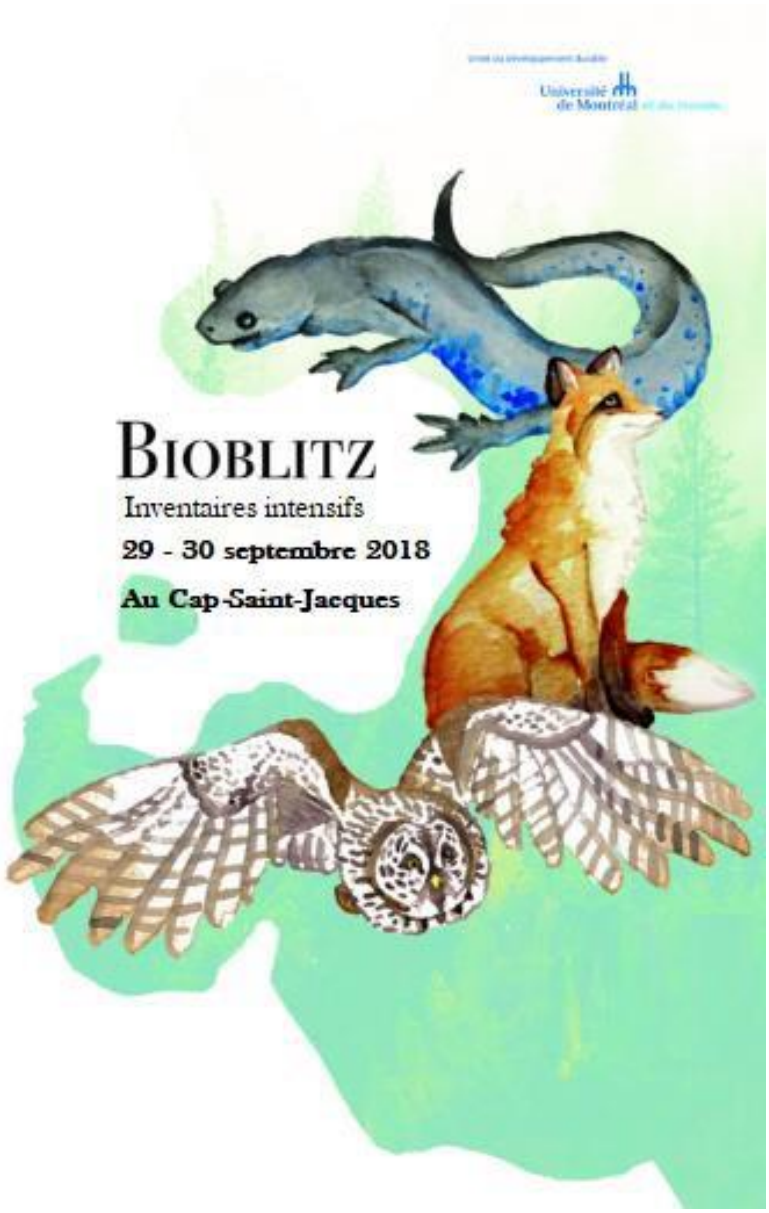
Bioblitz Report: September 29 and 30, 2018 in Cap-Saint-Jacques



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Lists of abbreviations

UdeM: Université de Montréal

UDD: Sustainable Development Unit GG:

Gérald-Godin

APEVIB: Association pour la protection des espaces verts de l'Île Bizard

SGPVMR: Service des grands parcs, du verdissement et du Mont-Royal

GCQ: Groupe des Chiroptères du Québec

HL: Laurentian Heritage

GUEPE: Groupe Uni des Educateurs et Professionnels de l'Environnement (United Group of Environmental Educators and Professionals)

List of Appendices

Introduction

A bioblitz is the realization of numerous biological inventories in a short period of time in partnership with scientific experts, naturalists and the community. Designed as part of a rapid biological survey and public awareness activity, Bioblitzes bring a group of scientists and naturalists into a local, often urban, community to compile a snapshot of the biodiversity present there.

a) Context and general objectives

The Université de Montréal (UdeM) has been involved in biodiversity for several years now and has adopted a 2012-2020 biodiversity action plan, the last axis of which consists of "Mobilizing and raising community awareness about biodiversity". The bioblitzs meet this objective by meeting three (3) sub-objectives of the action plan's axis, namely the "creation of a large volunteer force", the "realization of educational workshops for the general public, elementary schools and day camps", as well as the development of "partnerships with local stakeholders (Amis de la montagne, Biodôme, Espace pour la Vie, Éco-Quartier, Table Jeunesse, community and environmental organizations and many others)". In fact, the various bioblitzes that have taken place in connection with the UdeM since 2013 are still organized and led by volunteers from various backgrounds: students (university and CEGEPs), environmental organizations, citizens, biologists, etc.

These are inter-order events that involve the University and some CEGEPs. The main objectives are the following:

- Documenting biodiversity in a delimited area (generating new data and/or confirming and strengthening existing biodiversity data)
- Raise awareness of the importance of this one.
- Allow students to refine their inventory techniques
- Fostering exchanges between experts and the community
- Contribute to large databases, such as Canadensys, DarwinCore, etc.

- Make UdeM's academic programs known, especially the biological sciences and potentially the geography department.

b) Presentation and objectives of the bioblitz 2018

The bioblitz in Cape St. James in the fall of 2018 therefore followed this model. It was organized by the Sustainable Development Unit of the UdeM (UDD), in partnership with the Cégep Gérald-Godin (GG). This bioblitz was in fact an integral part of a final year course (Environment, Microbiology and Biotechnology 101-3XV-GG) focused on experimentation, which should enable students to develop eco-citizen skills and acquire technical and theoretical knowledge to observe and understand the structure of ecosystems and the relationships between organisms and their biotic or abiotic environment. The professor (Marie-Catherine Fournier) has therefore chosen to integrate the bioblitz as a field placement in the course.
The professor and a UDD employee took charge of the logistical organization of the bioblitz, and the students participated in the development of the protocols, data collection and transcription following the bioblitz.

The bioblitz took place in the solitude sector at Cap-Saint-Jacques (see Fig.1) on September 29 and 30, 2018. This was the second bioblitz at this time of the year in the same area (although last year the bioblitz took place a little later in the season - end of October).

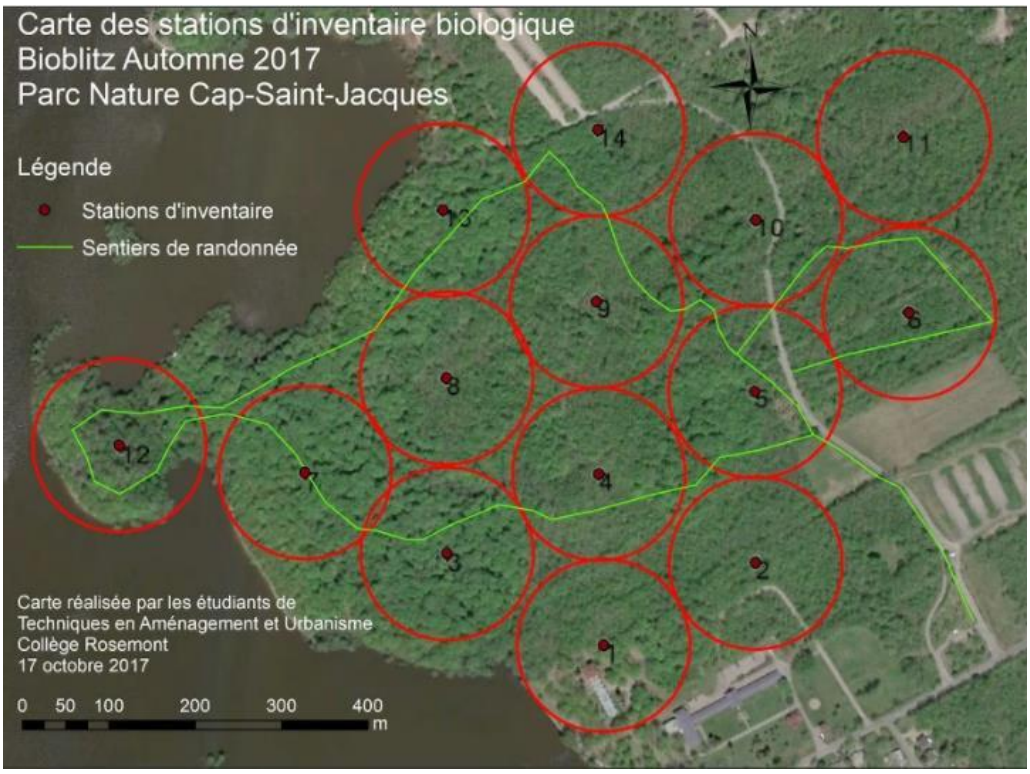


Figure 1: Map of Biological Inventory Stations, Bioblitzs 2017 and 2018

This inter-order project therefore had two main objectives:

- Continue to document biodiversity in the area of solitude in Cap-Saint-Jacques
- To interest the student community (university and college) as well as the public in the importance of this biodiversity and inventory techniques.

I - Review of the organization of the bioblitz 2018

This section reports on the organization of the bioblitz and therefore focuses on the elements to be taken into account for the organization of a similar event.

a) Calendar of activity development

May 2018: beginning of contacts between the UDD, the professor of the CEGEP GG, and the APEVIB, an association for the protection of green spaces on Île Bizard (where the bioblitz was originally planned).

Early to mid-August 2018: resumption of the organization (beginning of the CEGEP course) - choice of the date jointly with the students involved in the organization - reflection on areas to be inventoried on Île Bizard

August 13: First contacts with the City (the SGPVMR) to obtain the Licence of Occupation on Île Bizard on the dates chosen.

August 16: City's refusal to perform a Bioblitz in areas under the jurisdiction of the SGPVMR on Île Bizard

September 7, 2018: Obtaining the occupancy contract to go and do the bioblitz at Cap-Saint-Jacques (Solitude sector) (see Appendix 1)

September 2018: launch of invitations (environmental organizations, press release within the UdeM Biology Department, etc.) + search for materials + development of protocols September 11, 2018: first field visit with GG students

September 28, 2018: second field visit with GG students: setting up of flags in each zone

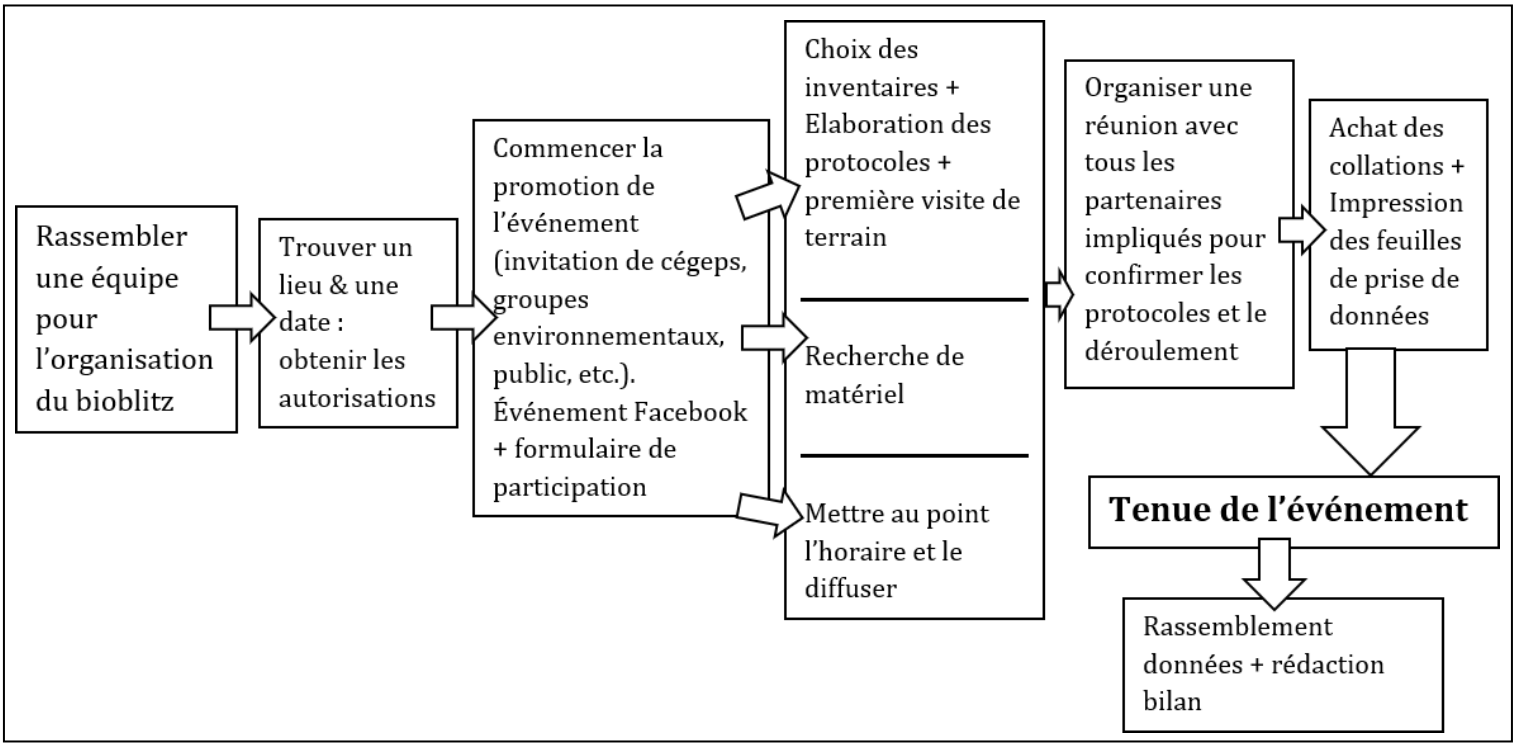


Figure 2: Steps in the organization of a bioblitz

Recommendations

• The bioblitz should be carried out early in the season to increase the inventory potential (especially for flora, insects, migratory birds). However, as the bioblitz is an inter-order event, the date depends largely on the school calendar and this recommendation is difficult to implement. Indeed, students - from CEGEP as well as university - are often not available during the summer.

• The application for a Licence of Occupation must be made within a fairly broad time frame for the City's territories under the jurisdiction of the SGPVMR: the City has advised us to start the process three (3) months in advance in order to obtain a Licence of Occupation. In fact, this year, determining the location of the bioblitz was a big challenge and we obtained the City's authorizations very late and after a lot of effort. In our case, we initially wanted to do it on Île Bizard, but we did not obtain the necessary authorizations from the city, so we decided to return to Cap-Saint-Jacques to maintain a bioblitz in 2018.

• Organizing meetings with all the actors involved upstream of the inventories would be really relevant. This would include involving everyone in setting up the protocols, presenting the field and the equipment used to ensure better harmonization of practices on inventory days.

b) Means of promotion and communication

An online registration form had been created to facilitate the organization of the event (link: https://goo.gl/forms/VJFrVu6IC6skRdtG2). The use of the form made it possible to collect all email addresses, to organize carpools and to estimate the number of participants.

The event was posted on Facebook about 15 days before the event (11 people had registered to participate, and 15 were interested).

It was also disseminated thanks to the support of the UdeM Biology Department: a press release was sent to all students by the Curriculum Advisor.

biological (see communiqué in appendix 2). This press release was sent two weeks before the bioblitz, and allowed the recruitment of several UdeM students.

In addition, the organizers sent personal invitations to past participants and to several environmental organizations or groups: Les Amis de la Montagne, GUEPE, Laurentian Heritage, McGill Bird Observatory (see contact information in Appendix 3 and 4).

Recommendations

• Facebook is a good way to reach the general public, however it is difficult to know if the "interested" people will really participate in the activity. It is therefore complementary to the use of a registration form. For the use of this social network to be more effective, the event should be broadcast much earlier and shared in the following networks
"Biodiversity" on Facebook (Ornithologists Club, McGill Bird Observatory, etc.).

• The event could be broadcasted via Accès Sciences in order to reach the maximum number of interested students. This is an inter-order platform (university and college) seeking to put forward joint projects in science (contact: hmathieuscience@gmail.com).

• It is very important to always have a telephone number given to participants in advance, especially for late arrivals.

c) Material and financial resources

Financial contributions for the bioblitz were very limited. Only the CEGEP participated financially by purchasing snacks for the entire group. The rest of the material was collected through the pooling of materials lent by the organizing groups (CEGEP GG and UDD) and some participants.

Hardware	***Who lent the equipment***
Camera	UDD
Aquatic inventory equipment	Laurentian Heritage
Data collection sheets + field pads	UDD + Cégep GG

2 GPS	UDD + a loan from a participant (the 3rd participant to équipe a use the application). "Offline maps")
Compasses	Cégep GG
Flag	UDD + Cégep GG
Binoculars	UDD +Cégep GG + some participants
Insect trap with UV lamp	one participant
Sherman Traps	Les Amis de la Montagne - finally not used due to lack of time
Insect trapping material - glass, soap, bait, small shovels	UDD and CEGEP
Tent + Gazebo in case of rain	Cégep UDD
Garbage bags	
3 measuring tapes	UDD + Cégep
Wireless speakers	CEGEP GG
Smartphone to broadcast the bird recordings	
Rain boots	All participants
Food	Cégep GG + all participants
Various identification guides	everyone

Table 1: List of materials used at the Bioblitz 2018

Recommendations

If bioblitz events continue from year to year, it might be interesting to set aside a certain budget for the event (at least for the purchase of snacks or even lunches for the volunteers) and/or to invest in equipment that can be used year after year. This would avoid relying on the loan of equipment from participants and organizations, who often need it for other concurrent events. For example, we were not able to obtain a third GPS, which was needed to navigate through the two days.

II - Inventory days balance sheet

Figure 3: Photo September 29, 2018. Morning, presentation of the protocols.

a) Participation

On Saturday, twenty-five (25) people participated for the entire day, and four (4) people participated for only part of the day. On Sunday, eighteen (18) people participated for the entire morning (see list of participants in Appendix 4).

Participants came from various backgrounds: CEGEP Gérald Godin students, their professor and a CEGEP technician, UdeM students (bachelor's degree in biology, master's degree in environment, doctorate in biology), UDD employees, former bio-ecology students, as well as interested citizens. Of all the participants, approximately twelve (12) had never conducted biological inventories before.

Two environmental organizations participated: Héritage Laurentien (HL) and the Groupe des Chiroptères du Québec (GCQ). HL provided the material for the fish inventory and the GCQ provided the material for the fish inventory.

held a bat kiosk during the lunch break (unfortunately we were not able to organize a bat inventory this time). Les Amis de la Montagne and GUEPE were unfortunately not available this weekend, but supported the project by spreading it on their networks and lending equipment.

The participation of several experts and naturalists, from research, teaching or various community organizations is necessary for the successful conduct of the bioblitz, the transmission of their knowledge to the general public being one of the goals of the bioblitz.

Recommendations

• The number of participants was perfectly adapted to the size of the territory to be covered and the inventory effort deployed. Having small groups is an advantage for several reasons:

- This limits trampling and impact on the environment,
- All participants are concretely involved in the inventories and have the opportunity to learn a lot about the biodiversity present.

• To minimize the impact on the environment: Introduce ethics and principles "without a trace" to participants

• Always make sure you have enough expertise on each team (naturalists are often very busy and sometimes hard to reach so you should think about letting them know in advance of the event).

b) Schedules

-- Updated schedules --

Table 2: Saturday, September 29th schedule

8h00	Welcome, presentation, coffee and snacks Meeting point: La solitude Notre-Dame (Montreal, H9K 1C1) (see Figure 4)

8h15	Team division (3) Explanation of the morning protocols Distribution of materials (measuring tape, maps and GPS, data sheets, field pads, guides, insect traps) Sharing of observation areas : 1-2-3-4-5 (Team 1); 7-8-12-13 (Team 2); 6-9-10-11-14 (Team 3)
8h30	Departure of the teams
8h45 - 12h	Each team in each assigned zone : - Floristic inventory - Movement along transects and observations of traces of mammals, amphibians and reptiles. - Setting up insect traps (container, soapy water, bait)
12h00	Gather the entire group for dinner. Kiosk on bats of the Groupe des Chiroptères du Québec (GCQ)
13h30	The whole group: departure for the aquatic inventory (supervised by Laurentian Heritage)
16h00	Break/snack
16h30 – 18h00	Resumption of team inventories (to complete the morning's unfinished inventories)
18h00 – 19h00	Dinner + Installation of the UV lamp device Repatriation of equipment
19h30 - 21h30	Inventory of night raptors (2 zones)

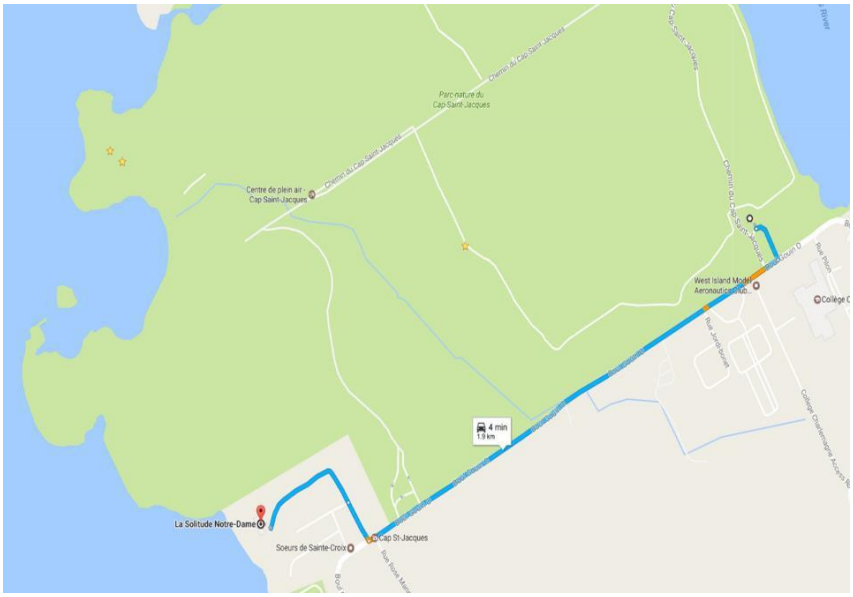


Figure 4: Meeting point on inventory days

Table 3: Schedule for Sunday, September 30

6h45	Home page Meeting point: La solitude Notre-Dame (Montreal, H9K 1C1) (see figure 4)
7h00	The whole group: ornithological inventories (hike to the beach, approximately 1.5km)
8h15	Break, coffee/break time Division of teams/tasks
8:45 am - 12:00 pm	By team: complete the floristic and mammalian/amphibian/reptile inventories in the areas Recovery of insect pit traps and insects in the UV lamp and then identification
12:00pm-1:00pm	End of the event, repatriation of the material

c) Protocols

Each team was given a pad with note-taking sheets (see Appendix 5 for sample tables), which contained general instructions and protocols to be followed for the inventories.

It is important to clearly specify the safety instructions, as well as those to limit the impact on the environment (hence the relevance of integrating a short presentation of "No Trace" ethics).

Vegetation

Tree stratum

Objectives

Estimate the richness and abundance of mature trees by identifying all mature trees in a quadra.

Hardware

- Measuring tape
- 25 cm strings (for DHP)
- Identification guide as required
- Flags

Guidelines

- Delimit the plot: using the tape measure and flags, establish a 10-meter radius zone from the center point (GPS coordinate).
- Identify trees that have a diameter at chest height of 25cm (corresponds to about 78cm in circumference). Take pictures of the leaves, bark if you are not sure of your identification.
- Counting trees less than 25 cm DBH
- Counting snags (dead trees still standing)

Herbaceous plants, shrubs and ferns

Objectives

Estimate the richness and abundance of herbaceous plants, shrubs and ferns. Estimate the relative abundance of cathartic buckthorn (invasive alien species).

Guidelines

- Delimit the plot: using the tape measure and flags, establish a 5-meter radius zone from the center point (GPS coordinate).
- Identify herbaceous plants, shrubs and ferns present.
- Take pictures if you are not sure of your identification.
- Estimate the percentage of cathartic buckthorn recovery

Mammals/reptiles/amphibians

Objectives

Collect animal clues and identify wildlife species using the study area by travelling a transect.

Hardware

- Compasses and GPS
- Animal Track Identification Guide
- Photo camera (optional)

Guidelines

- Walk 50 meters north and 50 meters south from the center of the plot.
- Divide the sampling effort among teammates (make two sub-teams). One person can be responsible for measuring 50 meters (which corresponds to about 70 steps).
- Detect and analyze signs of animal presence (traces, tracks, excrement, grazing, markings, etc.). Lift rocks and logs to locate reptiles and amphibians.
- Record relevant information in the field notebook to document observations and complete the identification of clues at HQ. Take photographs if necessary.

Figure 5: examples of animal tracks found (left: photo of a burrow, right: photo of a nibbled nut)

Ichthyological fauna

Protocol provided by HL, who coordinated the inventory (everyone participated).

Figure 6: Photo of the ichthyological inventory. On the picture, we can see participants bringing the net back to close it and start the inventory of the fish caught.

Entomological fauna (pit trap)

Objective

Using a pit trap, capture and identify some insects present in the plot soils.

Hardware
- Plastic pot
- Water + soap
- Bait
- Small shovel

Guidelines
Pre-capture
- Dig a hole 10 cm deep and 5 cm in diameter near the center of the station.
- Put a plastic glass in the hole with soapy water and a piece of meat inside.
- Camouflage the hole with leaves and twigs
- Identify the trap with a flag

Post-capture
- Make an inventory of all the traps

Nocturnal entomological fauna (UV trap)

Objective

Using a trap consisting of a UV lamp and a tank to capture insects, capture and identify nocturnal insects in the vicinity.

Hardware
UV trap (provided by a participant).

Guidelines
At nightfall, place the UV trap near a relatively open area (so that the light can be seen from a distance). Leave it on all night and come to identify the insects caught the next day. In our case, we chose to place the trap close to the water and the parking lot.

Avian fauna (morning)

Planned Protocol :

Objectives

Estimate the richness and abundance of bird species. To identify all species heard and/or observed and estimate the distance between the observer and the bird heard and/or observed

Activity-specific equipment

- Binoculars (1 per person)
- Bird Identification Guide of North America or Quebec

Guidelines

- Establish a team strategy (divide the sampling effort among teams; listening periods should be between 6:00 and 11:00 a.m.).
- Move to listening stations.
- Approach listening stations as quietly as possible.
- Once you arrive at a listening station, sit in a suitable and comfortable place and wait 3 minutes while being as quiet as possible (to ensure that the birds resume normal activity).
- Conduct three consecutive 5-minute listening periods and record observations.
- Fill in the following data table according to the instructions.

									0-5 min		5-10 min		10-15 min	
Eq.	Obs.	Station	Date	Hre	E	V	T	Sp.	<50m	>50m	<50m	>50m	<50m	>50m
…	…	…	…	…	…	…	…	…	…	…	…	…	…	…

Guidelines for the use of the table

- Whenever possible, listening and data collection should be done on an individual basis. After listening, team members' results are then pooled by consensus (to increase the accuracy and precision of the data).
- Per station and per visit, the species detected are represented only once (one line per species).
- The numbers of individuals detected by species should be noted in the cells corresponding to the distance from the observer.
- The distance category chosen for a given observation corresponds 1) to the first distance estimate (e.g. if the detected bird is moving, do not modify the data), 2) to a distance at ground level which includes topographic elements (e.g. if the bird sings very high in the forest, the estimate corresponds to the distance at ground level between the observer and an imaginary vertical line that connects the bird and the ground).

- From one 5-minute period to the next, only newly detected individuals are scored (individuals detected in the first 5-minute segment that sing again in the second segment are not counted again).
- Unknown species should be identified in the Sp. column by the time indicated on the recorder's counter when the individual sings (to easily find the passage on the recording).
- If during a given visit no bird is detected, enter none in the Sp cell.
- The observation of a bird that is within 10 meters of the center of the listening station and flees because the observer arrives at the station should be added to the dataset.

Protocol applied :

For practical reasons, we have not followed this protocol. We preferred to go on a birding hike to Cap Saint Jacques (about 1.5 km), the whole group together. We followed in total silence the route indicated in figure 9, noting the species of birds observed.

Figure 7:Photo of the birding tour.September 30, 2018.

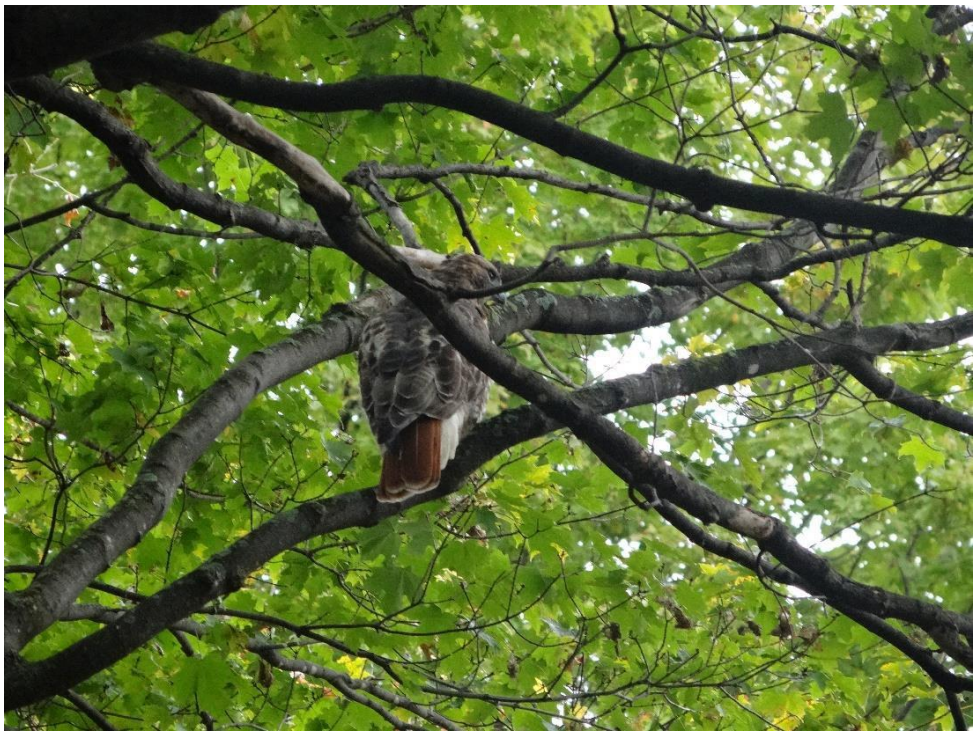


Figure 8: Photo of a Red-tailed Hawk (September 29, 2018).

Night raptors

Objectives

Observe and identify nocturnal birds of prey with the technique of singing reptiles.

Material

- Battery speaker
- A good flashlight or headlamp
- Song and call recordings of target species

Guidelines

- Determine listening stations (see map)
- For each station, play 1 song + 1 call of each species in order (since interactions (i.e. predation...) exist between certain species of nocturnal raptors, these calls are emitted sequentially from the smallest to the largest species in order to limit the potential phenomena of inhibition of response of the smallest species.

For Cap-Saint-Jacques at this period:

1)Stained Scopsucker,
2)Lesser Saw-whet Owl,
3)Barred Owl, 4)Great
Horned Owl.

If one species responds, do not continue to sing the songs of the other species and repeat 2 or 3 times the song of that species.
- Make as little noise as possible and observe the species.
- Be careful not to blind and aim directly at the bird of prey in the eyes.

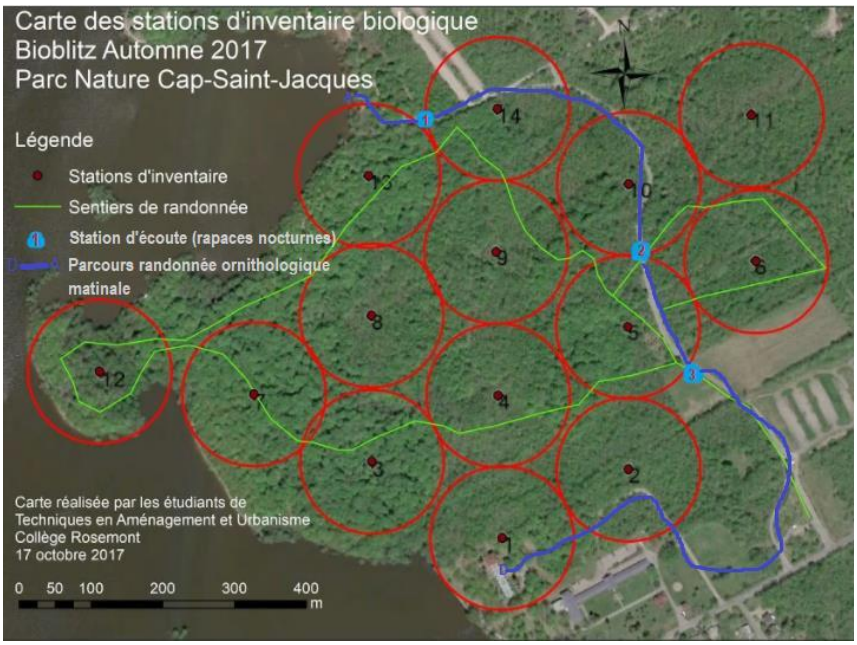


Figure 9: Map of the areas with listening stations for night raptors and the route of the morning bird walk

General

Recommendations

• The use of applications such as Inaturalist can be very useful to ensure better data reliability in case of lack of expertise. This year we have not really been able to coordinate our use of this application. In the future, it is necessary to communicate with participants in advance to inform them to download the application and become familiar with it.

• In order to better harmonize protocols between each team, there could be predefined team leaders who are already familiar with the protocols.

• Be sure that the protocols are relevant for the entire territory to be covered.

• Always remember to note the weather conditions during inventories.

Vegetation

• With the rather limited means we have, establishing a square plot rather than a round one would perhaps allow for more efficiency and precision by placing four flags at the corners connected with a rope.
• The choice to identify only trees over 25 cm DBH was problematic in some areas that had very few mature trees. Identifying and counting trees between 10 and 25cm and those over 25cm would have provided more information on the regeneration species in some areas. This was done by some teams during the day (and worked very well) but this was not the case for all teams, so the data is unfortunately of little use in making an inventory of the entire area.

Mammals/Reptiles/Amphibians

• It was not always possible to leave exactly in the North-South axis for the transects, we adapted ourselves according to each zone.
• Adding a transect width would have helped to better harmonize the practices of each group.

Insects (pit trap)

• The protocol showed very few results. Apart from the somewhat late period in which we conducted the inventories, we have several hypotheses as to its ineffectiveness:
• The plastic cups may not have been effective at capturing insects despite the soap and water at the bottom. The use of a masson jar with an inwardly curved rim might be a solution.
• In addition, the bait used (small piece of meat) had the defect of attracting other mammals and the traps were often destroyed. Using a different type of bait could improve the protocol.

Nocturnal insects

The system in place did not produce any results either. As this system has proven its effectiveness in previous uses, our hypothesis is mainly the late period in the inventory season and the low presence of insects.

Possibilities and openings for the next bioblitz

- Other types of inventories could be added: an inventory of bats (contact the CQG in advance to make arrangements with the equipment. Contact: Antoine Leblet - lebletantoine@hotmail.fr), using sherman traps for small mammals could also be considered (this has already been done in previous bioblitzes, but without too many results).
- More characterization of the environment would also be interesting (information on the soil, pedons, etc.).

III - Results

All results presented were transcribed by CEGEP GG students from data taken directly from the data sheets.

Vegetation

Trees

Zone	1		2		3		4		5		6		7		8		9		10		11		12		13		14	
Shaft / Diameter	>25	[10;25]	>25	[10;25]	>25	[10;25]	>25	[10;25]	>25	[10;25]	>25	[10;25]	>25	[10;25]	>25	[10;25]	>25	[10;25]	>25	[10;25]	>25	[10;25]	>25	[10;25]	>25	[10;25]	>25	[10;25]
Common name - Scientific name																												
birch paper-betula papyrifera marsh	1																											
Hickory cordiform - *Carya cordiformis*												1		1		1												
Late cherry tree - *Prunus serotina*																												
Red oak - *Quercus rubra*								10																				
Sugar maple - Acer saccharum	2				4				5	12			3			1												1
Silver Maple - *Acer saccharinum*			1				1																					
Black maple - *Acer nigrum*															4													
Ash sp.									4																			
Red Ash - Fraxinus pennsylvanica				13			1				16				1						1	1						
White ash- fraxinus Americana l.	1				3		1																					
American ash - *Fraxinus americana*												1		1														
Black ash - *Fraxinus nigra*																												
Big leaf beech - *Fagus grandifolia*																												
Hackberry occidental - *Celtis occidentalis*																1												
Butternut - *Juglans cinerea*									1	2																		
American Elm - *Ulmus americana*				7				8			3	1		1	1													
Red elm - *Ulmus rubra*																												
Ostryer of Virginia - Ostrya virginiana				1																								
Deltoid poplar - *Populus deltoides*																												
big-toothed poplar	8																											
Trembling aspen - *Populus tremuloides*																												
Western Red Cedar - *Thuja occidentalis L.*																												
American linden - *Tilia americana L.*													3			1												

Note: As explained above, the addition of the identification of trees with a DBH of 10 to 25 cm was done spontaneously by several teams during the day. However, not all teams did so, hence the blanks in some areas.

Shrubs, grasses & ferns

	Herbaceous plants	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Family	**Common name - Scientific name**														
	White Actée							1							
Renonculacées	Red Actaea - Actaea rubra			1											
	Compendial ally									1		1			
Renonculacées	Acute-lobed anemone - *Adonis vernalis*														
Renonculacées	Anemone of Canada - *Anemone canadensis*														
Apocynaceae	Apocyn with *Androsaemia* leaves - *Apocynum androsaemifolium*														
	Aster sp.								1						
Asteraceae	Big-leaved aster - Eurybia macrophylla														
	Aster acuminate - *Oclemena acuminata*		1												
	Launched Aster						1								
Araliaceae	Aralie a tige nue - *Aralia nudicaulis L*														
Araceae	Ariseme petit-prêcheur - *Arisaema triphyllum*			1	1		1		1		1		1		
Aristolochiaceae	Asaret du Canada - *Asarum canadense*														
Compounds	Major burdock - *Arctium lappa L.*														
	Berberis - Berberis vulgaris		1				1								
Rosaceae	Benoîte sp.						1			1		1			
	Botryche - Botrychium sp.				1										
Lamiaceae	Common Brunella vulgaris-Prunella vulgaris		1		1										
Crucifers	Cardamine wolverine - *Cardamine diphylla*														
	Carex sp.	1	1		1		1								
Cyperaceae	Carex plantain - *Doronicum plantagineum*														
Rutaceae	American Clavalier (prickly ash) - *Zanthoxylum americanum*						1								
	Boreal Clintonia													1	
Berberidaceae	Blue Cohosh - *Caulophyllum thalictroides*							1						1	
Cornacées	Sotosiferous dogwood - *Cornus canadensis*				1			1			1		1		
Orchids	Epipactis *helleborin - Epipactis helleborine*							1						1	
Onagraceae	Fireweed - Epilobium									1		1		1	
Asteraceae	*Eupatorium maculatum - Eupatorium maculatum*				1										
	Strawberry field - *Fragaria virginiana*		1				1					1			
Rosaceae	wild strawberry- Fragaria vesca				1										
	Gadellier sp.					1									
Grossulariaceae	Glandular glandular- *Ribes glandulosum*			1							1				1
Rubiaceae	gaillet- Galium		1							1		1			
Hydrophyllacées	Hydrophylla of Virginia - *Hydrophyllum virginianum*														
	Lamiaceae				1										
	Nummular Lysimia		1												
Asparagaceae	Grape Maidenhair - *Maianthemum racemosum*	1											1		
Asparagaceae	Maidenhair of Canada - *Maianthemum canadense*														
Embryophytes	*Foams sp - Bryophyta sp*									1	1				
Rubiaceae	Crawling *Mitchella - Mitchella repens*														
Urticaceae	Nettle - *Urtica dioica*														
	Oxalide sp.		1												
	Oxalide dressed - *Oxalis strica*						1					1			
Oxalidaceae	*Oxalis montana Raf - Oxalide of the* woods				1										
Urticaceae	Canada Stinging Nettle - *Laportea canadensis*								1						
	Pigamon sp.			1											
Renonculacées	Early Pigamon - *Thalictrum dioicum*														
	Pigamon pubescent - *Thalictrum pubescens*												1	1	
Renonculacées	*Abortion Buttercup - Abortion Buttercup*														
	Sanicle - Sanicula sp.		1												
	Blood of Canada													1	
Asparagaceae	Pubescent Solomon's Seal - *Polygonatum pubescens*		1												
	Pink Streptope - Streptopus roseus		1		1										
Pulses	*Red* clover - *Trifolium pratense L .*														
Asteraceae	Canada Goldenrod		1		1				1						
Violaceae	Violet sp.		1		1		1		1						

	Herbaceous plants	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Common Famille	**name - Scientific name**														
	Grasses														
	Common Reed - *Phragmites australis*														
	Ferns and lycopods														
	Fern			1											
Thelypteridaceae	Moustached fern - *Thelypteris phegopteris*								1						
	Lycopodium interrupted - Lycopodium annotinum												1		
Polypodiaceae	Sensitive *onoclea - Onoclea sensibilis*														
Dryopteridaceae	intermediate wood fern- Dryopteris Intermedia		1							1					
Osmondacées	Osmunda cinnamon - Osmunda cinnamomea								1						
	Shrubs														
	Cherry sp.					1									
	Virginia cherry tree			1			1								
Rosaceae	Pennsylvania cherry - *Prunus pensylvanica L.*														
Betulaceae	Carolina Charm - *Carpinus caroliniana*														
	Canada's Gooseberry		1				1								
Cornacées	Dogwood - Cornus *alternifolia L. f*		1										1	1	
Rhamnacées	Cathartic Buckthorn - *Rhamnus cathartica*						1	1	1		1		1		
Rhamnacées	Buckthorn buckthorn - Rhamnus frangula						1	1	1				1		
Betulaceae	Long-billed hazelnut tree - *Corylus cornuta*										1				
Vitacées	Parthenocissus with five leaflets (Virginia creeper) - *Parthenocissus quinquefol*		1				1						1		
Rosaceae	Fragrant bramble - *Rubus odoratus*														
Cashew nuts	Climbing sumac (poison ivy) - *Toxicodendron radicans*	1	1		1				1				1	1	
Cashew nuts	Sumac vinegar - *Rhus typhina*														
Vitacées	Shore vine - *Vitis riparia Michx.*					1	1								1
	Sowing of trees														
	Saskatoon berry bush		1												
	Hickory sp-carya										1				
	Hickory hickory					1						1			
	Oval hickory												1		
	Oak sp.				1										
	Big fruit oak		1				1			1					
	Ash sp.			1	1										
	White ash- fraxinus Americana l.	1												1	
	Red ash - fraxinus pennsylvanica		1									1			
	Maple sp.			1	1										
	Sugar maple - Acer saccharum	1	1			1	1				1				
	Manitoba maple						1								
	Ostryer of Virginia - Ostrya virginiana														
	American elm									1					
	Red elm- Ulmus rubra														1
	American linden - Tilia americana L.		1	1			1			1					
Enter the percentage of recovery															
Rhamnacées	Cathartic Buckthorn - *Rhamnus cathartica*	<1%	<1%	<1%	50%	1%	50%	5%	15%	15%	3%	60%	35%	10%	5%

Insects (pit traps)

Insects		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Family	**Common name - Scientific name**														
Araneae (order)	spider								3			1		0	
	slug-Stylommatophora													0	4
Camerines	cricket- Rhanphido phoridae									1				0	
	beetle sp.								1					0	

Transects (animal tracks)

Animals14

Common name - Scientific name Mammals														
Red foxExcrement	2 individuals seen/feeding sign1 excrement 1 individual vu				**Reverse pot reveals presence of animals (raccoons?)									
Little Mamma	Terrier	Terrier	Terrier			presence of one-inch diameter (8cm)					burrows and gnawed hickory nuts			
Virginia deer	grazing	excretion/grazing	individual seen											
Squirrel sp.				1 heard/sign for power										
raccoon				excrement										
Grey Squirrel														1 individual seen
Squirrel or chipmunk	power/nest sign													
Red Squirrel						Individual seen							Food	
Tamia		1 idividual seen/feed sign			1 individual seen/ 1 individual seen					2 individuals seen				
Mammal (maybe Pekan?)						excrement with presence of berries								
Amphibians														
Cruciferous Frog3 individuals vu	1 individual vu				1									
American Toad1 individual seen														
Wood vu						FrogIndividual Individual seen								
Reptiles														
Tortue													Bones and carcasses	
Other animal tracks														
Slug														feeding sign on wolf's braid
Cepea nemoralis													Carapace	
Spotted Woodpecker						feathers found								
Bird (no identification)		feather/excrement		White feather		excrements								
Big Peak		feeding sign	1 power sign		heard/sign power supply sign power supply sign									
Goose - *Branta canadensis*		1	1		1 heard									heard
Downy Woodpecker - *Picoides pubescens*									1 (holes)				Food	

Note: a striped snake was also seen near the water (at the location of the ichthyological inventory), a skunk was also seen in the evening at station 1 of the night raptor inventory.

Ichthyological fauna

Ichthyological fauna

Common name - Scientific name	nb	length (cm)
Large fish (length >10cm)		
Comforter	1	55
Silver Lacaiche	1	32
Northern pike	1	56,1
Golden jaune	3	24.6; 10.6; 27.7
Yellow bullhead	1	19,5
Yellow Perch	1	16,9
Zebra rock excavation	1	11
Small fishes		
Zebra rock excavation	36	
Pale straw shiner	39	
Yellow Perch	32	
Black-spotted shiner	66	
Sunfish	3	
Raseux de terre	7	
Silver pencil	1	
Altequin sunfish	1	

Avian fauna

Avian Fauna Spring 2017	Fall 2017	Fall 2018	
Common name - Scientific name			
Goshawk - *Accipiter gentilis*	1	1	0
American Woodcock - *Scolopax minor*	0	1	0
Canada Goose - *Branta canadensis*	1	1	1
White-throated Sparrow - *Zonotrichia albicollis*	0	1	1
Song bunting - *Melospiza melodia*	0	1	0
Song bunting - *Melospiza melodia*	0	1	0
Red-shouldered hawk - *Buteo lineatus*	1	1	0
Red-tailed Hawk - Buteo jamaicensis	0	0	1
Wood duck - Aix sponsa	0	0	1
Mallard duck - *Anas platyrhynchos*	1	1	1
Black duck - *Anas rubripes*	0	1	0
Pintail - *Anas acuta*	0	1	0
Northern shoveler - *Anas clypeata*	1	0	0
Red Cardinal - Cardinalis *cardinalis*	1	1	1
Red-winged blackbird - *Agelaius phoeniceus*	1	0	0
American Goldfinch - *Spinus tristis*	1	1	0
Red-breasted Citadel - Sitta canadensis	0	0	1
White-breasted Citadel - Sitta carolinensis	0	0	1
Double-crested Cormorant - *Phalacrocorax auritus*	0	1	0
American Crow - *Corvus brachyrhynchos*	1	1	1
Sharp-shinned Hawk - *Accipiter striatus*	1	1	0
Cooper's Hawk - *Accipiter cooperii*	1	0	0
Starling withoutonnet - *Sturnus vulgaris*	1	0	0
Swivel falcon - *Falco columbarius*	1	0	0
Blue Jay - *Cyanocitta cristata*	0	1	1
Ring-billed Gull - Larus *delawarensis*	1	1	1
Herring Gull - *Larus argentatus*	0	1	0
Great Black-backed Gull - *Larus marinus*	1	1	0
Raven - *Corvus corax*	0	1	0
Grand Duke - Bubo virginianus	0	0	2
Great Blue Heron - *Ardea herodias*	0	1	1
pileated woodpecker - *Dryocopus pileatus*	0	1	1
Great horned owl - Bubo *virginianus*	1	0	0
Brown creeper - *Certhia americana*	1	0	0
Hermit Thrush - *Catharus guttatus*	1	1	0
Harelde Boréale - *Clangula hyemalis*	0	1	0
Swallow bicolor - *Tachycineta bicolor*	0	1	0
Waxwings of America - *Bombycilla cedrorum*	0	1	0
Junco slate - *Junco hyemalis*	0	1	0
velvet scoter - *Melanitta fusca*	0	1	0
American Kingfisher - *Megaceryle alcyon*	0	1	0

American Robin - *Turdus migratorius*	0	1	1
Black-capped chickadee - *Poecile atricapillus*	0	1	1
Phebi flycatcher - *Sayornis phoebe*	0	1	0
Quebec Flycatcher - *Empidonax minimus*	0	1	0
Yellow-rumped warbler - Setophaga coronata	0	0	1
Grey-cheeked warbler - Leiothlypis ruficapilla	0	0	1
Spotted eagle-owl - *Megascops asio*	0	1	0
Hairy woodpecker - *Picoides villosus*	0	1	0
Flaming woodpecker - *Colaptes auratus*	0	1	0
Spotted Woodpecker - *Sphyrapicus varius*	0	1	0
Downy Woodpecker - *Picoides pubescens*	0	1	1
Biset pigeon - *Columba livia*	0	1	0
Eastern Pioui - Contopus *virens*	0	1	0
American Pipit - *Anthus rubescens*	0	1	0
Bald eagle - *Haliaeetus leucocephalus*	0	1	0
Bronzed Blackbird - *Quiscalus quiscula*	0	1	1
Kinglet with golden crown - *Regulus satrapa*	0	1	1
Ruby-crowned wren - *Regulus calendula*	0	1	1
House finch - *Haemorhous mexicanus*	0	1	0
White-breasted Nuthatch - *Sitta carolinensis*	0	1	0
Red-breasted Nuthatch - *Sitta canadensis*	0	1	0
Cute Wren - *Troglodytes troglodytes*	0	1	1
Blue-headed Vireo - Vireo solitarius	0	0	1

Note: During the inventory of nocturnal raptors, we heard and saw two individuals of the species Great Horned Owl.

Conclusion

The Bioblitz 2018 was an inter-order project that promoted knowledge sharing at the college and university level with the participation of organizations specializing in biological inventories. The project allowed for the development of collaborative work that was fueled by the academic community and government agencies. In this sense, it was a great success. All of the planned inventories were completed successfully, although some protocols were more effective than others, we all learned from the experience and the data could be used by the students. They are a support to the data collected in Cap-Saint-Jacques in previous years, and confirm the trends observed; in particular, that cathartic buckthorn represents a major problem that should be addressed in certain areas.

All participants seem to have enjoyed the experience and learned a great deal during this intensive weekend, as shown in the thank-you letter written by the GG team (see Appendix 6). The field exercises, because they are very concrete, are particularly effective in enabling students and the public to develop their environmental awareness.

For 2019, we hope to continue organizing such events. The holding of a bioblitz on Île Bizard, in partnership with the city, would be very relevant. Indeed, Île Bizard abounds in biodiversity and would be an ideal place to conduct biological inventories. Furthermore, the Marcel-Laurin Park would also be very suitable for hosting this type of event.

Appendices

Schedule 1: Licence of Occupation Signed by the City

Montréal

Direction des grands parcs, du verdissement et du Mont-Royal
Division de la gestion de l'entretien et des opérations des parcs
Parc-nature du Cap-Saint-Jacques / secteur ouest
163, chemin du Cap-Saint-Jacques
Pierrefonds (Québec) H9K 1C5
Téléphone : (514) 280-6784
Télécopieur : (514) 280-6694

CONTRAT D'OCCUPATION

PARC-NATURE DU CAP-SAINT-JACQUES
Secteur de la Solitude

DATE D'OCCUPATION 29 et 30 septembre 2018	**Horaire:** samedi 29 sept 8h-21h dimanche 6h-15h
DESCRIPTION DE L'ÉVÉNEMENT: Il s'agit d'un bioblitz inter-ordre (partenariat entre l'Université de Montréal et des cégeps), durant lequel les étudiants et autres personnes impliquées feront des inventaires biologiques intensifs de différente nature afin de documenter la biodiversité au Cap Saint-Jacques et de développer leurs compétences en matière d'inventaire. Le **samedi**: délimitation des zones, l'inventaire des arbres matures et des plantes envahissantes, la mise en place des pièges fosses à insectes, des fouilles de traces de mammifères, d'amphibiens, un inventaire aquatique, l'observation des rapaces nocturnes. Le **dimanche :** inventaire ornithologique matinal, terminer l'inventaire des arbres, regarder les pièges fosses.	**NOMBRE DE PERSONNES:** 30 personnes

Non du responsable:	Alexandre Beaudoin, conseiller en biodiversité à l'UDD Pauline Mouche assistante pour l'organisation		
Nom du groupe ou cie :	Unité du développement durable (UDD) de l'Université de Montréal.		
Adresse:	2900 Boulevard Edouard Montpetit		
Téléphone bureau:	514-343-6111 Poste 5229	**Télécopieur**	
Téléphone Cellulaire:	514-929-5442	Courriel:	alexandre.beaudoin.1@umontreal.ca mouchepauline@gmail.com)
Responsable lors de l'événement:	Alexandre Beaudoin		
Personne ressource Ville :	Chef animateur : 514-820-3048		

CONDITIONS DE L'AUTORISATION

- Faire l'activité tel que convenu et indiqué à l'Annexe joint :« Plan de la zone d'intervention »
- Le locataire et ses invités doivent stationner leurs véhicules autour du bâtiment.
- Les frais sont non-applicables pour ce projet.
- Une toilette sèche est disponible au Parc-nature de l'Anse-à-l'Orme.
- L'accès à la Solitude (bâtiment) est interdite.
- Les personnes qui utilisent les infrastructures de la Ville de Montréal sont responsables des bris et pertes des équipements utilisés au cours de leur séjour. Des frais seront alors exigés auprès d'eux, de leur organisme ou établissement, en guise de remboursement pour le remplacement des équipements manquants ou endommagés.
- La présente dégage la Ville de Montréal de toute responsabilité relative à un accident ou incident qui survient à l'intérieur du bâtiment. C'est donc le locataire qui est tenu responsable lors de la réception de tout accident ou incident.

Je, soussigné(e), autorise l'activité énumérée ci-dessus (page 1 et 2)

POUR ANNE DESAUTELS: CHARLOTTE HOGUE — 25/09/18

Anne Desautels, B. Agr., M. Env.
Chef de section - Ouest
Division de la gestion de l'entretien et des opérations des grands parcs

Date

Je, soussigné(e), accepte les conditions d'autorisation énumérées ci-dessus (page 1 et 2)

24 septembre 2018

Alexandre Beaudoin

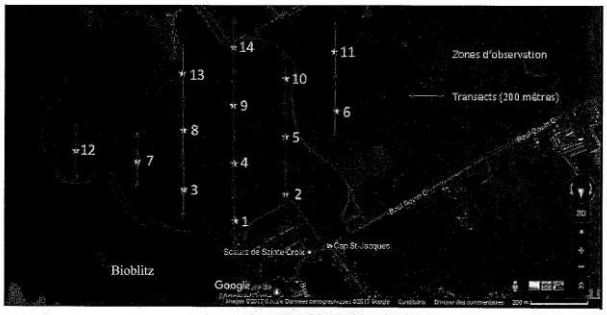
Date

N.B. Le responsable du projet devra être en possession de ce document lors de l'événement.

Montréal

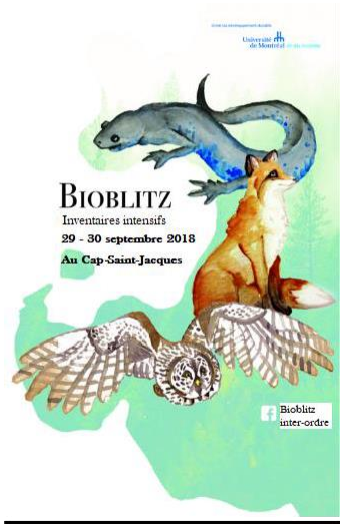
Bioblitz au parc-nature du Cap-Saint-Jacques, secteur de la Solitude
Samedi 29 septembre 2018 de 8h-20h et dimanche 30 septembre de 6h-15h
Responsable : Alexandre Beaudoin # de cellulaire 514-929-5442

PLAN DE LA ZONE D'INTERVENTION



Appendix 2: Communiqué sent to the Biology Department

Join the bioblitz in Cap-Saint-Jacques, September 29 and 30, 2018



A Bioblitz is the realization of several biological inventories in a short period of time in partnership with several experts and the community. This inter-order event involves the University and certain CEGEPs; it allows for the documentation of biodiversity and raises awareness of its importance. Several experts from different organizations will be on hand to share their knowledge, and participating students will have the opportunity to refine their inventory techniques. On the program: inventory of mature trees, evaluation of the presence of invasive exotic species, entomological inventory using pitfall traps, herpetology inventory, ichthyological inventory, morning ornithological inventory, inventory of nocturnal raptors, and more depending on the possibilities.
Bioblitzs are a beautiful way to discover the beauty of our urban ecosystems in an interdisciplinary and playful way.

To participate or for more information, please contact : Alexandre Beaudoin
Biodiversity Advisor
Université de Montréal
Tel: (514)343-6111 Ext: 5229
Write to
mouchepauline@gmail.com (assistant to the biodiversity advisor)
cc: alexandre.beaudoin.1@umontreal.ca

Appendix 3: List of participants (non-exhaustive)

Name	Contact	
Marie-Catherine Fournier	mc.fournier@cgodin.qc.ca	Professor at Cégep Gérald Godin (in charge of the course) "bioblitz") - organizer
Pauline Mouche	mouchepauline@gmail.com	UDD employee and UdeM student - organizer
Alexandre Beaudoin	alexandre.beaudoin.1@umontreal.ca	Biodiversity advisor at the UDD - organizer
9 étudiants from Gérald Godin	mc.fournier@cgodin.qc.ca	Students enrolled in the course including the bioblitz
VirginieLemieux Labonte	virginie.lemieux-labonte@umontreal.ca	Member of the chiropterian group of Quebec and doctoral student at UdeM
Gabriel Letendre	spqr-753ac@hotmail.com	Consultant in environment(flora specialist)
Katherine Monette	katherine.monette.13@gmail.com	Expertise in herpetology
Kévin Kaiser	kevin.kaiser@umontreal.ca	UDD Employee
Caroline Veaux	Caroline.veaux@orange.fr	Interested citizen
Ariane Roberge	arianeroberge13@gmail.com	Student at UdeM
LudovicLandry Ducharme	ludovic.landry-ducharme@umontreal.ca	Student at UdeM
Rousseau Ring	annrouss@gmail.com	Employée de UDDand student at UdeM
Bruno Moreau	brunodmoreau@hotmail.com	
Alison Hackney	scolopax8183@gmail.com	Amateur Ornithologist, McGill Bird Observatory
Louis Gabriel Pouliot	lgpouliot@videotron.ca	Student at UdeM
Jean-François Dubuc	dubuc.j.francois@videotron.ca	Father of a GG student (biologist at Agriculture and Agri-Food Canada)
Hélène Dupont	h.dupont@cgodin.qc.ca	CEGEP GG Technician
Virginie Michaud	virginie.michaud@heritagelaurentien.org	Laurentian Heritage

Appendix 4: Agency Contact Information

• Les Amis de la Montagne : conservation@lemontroyal.qc.ca
• GUEPE: melaniedappen@guepe.qc.ca, patricklaniel@guepe.qc.ca (ornithologist, has already participated in the bioblitz)
• Laurentian Heritage: virginie.michaud@heritagelaurentien.org
• McGill Bird Observatory: Alison Hackney (Amateur Ornithologist) scolopax8183@gmail.com
• Science Access: hmathieuscience@gmail.com
• Groupe des Chiroptères du Québec (GCQ): lebletantoine@hotmail.fr

Appendix 5: Blank Data Sheets for Vegetation and Animal Tracks

Data capture #plants

• Site number :

• Dominant stratum :

Tree inventory (>25cm DHP)

Species name	Number	# of the photo
		…

• Counting trees of -25cm DHP : - Snag count : _____

• Estimated % recovery of *Cathartic Buckthorn* :

Inventory of herbaceous plants, shrubs and ferns (indicate species found)

...

Data capture #Wildlife

Site Number: Transect : Nord / South (circle direction)

Indicate the species you think you have spotted. Put a cross on the signs of presence detected (and a brief description if necessary).

Species						
Individual seen						
Tracks						
Excrements						
Feeding signs						
Bones - Remains Carcasses						

Appendix 6: Thank you letter from GG students

Mr. Alexandre Beaudoin Mrs.
Pauline Mouche
Sustainable Development Unit
Université de Montréal

Dear Alexandre, dear Pauline and dear volunteers.

We would like to thank those who approved and those who helped us get the Bioblitz at Cap Saint-Jacques approved. Not only is it a green area with a variety of flora and fauna, but it is also a site whose proximity to us makes the study of the site more meaningful. Indeed, we were particularly interested in studying Cap Saint-Jacques since we knew that it would show us how present and varied nature is, even on the island of Montreal. Also, this chance to walk in the forest and take data allowed us to appreciate the beauty and necessity of Cap Saint-Jacques even more than before. We hope that other students, volunteers and researchers will in turn have the opportunity to walk around Cap Saint-Jacques and study its ecosystem.

It is all the more important to highlight the help offered by the many volunteers present at the event. Thanks to their varied skills and knowledge, we were able to gather a large amount of data. We were also given enriching information capsules on the virtues of certain plants, environmental issues, etc. In addition, their expertise in the field of environment and biology gave us an insight into their work methods and the vast knowledge to be able to recognize all kinds of living species. It should also be mentioned that without their contagious enthusiasm for wildlife, the Bioblitz would never have been as fun and educational as it is today.

An unforgettable moment for all the participants was surely the communication between the two great-dukes during the activity on nocturnal bird life. Indeed, the first point had not had any results and we were all tired from our day. However, a few minutes after arriving at the second point, the first great-owl gave us an answer. This magical moment was quickly surpassed when a second grand duke answered. Then, we stayed a few minutes longer for the

listen to "converse" in the dark. And finally, the highlight of the show: we caught a glimpse of one of the grand dukes.

The fish inventory was also a highlight of this experience. We were able to observe a great quantity of them thanks to a huge net. The fact that everyone had a small role to play in this collection made the activity much more enjoyable.

We would like to thank you for your precious help. Your advice and information on nature allowed us to deepen our knowledge, essential assets, impossible without your guidance. We would also like to thank all the specialists who came from far away to help us in the BioBlitz. Thanks to you, we were able to discover new things. Thank you once again and we wish you every success for your future.

The Bioblitz would not have been the same without all the specialists, students and enthusiastic volunteers and their good humour.

On behalf of all students, thank you!
Jean-Thomas, Juliette, Maryse, Jade, Vladimir, Beatrice, Mark, Sanella and Ngirankugire