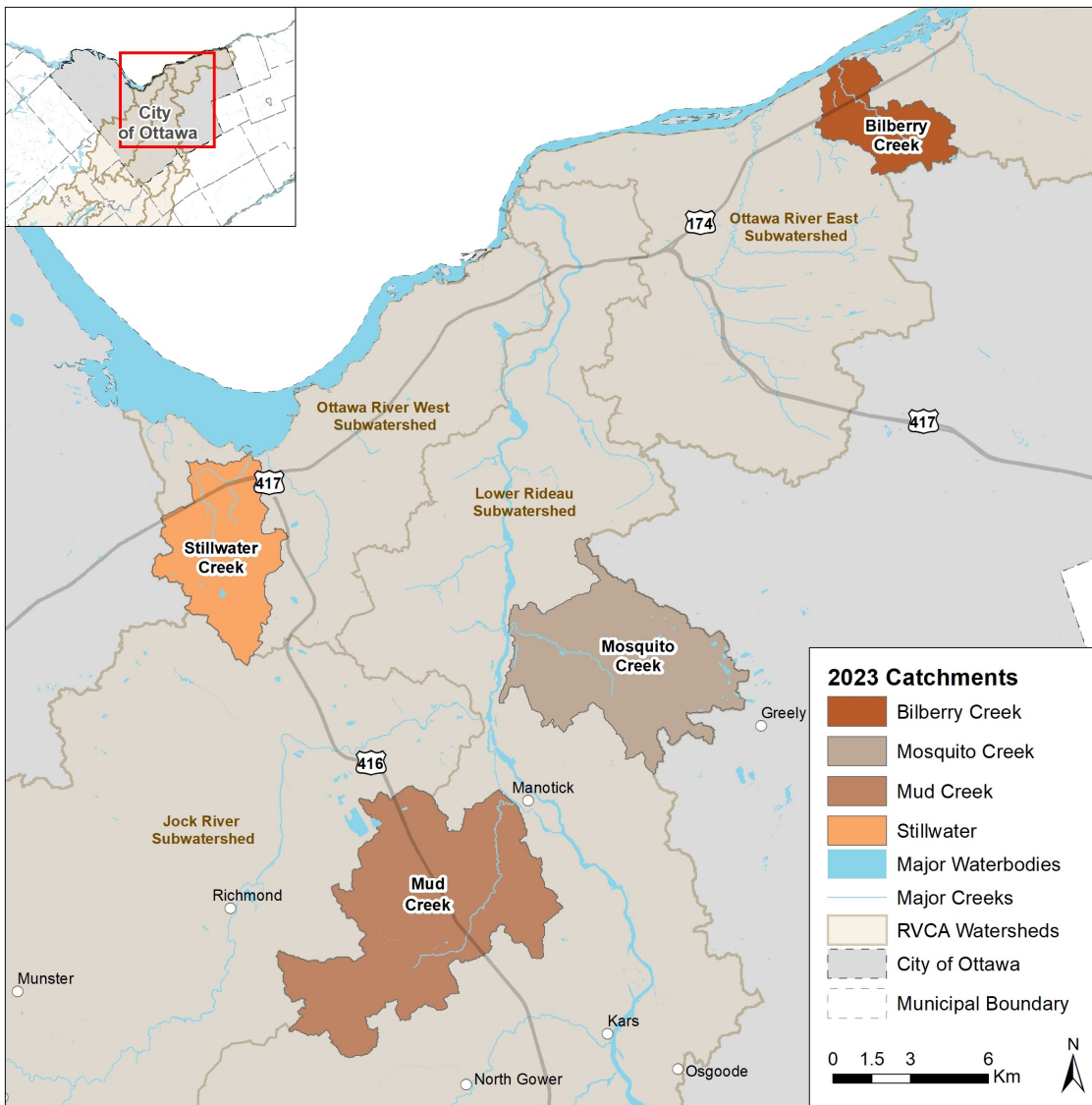
## RVCA Plans for 2023

In 2023 as part of our City Stream Watch program we will be monitoring the following creeks:

- Mosquito Creek
- Bilberry Creek
- Mud Creek
- Stillwater 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 2023.

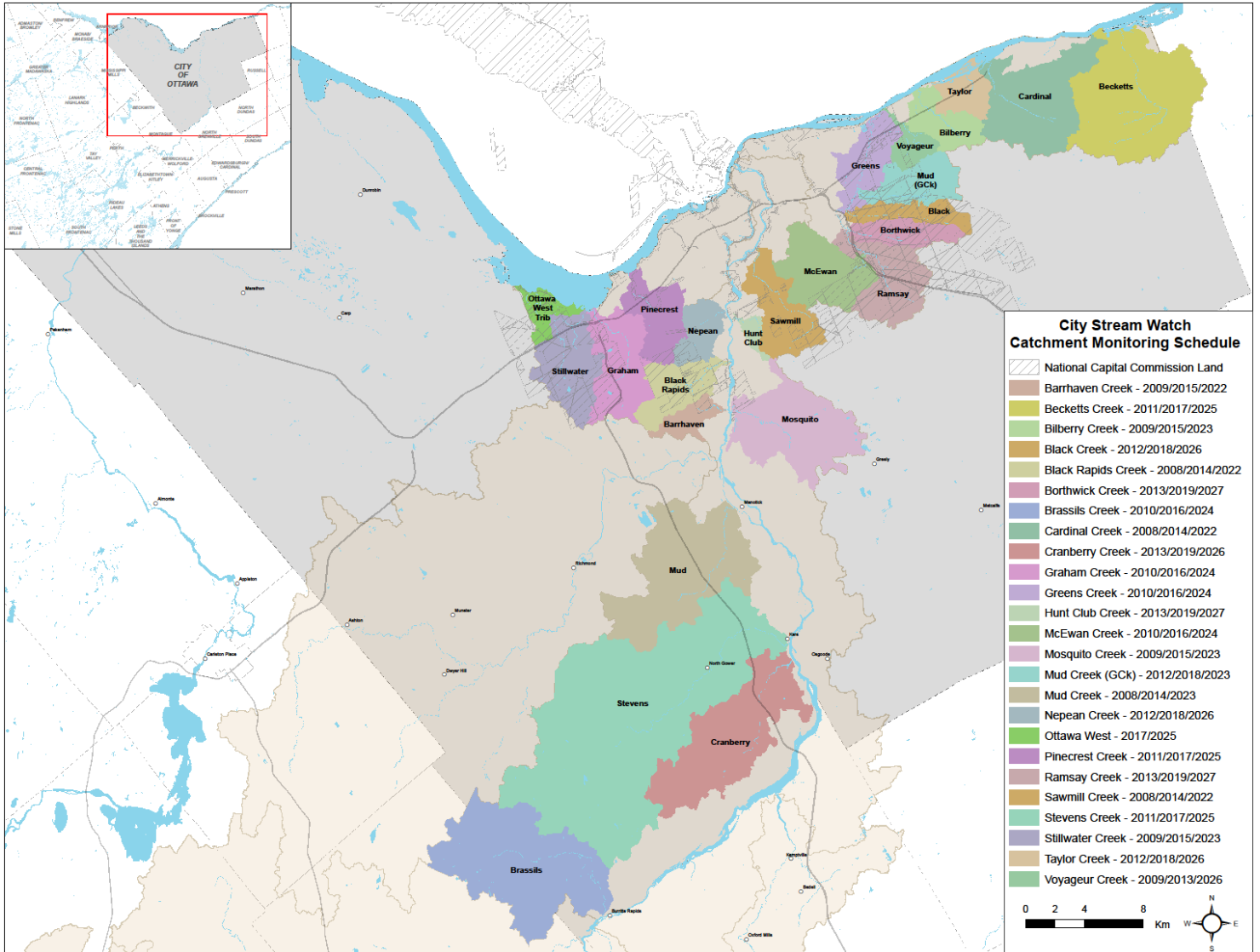
To volunteer with RVCA’s City Stream Watch program, please visit [rvca.ca](http://rvca.ca) or contact:  
City Stream Watch Coordinator

(613) 692-3571

[citystreamwatch@rvca.ca](mailto:citystreamwatch@rvca.ca)

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

## RVCA City Stream Watch Monitoring Schedule



**Figure 8** RVCA City Stream Watch catchment locations and monitoring schedule.



## Acknowledgements

A big thank you to all of our 2022 **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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