Together let's take action to protect Gatineau Park!

Citizen Science in Gatineau Park

2019-2020 Report

Program carried out in collaboration by the Friends of Gatineau Park and the National Capital Commission (NCC)

Les Amis du parc de la Gatineau
Friends of Gatineau Park

CCN NCC | Parc de la Gatineau Gatineau Park

Table of contents

Citizen Science?

Citizen science is characterized by the collaboration between scientists and citizens, which results in the collection of data relevant to specific conservation issues, using recognised scientific protocols. For the Friends of Gatineau Park, this represents an opportunity to contribute to the ecological monitoring of park ecosystems and species and, as such, to park management overall. Citizen science also facilitates the development of a deeper connection between the public and the natural environment, and through this it encourages an interest in conservation.

Gatineau Park managers benefit from citizen science through additional information provided by an increased number of observers in the field and an increased frequency of observations. These activities also have the potential to bring to light conservation challenges or a need for an increased level of monitoring.

As for the public, these initiatives can serve as gateways to better understand nature, develop new expertise, and increase interest in natural areas and their conservation. Many participants to these citizen science programs indicate that their appreciation for nature has been enhanced and that they perceive nature differently when they perform outdoor activities.

Citizen Science with the Friends of Gatineau Park

For many years now, the Friends of Gatineau Park has offered scientists doing research in the Park or about the Park, the possibility of relying on its volunteers for help with their research projects. In 2016, in collaboration with the National Capital Commission (NCC), we decided to go further and create a Citizen Science Program which was launched in the spring of 2018.

The objective of this program is to offer memorable learning experiences and involvement opportunities regarding Gatineau Park conservation, while contributing tangibly to the latter. The program encourages users and visitors of the Park to participate in surveillance programs, research projects and ecological restoration initiatives.

We hope participants will gain enhanced comprehension and appreciation of the diversity, vulnerability and resilience of the ecosystems and species found in the Park and its ecological corridors; and that they will become ambassadors for the conservation efforts that are implemented. We also hope to determine how and to what extent participating in programs of this sort stimulates a sense of attachment to nature.

It is expected that the surveys from the Citizen Science Program will provide important data for the NCC biologists regarding the health of the Park's ecosystems and the species found there. The program's ecological restoration activities will also help to restore the Park's ecological integrity.

For this first year, three surveys and one control activity of invasive species have been held.

From 2018 to 2020, four monitoring activities, has well as one ecological restoration activity was implemented.

A first report for 2018 was published and is available on the Friends of Gatineau Park website at: https://www.friendsofgatineaupark.com/citizen-science.html.

The current report covers the activities in 2019 and 2020.

Frog Watch

What is an anuran?

Anura is an order of amphibians. In Quebec, this order comprises 10 species of frogs and one species of toad.

Why an anuran survey?

The anurans were chosen for a survey because their presence is an indicator of the quality of wetland habitats. More precisely, since anurans are very sensitive to many types of environmental disturbances, their presence or their absence in some habitats, and changes to their abundance, may indicate the presence of stress factors and threats to biodiversity.

Moreover, the western chorus frog is threatened by the loss of its habitat due to urbanization and the intensification of agriculture.

Methodology

Data collection

In the spring of 2019, the participants in this activity visited a total of 21 stations divided between five sectors. For each station, they noted the species heard and the intensity of their songs, as well as the presence of factors that could diminish the number of anurans singing at that time or that could impede the listening (temperature, rain, wind, and noise).

In 2020, this monitoring was not carried out due to the closure of Gatineau Park as per to the public health guidelines for COVID-19.

The following scale was used in the field to evaluate the abundance of each species heard:

- Level 0: no sound heard
- Level 1: individual songs that can be tallied separately;
- Level 2: a few individual songs that can be tallied separately, with other overlapping croaking;
- Level 3: chorus with croaking that cannot be tallied.

Each station was visited at least 3 times to reduce the effect of meteorological conditions potentially affecting the anurans' degree of activity.

Analysis

The following aspects were analyzed: abundance of each species by sector, frequency of observation, and diversity.

Abundance by sector

We transformed the data collected by listening, into an abundance index for each sector. To do this, the highest song intensity of each species, at each station, was retained. Then, for each species and every level, the number of stations for which this level was the maximum intensity was calculated. We then obtained the abundance index by multiplying the results by the constants used in the NCC surveys. This essentially converts the recorded intensity to a more representative order of magnitude. The index must not be mistaken for the number of individuals.

List of sectors:

- 1 (PG3): Eardley Escarpment
- 2 (PG4): Meech Creek Valley
- 3 (PG5): Eardley Plateau (parkways)
- 4 (PG6): Dennison Dam
- 5 (PG7): Lac-des-Fées

Frequency of observation

The frequency of observation for each species was calculated by dividing the number of stations where each species was heard by the total number of stations (21) and multiplying all by 100.

Rate of observation = (N obs. / N tot.) x 100
Where: N obs. = number of stations where the species was heard
N tot. = total number of stations for all sectors

Diversity

The modified Shannon-Weaver index was used to evaluate the diversity of the species present on the studied sites.

This index takes into account not only the number of species present, but also the relative abundance of these species. To illustrate the importance of this approach, imagine walking into a wooden area comprised of 5 species of trees in the following numbers: 100 sugar maples, 100 yellow birch, 75 silver birch, 75 American beech and 75 American basswood. Then, imagine walking in another wooden area with the same species but in the following numbers: 410 sugar maples, 5 yellow birch, 5 silver birch, 3 American beech and 2 American basswood. The two areas have the same number of species (5) and the same number of trees (425), but the first one has a far greater diversity.

Modified Shannon-Weaver index

The modified Shannon-Weaver index is expressed in the following way:

$$H = -\sum [(Ni/N) \times \ln(Ni/N)]$$

N_i = relative abundance score for the target species
N = overall index of abundance (sum of relative abundance scores for all species)
ln = natural logarithm to the base e, Euler's constant = 2,71828
∑ = product of the multiplication (Ni/N) x ln(Ni/N) repeated as many times as there are identified species

This index produces values between 0 and 3 and its superior limit indicates maximum biodiversity.

Results 2019

Abundance by sector

Anura Table 1: Abundance index by sector*

Species	1 (PG3)	2 (PG4)	3 (PG5)	4 (PG6)	5 (PG7)
American toad	0	15	0	0	5
Gray treefrog	20	25	0	75	0

Anura Table 1: Abundance index by sector*					
Species	**1 (PG3)**	**2 (PG4)**	**3 (PG5)**	**4 (PG6)**	**5 (PG7)**
Spring peeper	16	30	60	60	16
Western chorus frog	11	0	0	20	0
Bullfrog	0	0	0	0	0
Green frog	5	0	1	2	0
Pickerel frog	0	0	0	0	0
Leopard frog	1	0	0	0	0
Mink frog	0	1	0	0	0
Wood frog	0	0	0	0	0

*Note: the abundance index must not be mistaken for an estimate of the number of individuals.

Frequency of observation

Anura Table 2: Frequency of observation	
Species	**Rate (%)**
American toad	9.52
Gray treefrog	23.81
Spring peeper	66.67
Western chorus frog	23.81
Bullfrog	0.00
Green frog	19.05
Pickerel frog	0.00
Leopard frog	4.76
Mink frog	4.76
Wood frog	0.00

Diversity

With the abundance index by sector [Anura Table 1], we were able to calculate the relative abundance scores (Ni) by adding up the former [Anura Table 3], and the global abundance index (N) by adding up the relative scores [Anura Table 3].

Anura Table 3: Calculation of Ni and N							
Species	**Abundance by sector**					**Ni**	**N**
	1 (PG3)	2 (PG4)	3 (PG5)	4 (PG6)	5 (PG7)		
American toad	0	15	0	0	5	20	276
Gray treefrog	1	1	0	31	0	33	
Spring peeper	16	30	60	60	16	182	
Western chorus frog	11	0	0	20	0	31	
Bullfrog	0	0	0	0	0	0	
Green frog	5	0	1	2	0	8	
Pickerel frog	0	0	0	0	0	0	
Leopard frog	1	0	0	0	0	1	
Mink frog	0	1	0	0	0	1	
Wood frog	0	0	0	0	0	0	

Then, we calculated the Shannon-Weaver index for each species.

Modified Shannon-Weaver Index

$$H = -\sum [(Ni/N) \times \ln(Ni/N)]$$

Anura Table 4: Shannon-Weaver Index		
Species	**ln(Ni/N)**	**Shannon-Weaver (H) Index**
American toad	-0.19	1.07
Gray treefrog	-0.25	
Spring peeper	-0.27	
Western chorus frog	-0.25	
Bullfrog	0.00	
Green frog	-0.10	
Pickerel frog	0.00	
Leopard frog	0.00	
Mink frog	0.00	
Wood frog	0.00	

The value of the Shannon-Weaver index obtained for all of the sites and species included in the survey is 1.07. It was 1.13 in 2018.

Discussion

According to the 2019 results, the spring peeper was the most abundant species. The results also suggest that the gray treefrog, the western chorus frog and the American toad are also more abundant than the other species. No calls were heard from bullfrogs, pickerel frogs or wood frogs.

The results from this second year of monitoring in 2019 also vary in other ways from the results of 2018. The global abundance index increased by a value of 70, suggesting an increased in the general abundance.
The increase in the relative abundance of the gray treefrog is notable considering that there was only one observation for this species in 2018.

With regards to the bullfrog, no individuals were heard during the 2019 monitoring contrary to 2018.

Finally, the fact that the Shannon-Weaver index went from 1,13 in 2018 to 1,07 in 2019, could indicate a decrease of species diversity between the two years.

The COVID-19 pandemic resulted in the activity being canceled for 2020 and since the activity looks at variation in time, it is impossible with only two years of data collection to make any scientific conclusions. However, it is possible to observe that there have been changes to frequency of observations and global abundance index.

Since some of the stations used by the NCC in the implementation of the protocols in previous years were not included in the citizen science program due to their remoteness, it is not possible to compare the Shannon-Weaver index from this activity to the results obtained by the NCC. However, it will be possible to continue to compare results of the citizen science program from year to year and this information will complement data collected by the NCC.

Common Loon Survey

photo: Claire Banville

Why a survey of the common loon?

The common loon has been chosen because of its requirements in terms of habitat and its sensitivity to human activity on lakes. Its presence or absence can thus be an indicator of the impacts of aquatic recreational activities and pollution on the target lakes.

Methodology

In 2019, as in 2018, participants in the Common Loon survey visited: Meech Lake (4 outings), Philippe Lake (6 outings) and Taylor Lake (9 outings). In 2020, the three lakes were also studied: Meech Lake (5 outings), Philippe Lake (6 outings) and Taylor Lake (9 outings).

In 2019, monitoring at La Pêche was added to the activity. As the lake covers a greater area, a group outing was organized, the lake being divided in 5 sections each covered by a pair of observers using the same approach as for the other lakes.

In 2020, similar approach was used for La Pêche Lake with 5 teams covering the Lake over one weekend in July and three teams over a weekend in August.

For each visit, the participants patrolled their lake in a canoe/kayak and noted the presence and location of adults and young. Factors that may have diminished the chances of seeing loons were also noted (e.g., wind, rain and temperature).

The collected data mainly allowed the use of these lakes for reproduction to be determined by the presence of couples.

To be able to follow the evolution of the presence of couples over time, the number of adults observed was converted into equivalent couples (1 adult observed = 1 couple, 2 adults observed = 1 couple, 3 adults observed = 2 couples). This accepted method considers the possibility that individuals observed alone during nesting season can form a couple with an individual not seen.

The highest number for equivalent couples observed on the same visit, for each lake, was retained. The data thus obtained for each lake was added up to obtain the indicator value.

Results

Common loon table : Equivalent couples - 2019				
Lake	**Date of outing**	**Observations of adults**	**Equivalent couples**	**Total of equivalent couples**
Meech	June 29, 2019	2	1	**4**
		2	1	
		2	1	
		1	1	
Philippe	July 13, 2019	1	1	**3**
		1	1	
		2	1	
Taylor	May 30, 2019	2	1	**1**
		REFERENCE VALUE (2019)		**8**

Common loon table : Equivalent couples - 2020				
Lake	**Date of outing**	**Observations of adults**	**Equivalent couples**	**Total of equivalent couples**
Meech	July 31, 2020	1	1	**5**
		1	1	
		1	1	
		1	1	
		1	1	
Philippe	July 31, 2020	1	1	**2**
		2 + young	1	
Taylor	June 29, 2020	2	1	**2**
		1	1	
		REFERENCE VALUE (2020)		**9**

Here is the date for La Pêche Lake for 2019 and 2020.

Common loon table : Equivalent couples - 2019				
Lake	**Date of outing**	**Observations of adults**	**Equivalent couples**	**Total of equivalents couples**
La Pêche	June 19, 2019	1	1	**7**
		2	1	
		2	1	
		2	1	
		2	1	
		2	1	
		2	1	
REFERENCE (2019)				**7**

Common loon table : Equivalent couples - 2020				
Lake	**Date of outing**	**Observations of adults**	**Equivalents couples**	**Total equivalents couples**
La Pêche	August 7 and 8, 2020	1	1	**10**
		5	3	
		2	1	
		1	1	
		1	1	
		4	2	
REFERENCE (2020)				**10**

photo: Claire Banville

photo: Claire Banville

Discussion

The data collected allowed for calculation of a reference value of 8 equivalent couples for all three lakes in 2019 and of 9 equivalent couples in 2020. This reference value was of 9 equivalent couples in 2018.

The decrease in 2019 was mainly due to the number of equivalent couples on Meech Lake, which went from 5 to 4. The question was, would this trend maintain itself in 2020, but as observed, the number of equivalent couples went back to 5 for Meech Lake in 2020.

The number of equivalent couples at Philippe Lake went from 3 in 2018 and 2019 to 2 in 2020. This variation will also be followed in coming years.

As for Taylor Lake, contrary to 2018, when one solitary adult was observed during only one outing, one equivalent couple was observed during the 5 outings in 2019, and 2 equivalent couples during two outings in 2020. In addition, one adult on the nest was also observed on July 2, 2019. It will be interesting to see if these numbers are maintained in the coming years.

The group approach used for La Pêche Lake allowed for a better area coverage. Loons were observed in all the zones assigned, including the shallower areas at the north end of the lake.

Monarch Mission

Why a survey of the monarch butterfly?

Who hasn't heard of the monarch? Each Fall, this butterfly migrates from our latitudes toward the south (those from our region migrate to Mexico while those from the West migrate to California). In those wintering areas, it is the degradation and fragmentation of the habitat that threatens it, while in the rest of the United States and Canada, it is the use of herbicides. Their use causes the decline of milkweed, the only source of nourishment for the monarch caterpillar, and of the nectariferus plants the adults rely on. The neonicotinoid pesticides are also an emerging threat, the importance of which is not yet well understood (COSEWIC, 2016).

In 1997, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) declared the monarch to be a species of special concern. In 2016, it was declared an endangered species.

In 2015 and 2016, the NCC evaluated potential monarch habitats in Gatineau Park and its urban lands in Quebec. This evaluation made it possible to identify the monarch's potential habitats, estimate the milkweed density, keep watch on the monarch population and identify the main threats. The data was later used to map the importance of open habitats for the monarch and formulate recommendations as to how to improve the habitat area and the quality of these habitats for the monarch on the Park's territory. As in 2018, monarch monitoring in 2019 and 2020 allowed for the evaluation of the monarch's density at two sites identified in Gatineau Park. One of the sites (Gamelin sector) was the same as in 2018 and the other was a new site chosen by the NCC in the Meech Creek Valley.

Methodology

The methodology used for this monitoring is the one used for Mission Monarch. Following the lead of the Insectarium – Space for Life, Monarch Mission is a citizen science program that documents the reproductive success of the monarch. The program is part of an international effort of research and education seeking to protect the migratory populations of this species at risk.

Since many generations of monarchs follow each other during the summer, the dates for the two group outings were chosen to coincide with an overlapping of generations.

In 2019, the first outing that took place in July, was conducted near the P3 parking lot (Gamelin sector), as it was in 2018. In 2019, this outing coincided with an international monarch observation blitz. In 2020. this first outing was conducted near the P16 parking lot in the Meech Creek Valley.

The second outing in August took place in the Meech Creek Valley in 2019 and in the Gamelin sector in 2020.

Alternating between sites has a counter-balancing effect, distributing the impact of variables that can impact the observations. Weather conditions and temperature are common examples of such variables.

In addition, specific to this monitoring, the egg-laying period also has an influence on observations, so if the outings at each site are always during the same period, it could impact the number of eggs vs. the number of caterpillars.

At each of these sites, the parcels of land were divided in subsectors, and teams of participants examined each milkweed plant individually noting the presence of eggs, caterpillars (and the caterpillar stages) and the *Aphis nerii* parasite. The presence of adults flying over the parcels was also noted.

The number of milkweed plants and the temperature in the shade were also recorded.

In 2019 and 2020, the data collected as part of this program was also included in the Monarch Mission database.


photo: Estelle Rother

Results

Monarch Table 1: Results from July 27, 2019 outing (Gamelin Sector)										
	Temp. in the shade	Eggs	Caterpillars (Instar)					# dead[1]	# adults[2]	# milkweed plants	*Aphis nerii*
			1	2	3	4	5				
	21-29°C	23	0	2	3	1	0	2 eggs	2 (I)	1524	No
Results from August 16, 2020 outing (Gamelin Sector)											
	Temp. in the shade	Eggs	Caterpillars (Instar)					# dead[1]	# adults[2]	# milkweed plants	*Aphis nerii*
			1	2	3	4	5				
	20-24°C	0	2	0	0	0	0	2 eggs	1 (I)	959	Yesi
Monarch Table 2: Results from August 11, 2019 outing (Meech Creek Valley)											
	Temp. in the shade	Eggs	Caterpillars (Instar)					# dead[1]	# adults[2]	# milkweed plants	*Aphis nerii*
			1	2	3	4	5				
	18-24 °C	3	3	6	1 2	3	3	4 eggs	3 (I)	1516	No
Results from July 25, 2019 outing (Meech Creek Valley)											
	Temp. in the shade	Eggs	Caterpillars (Instar)					# dead[1]	# adults[2]	# milkweed plants	*Aphis nerii*
			1	2	3	4	5				
	24-28 °C	13	3	6	1	0	0	0	6 (I)	547	No

[1]Number of dead eggs and larvae

[2]Number of adult monarchs (F= female, M = male, U = uncertain)

Discussion

In 2018, a challenge presented itself in that for the organizers and many participants, this was their first experience with this monitoring and very few magnifying glasses were available. This made egg identification in particular quite difficult. With the experience gained since, organizers and participants were better prepared, allowing for more confidence in the results.

Between 2018 and 2019, the observation rate, all stages combined (number of observations divided by the number of milkweed plants), in the Gamelin sector went from 0,84% à 2,03%. Maxim Larrivée, Section Chief for Entomological Collections and Research at the Montréal Insectarium indicated that in 2019 the chances of finding monarchs looking for milkweed plants on which to lay eggs were very good.

In 2020, this rate in the Gamelin sector went down to 0,31%. Participants noted the decrease in the number of milkweed plants in this area, the presence of smaller plants and the increased abundance of invasive species, which in certain areas dominate the plant cover.

For the Meech Creek Valley site, the observation rate in 2019 was 2,17% and 5,30% in 2020.

As recommended by Monarch Mission, the results for the total number of caterpillars for the 2 sites were combined and it was noted that the observation rate went from 1,15% in 2019 to 0,92% in 2020, a decrease of 20% for the estimated Monarch population. Such decrease was also observed in the wintering sites. According to date collected by the World Wildlife Fund Mexico, in collaboration with CONANP (Comisión Nacional de Áreas Naturales Protegidas) and the Monarch Biosphere Reserve, the area occupied by monarchs decreased by 53% between winter 2019 and winter 2020. This trend is similar to the one found on the Monarch Mission website for observations in Québec between summer 2019 and summer 2020

In March 2021, the survey carried out at their wintering sites indicate a decrease of 23% in the Monarch population. Data from 2021 will determine if this decrease is also reflected in the summer results.

Control of the lesser periwinkle

To respond to observed threats with concrete actions, an ecological restoration activity was including in the program at its onset in 2018. Since invasive species are an important threat in many areas of the Park, its managers identified a problem species that could be controlled by teams of volunteers: the lesser periwinkle.

This plant species weaves a carpet of individual plants where it takes root and stops the indigenous species from re-establishing themselves. By eliminating it with mechanical means (without using chemicals), and by replacing it with resistant indigenous species, we hope to achieve a sustainable ecological restoration without harming the surrounding species. This method has been used successfully for similar initiatives. We may also conduct tests, in the future, to evaluate its efficiency in regard to the different types of propagation of the lesser periwinkle (rhizomes and seeds).

This part of the Program fits into the NCC's third area of action in the fight against invasive alien species[1]: *Managing invasive alien plants that are already established or spreading*.

Methodology

Site selection: the site was chosen for its natural character and the proximity of vulnerable plants.

As in 2018, a half day outing was organised in 2019 for the general public. It was followed by a second outing organised in collaboration with a partnering group.

In 2020, due to the public health guidelines related to COVID-19, the activity still took place but with pairs of participants working in the area at different moments over a period of two weeks in October.

[1] The NCC's three areas of action are

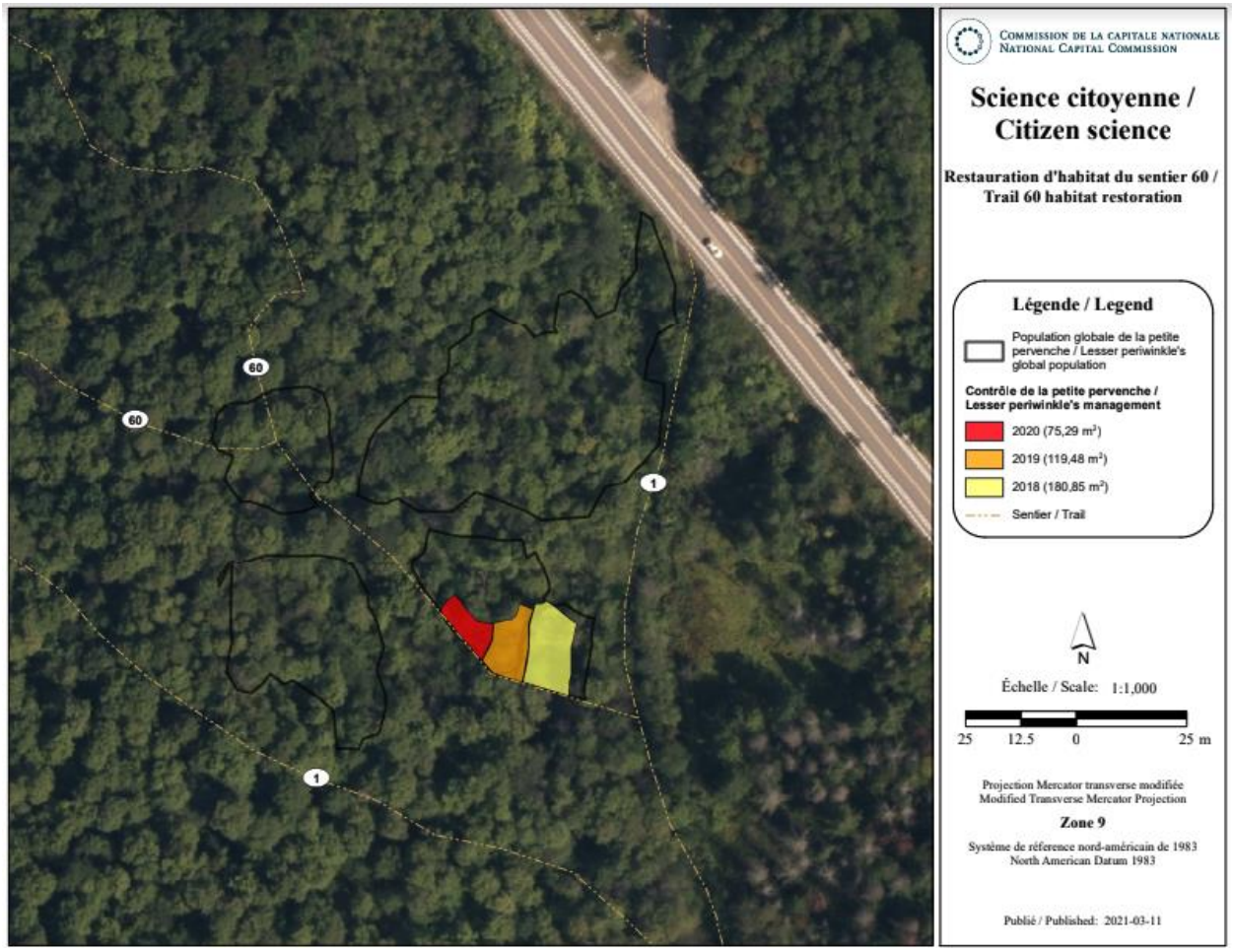
1. Preventing the introduction of harmful plants on our lands
2. Detecting invasive alien plants and taking quick action
3. Managing invasive alien plants that are already established or spreading on our lands.

In both cases, the removal was done by hand and the plants were placed in garden bags to be disposed of outside the Park.

The geotextile sheets were installed in Spring 2019 and Fall 2020 to prevent the regrowth of the periwinkle in the restoration area. The sheets are still in place to ensure that the plant debris dry up under the sun before the planting of indigenous species can take place, likely in Spring 2021.

Results

The map shows the results of the work carried out since 2018.



Discussion

After three years of periwinkle control, the results are apparent. A total area of 375 m^2 was cleared during these first three years. The participation and involvement of dedicated volunteers year after year have contributed to the elimination of this invasive species on a portion of the area it occupies and has paved the way for ecological restoration.

Animal Tracks Inventory

Why an inventory in winter?

The Animal Tracks Inventory is one of the activities under the Citizen Science in Gatineau Park program. This winter activity allows for a better understanding of the use by larger predators, such as coyotes, lynx, martens or fishers, of the ecological corridors that connect Gatineau Park to other natural areas surrounding the Park. The ecological connections between the Park and these natural areas are important for the health of these species and contribute to the ecological integrity of the Park.

This activity started in February 2019 and continued in 2020. It also complements the study carried out by University of Ottawa students under the supervision of NCC biologists. This study has been going on since 2016.

Methodology

Five ecological corridors were chosen in the southern part of Gatineau Park for the implementation of the Animal Track Inventory. The corridors that are inventoried as part of a study from the University of Ottawa are located in more northern sectors.

In 2019, the corridors were visited on 6 occasions in February and March. In 2020, they were visited on 5 occasions during the same period, the closure of the Park due to COVID-19 resulting in the cancellation of the last week of outings.

During each outing, participants travel along the trail found in each corridor on snowshoes, cross-country skis or on foot. For each outing, participants take note of basic weather data, snow depth and texture, and general observation conditions.

As they travel along the trail, they take note of the types of animal signs found in the snow: mainly tracks but also scats, signs of browsing others.

The list of species of interest to the Park includes the: coyote, lynx, marten and fisher. However, tracks from other predators are also noted: fox, otters, weasel, for example. Each observation is accompanied by GPS coordinates and photos to help validate the data.

As for prey species: deer, hare, rabbit, squirrels, small rodents, etc. participants compile their observation by indicating a level of abundance:

1. fewer than 5 tracks observed
2. between 5 and 10 tracks observed; and
3. more than 10 tracks observed.

Identifying animal tracks in the snow is not an easy task and takes practice. The data collected by the participants, along with the photos, are validated before being included in the final report.

Results

The following tables present the results for tracks of predators observed in 2019 and 2020.

	Corridors - 2019					
	Aylmer	Champlain - Voyageur	Philemon - Leamy	Chelsea Creek	Wakefield and northeast	Number of observations in all corridors
Species	Number of tracks					
Coyote	5	0	2	0	0	7
Wolf	0	0	0	0	1	1
River Otter	0	0	0	0	0	0
Lynx	0	0	0	0	0	0
Marten	0	0	3	2	4	9
Black bear	1	0	0	0	0	1
Fisher	12	1	13	2	10	38
Red fox	8	10	4	3	1	26
Mink	1	0	0	0	0	1
	Estimated # of individuals per corridor					
	27	11	22	7	16	
	# of different species per corridor					
	5	2	4	3	4	

	Corridors - 2020					
	Aylmer	Champlain - Voyageur	Philemon - Leamy	Chelsea Creek	Wakefield and northeast	Nombre de présence de l'espèce dans les corridors
Species	Number of tracks					
Coyote	9	0	4	2	0	15
Wolf	0	0	0	0	0	0
River otter	0	0	0	0	0	0
Lynx	0	0	0	0	0	0
Marten	0	3	0	2	1	6
Black bear	0	0	0	0	0	0
Fisher	1	2	3	6	4	16
Red fox	1	7	3	5	[7]	23
Mink	0	0	0	0	2	2
	Estimated # of individuals per corridor					
	10	5	7	10	7	
	# of species per corridor					
	2	2	2	3	3	

Discussion

The Animal Track Inventory seeks to estimate the abundance and activity of target species in the corridors being monitored. After a few years of monitoring, it will be possible to analyze medium term trends. For now, it is only possible to notice the changes between 2019 and 2020 and how observations went down from 83 in 2019 to 62 in 2020.

The canceled outings due to COVID-19 could possibly explain this decrease between the two years. However, other causes shouldn't be overlooked. The misidentification of a track could result in a positive or negative effect. It is possible that the data from 2019 might have been over evaluated and those of 2020 under evaluated and vice versa. It is important to consider that some tracks could have been recorded as made by different individuals but would actually be from the same individual moving through the area. In addition, weather conditions can make the identification of tracks more difficult. Precipitations or the freezing of the snow surface the day before are factors that contribute to making identification more challenging. Clear and precise conclusions cannot be made at this time but ongoing monitoring and additional results will help determine a trend.

Conclusion

2018 marked the first edition of the program *Citizen Science in Gatineau Park* coordinated by the Friends of Gatineau Park and the National Capital Commission.

Even in its first year, results related to frogs, loons and monarchs allowed for some insights as described in the first report. These results also provided the reference values for the various monitoring activities. Participation in the control of periwinkle also allowed to initiate steps towards ecological restoration.

Through the year, the importance and contribution of this program become more obvious. The results are concrete and appreciable.

Thanks to the participation and efforts from the participants, the program continued in 2019 and 2020. As such, it allowed the program to start looking at trends and to complement the monitoring carried out by the NCC usually at longer intervals. The extraordinary circumstances in 2020 resulted in changes to the program with the cancellation of the FrogWatch activity and adjustments to others to respect government guidelines. Despite these obstacles, the program moved forward so that it can continue to provide park biologists and managers complementary scientific data.

The results of these activities as described in this report encourages both the Friends of Gatineau Park and the NCC to continue to implement and add to the program in the coming years.

Finally, this program would not be possible without the contribution of all the participants who help ensure its implementation and viability. Thank you!

Photo Credits

We would also like to thank our photographer participants for their pictures. The photos in the present report were taken by:

- Claire Banville;
- Estelle Rother; and
- Simon Landry.