EVALUATING THE WINTER DIET OF A PACK OF COYOTES (*Canis latrans*) IN A PERIURBAN ENVIRONMENT ON GEORGIAN BAY

by

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ABSTRACT

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This thesis explores the diet of a pack of coyotes in a periurban environment on the southern extent of Georgian Bay, west of the Town of Collingwood. Coyotes have seen a massive expansion in their range, and even though they are occupying increasingly urban areas, their biology has stayed relatively unchanged. Coyotes for years have been a focal point in many news articles and local politics due to a perceived threat on human safety and the safety of pets. Through the winter months of 2021, their diet was evaluated using scat dissections. Their diet was found not to differ significantly from other studies, with lagomorphs and rodents comprising at least 39%; their diet was partially supplemented by the availability of domestic dogs, but there was little evidence of garbage in their scats. It is suggested that education and informative postings in Collingwood and other similar communities should be increased to inform the public and mitigate risk of conflict between these canids and humans.

CONTENTS

TABLES

FIGURES

ACKNOWLEDGEMENTS

I would like to thank Dr. William Wilson for his assistance and continuous support throughout the duration of my thesis project, and for mentoring me throughout the in-field data collection phase of this project. I would also like to thank Dr. Brian McLaren for being an additional source of motivation through helping me explore the importance of honest, data driven wildlife management practices. Finally, I would like to thank my parents, friends, and colleagues for their support and insight on this emerging and complex sector of wildlife management. This thesis would not have been completed if not for the help I received in the final review process from Dr. Brian McLaren, Dr. Mat Leitch, and my peers-I will forever be grateful for all their efforts.

1.0 INTRODUCTION

The George Christie Nature Trails (GCNT) are located on the western boundary of Collingwood, Ontario. The trails include a small section of wetland and forest habitat that borders a golf course, subdivisions, farm fields, and an active landfill site. In recent years, there has been an increase in discussion on current wildlife management practice in the Collingwood area regarding the indigenous Coyote (*Canis latrans*) populations. Main public concerns are that the Coyotes in the area are suspected of predating on pets (dogs, cats), and some of the public feel the presence of coyotes are a safety concern (Reddekopp, 2019). The objective of the undertaken study is to examine the diet of a pack of coyotes that live in a periurban environment on the outskirts of Collingwood, ON, and through a review of current literature, to explore the effects that urbanization has or might have on the diets of the coyotes inhabiting the GCNT area.

Wildlife management in many sectors has shifted to a great degree in the wake of an ever-improving understanding about the ecology of animals. Various projects to maintain, reintroduce, reduce, and generally control the populations of predators have been successful over all of North America. However, there is still limited research and exploration on the ecology of urban populations and how they differ from their wild counterparts. Due to their massive geographic habitat range expansion, the coyote has been subject to a variety of management practices in varying intensity, and in many parts of the continent, there are no true management policies in place. Through observations of tracks and scat dissections of the coyotes within the GCNT, the diet of this pack of coyotes during an approximately three-month span between January and April, 2021 will be analyzed to evaluate any potential concerns of predation upon pets.

Additionally, by exploring literature regarding coyote diet throughout all North America, specifically about their interactions with humans or human elements and development, we should be able to quantify the degree of alteration of their natural diets and ecology and how it has changed through urbanization.

1.1 OBJECTIVE

This study will conduct non-invasive surveying and field observations of Coyotes within the GCNT including track recordings and scat dissections. Compilation and analysis of collected data will be completed so that there can be effective quantification and interpretation of the data. Finally, this data will be evaluated to discover if the diet of this pack of coyotes has been altered in any way from what would be expected of a completely natural population. Literature review will be conducted on similar studies that have occurred throughout North America to hopefully understand to what degree urbanization effects coyote populations.

1.2 HYPOTHESIS

The coyotes that inhabit a range that covers the GCNT in Collingwood, Ontario have a diet that has been altered due to the impacts of living in close proximity to human development. Coyotes throughout the continent have been experiencing changes to their behaviour and their ecology as a result of proximity to humans and through human interaction.

2.0 LITERATURE REVIEW

2.1 A BRIEF OVERVIEW OF COYOTES

Coyotes as we know them are a notoriously adaptable predator whose range covers a massive geographic space and their presence has been noted in nearly every jurisdiction in North America (Bekoff, 1978; Hody and Kays, 2018; Thurber and Peterson, 1991; Gompper, 2002; Flores, 2016). The highly exploitative ability that coyotes possess over their environments has led to an increase of coyote presence in most types of urban development, including low density residential neighbourhoods and even large, densely populated cities (Poessel et al., 2016). This rapid expansion of coyote habitat is understood to have reached a peak in 1999 with the capture of a coyote in Central Park, Manhattan, NY (Gompper, 2002). Historically, including prior to the colonization of North America, coyotes were realized as a great plains' species, and inhabited primarily grassland environments (Gompper, 2002). Although they are known to adapt to an extremely large variety of environments, coyotes commonly favor agricultural land over forested areas, especially in northeastern North America (Bekoff, 1978; Hinton et al., 2015).

The diet of the Eastern Coyote can be defined as a highly opportunistic omnivorous diet; favouring meat, they will often result to consuming berries, fruits, and insects in regions or seasons where prey availability is low (Bekoff, 1978; Ward et al., 2018). Deer, beaver, and most other small mammals are known prey to coyotes, and there is some evidence that coyotes may hunt large mammals such as bears. There is no evidence that coyotes predate on Moose (*Alces alces*), but there have been cases of

moose found in coyote scat that has been attributed to scavenging on carcasses (i.e., roadkill). Similar scavenging behaviour has been suspected by trappers in Maine, USA who blame coyote for a loss in some of their trapped mammals (Bekoff, 1978). There is also significant conflict in urban environments, where coyotes are known to predate on pets (Poessel et al., 2017). Additionally, concerns from ecologists are growing, as coyotes are known to supplement their diet with anthropogenic food sources, such as crab apples or food waste (Watts et al., 2015).

As coyotes rapidly expand their historic habitat and have an increased presence in many urban environments, much is being learned about the adaptations they make to these new environments. One of these many changes include a massive shift in the population dynamics of coyotes, including their home ranges and how they utilize their landscape. Although most coyotes are seeing a dramatic shift in their habitats, some small populations go entirely unaffected by urbanization, seemingly avoiding areas of high human activity altogether, despite inhabiting ranges that exist within an urban environment (Gehrt et al., 2009). Contrarily, some coyotes seemingly thrive on the human elements in areas of high urban concentration (Poessel et al., 2016).

Coyotes have a long-established history of an ability to hybridize with wolves and dogs (*Canis* spp.), and thus, their biology varies regionally. For example, the ecology of the coyotes that inhabit Maine, New Hampshire and surrounding areas have behavioural and ecological traits that are less alike to western coyotes than those that inhabit the St. Lawrence River area. Some ecologists suggest that the former have been more subjected to a degree of hybridization with eastern grey wolves (*Canis lupus*, Bekoff, 1978).

Algonquin Provincial Park has long been understood as being an area that hosts significant coyote-wolf hybridization to a significant extent. This hybridization has led to blurred distinctions between coyotes, grey wolves, and eastern wolves. The hybrid species that inhabits Algonquin Provincial Park has become ecologically and genetically unique to the extent that Algonquin wolves are suspected to have limited gene flow occurrences with neither coyote nor wolves (Rutledge et al., 2010). This hybridization is speculated by some as being the result of past wildlife research practices that relied heavily on experimental culls of wolves throughout Algonquin Park, resulting in a facilitation of wolf-coyote hybridization. It is anticipated that coyotes will be especially subjected to increased hybridization under human-driven changes to habitat and climate (Ellington and Murray, 2015).

Although coyotes have been present in North America throughout the entire Holocene, habitat and range expansion has been especially prevalent over approximately the last century (Hody and Kays, 2018). The first accounts of coyotes in Ontario were in the first quarter of the 20th century, and according to the Ontario Department of Lands and Forests, by the late 1920s there were established populations (Bekoff, 1978). For much of history, coyotes were a prairie creature (Flores, 2016), and similarly, throughout a large part of their presence in Ontario they were known as a creature of farmlands where they would predate on livestock and vulnerable small mammals, with a concurrent reduced risk of encountering large predators of their own (Person and Hirth, 1991).

2.1.1 General Diet Requirements of *Canis latrans.*

Specific components or requirements of coyote diet are hard to define, and there is limited evidence on the hunting characteristics and predatory behaviours of the coyote (Bekoff, 1978). What is known, however, is that coyotes are very opportunistic feeders, with their diets differing dramatically dependant on regional food availability. In a study that sampled coyote scats in the Adirondacks, New York, it was found that a large portion of their diet was snowshoe hare (*Lepus americanus*), with about a 36% frequency of occurrence of vegetation in the 1500 scats sampled. Throughout North America their diets can vary, with more densely forested areas hosting a less diverse diet, and in areas where there is greater habitat complexity at the landscape level, their diets will diversify. Of the many studies analyzed by Henry Hilton in the publication by Mark Bekoff (1978), snowshoe hare, eastern cottontail (*Sylvilagus floridanus*), and other small mammals made up most of the diets of coyotes. In urban areas, however, the diet can be increasingly difficult to define, as coyotes are known to supplement their intake with domestic and livestock animals. Nevertheless, much of their diet in urban settings still consists of lagomorphs and rodents when available (Gehrt, 2010). In general, the complexity presented by their generalist nature makes attempts to quantify coyote diets difficult, as their diet may differ considerably even between populations.

2.2 COYOTE MANAGEMENT IN NORTH AMERICA

2.2.1 General Management and Natural Controlling Factors to Population.

Coyotes have received ongoing persecution in North America since pioneer days, due to the nuisance that they become on farms (Bekoff, 1978), where they will consume livestock, pets, and crops (Neely, 2010). As a result, there have been efforts to control their populations with limited success; coyotes will maintain populations despite even the grandest and most expensive control efforts. In 1974, there were an estimated 295,000 coyotes harvested through eradication efforts, as reported by the US Fish and Wildlife Service (USFWS; Pearson, 1978). This estimate only includes those reported to the USFWS through a voluntary program, and the program only exists in 17 states; this number, then, does not reflect the actual number of coyotes harvested on both private and public lands when considering all of North America, and the actual number of coyotes culled by people over the last century is one that cannot be estimated accurately. Later, there were bans on various control measures.

Natural control factors for coyotes include the availability of food, which has the most significant impact on their numbers; usually the availability of a few key prey species is most limiting (Bekoff, 1978). Another factor that may have a limiting effect on distribution is competition for territory with wolves (Thurber and Peterson, 1991). Although there is evidence of hybridization between wolves and coyotes, there is also a degree of interference competition (Berger and Gese, 2007). Interference competition, or the demand for similar and limited resources between two species, could also be a factor that is driving coyotes into increasingly urban environments. Due to their small relative size and ability to stay mostly hidden when compared to larger predators like

bears or wolves, coyotes have the ability to move into urban areas that are not inhabited by any creatures larger than coyotes.

In Ontario, the culmination of factors including increasing importance of greenspace to city planning, a high number of open dump-style landfills, and agricultural and forested areas abutting many suburban regions (especially in Eastern Ontario) means infringement by coyotes.

2.2.2 Ontario Coyote Management.

According to the government of Ontario website, the Ministry of Northern Development, Mines, Natural Resources and Forestry (NDMNRF), does not actually directly take part in coyote management, and human wildlife encounters are managed by the governing municipality. The NDMNRF has some guidelines concerning coyote encounters, outlining the typical measures that should be considered when interacting with all wildlife such as: do not approach wildlife, make your presence known to the animal, do not run with your back turned from a wild animal, etc. There are also some guidelines concerning risk mitigation and prevention of dangerous interactions with coyotes, and methods that can be used to protect domestic dogs. Finally, this website also includes information on measures that can legally be taken to remove nuisance individuals from one's personal property (Ontario, 2021).

2.2.3 Coyote-Human Conflict in Urban Areas.

Coyotes have had an interesting role in politics, with many jurisdictions opting for extreme management practices that involve trying to extirpate populations entirely form certain areas. Despite this effort for several centuries, coyotes have expanded by

about 40% from historical ranges (Laliberte and Ripple, 2004; Hody and Kays, 2018). This range expansion has further increased both realized and perceived conflict in many areas. There has been limited research into the behaviour of coyotes, and as a result, many of the voids in actual scientific research are filled with speculation by the media (Gehrt et al., 2010). Often, the media exaggerates the actual threat that coyotes may pose. In fact, there have been very few conflicts with coyotes that result in human death.

2.3 COYOTE-HUMAN CONFLICT AND AN OVERVIEW OF "COYOTE POLITICS" IN COLLINGWOOD.

2.3.1 Coyote-Human Interactions in North America

In Canada, attacks by coyote are extremely rare, and the only recorded death was that of a 19-year-old in Nova Scotia who was mauled and died in the hospital from her injuries the following day (Bourjaily, 2009). In the United States, there is only one recorded human death attributed to coyote attacks, that of a three-year-old girl in 1981; comparatively, there are about 20 fatal domestic dog attacks each year in the U.S. (Bourjaily, 2009). Even though there is an extremely low actual risk, media headlines regularly exaggerate perceived risk with articles like 'Major coyote problem plaguing west end Toronto neighbourhood' (Ranger, 2021), 'Aggressive coyote problem has gone on too long' (Mills, 2020), and 'Aggressive coyote in Riverside South concerns residents' (Dyson, 2020).

2.3.2 Coyotes and their Management in Collingwood, ON

The coyote management plan in Collingwood is a co-existence plan (Town of Collingwood, n.d.). This means that coyotes are not actively removed from the area, and

instead, there are mitigation plans that aim to minimize the rate of conflict and danger to humans and their pets. This has led to many residents feeling frustrated with the Town, even provoking some to file lawsuits against the local government (Engel, 2019). The basis of a $650,000 lawsuit in 2019 was that “harbouring coyotes” in the area allows these pests to “wilfully” attack pets and is animal cruelty towards domestic pets. The conflicts are mostly perceived danger, however, and there have been no documented human injuries related to coyotes in the area. Even though the town has set out management strategies, there is very little education for locals and tourists informing them of the potential dangers, and the general population still calls for extreme management practices that involve removing all coyotes (Reddekopp, 2019).

3.0 METHODS AND MATERIALS

3.1 STUDY SUBJECTS AND AREA

This thesis study was conducted to examine the diets of a pack of Eastern Coyotes near the western limits of the Town of Collingwood in Ontario, Canada. A transect of about 3.5 km was tracked through the George Christie Nature Trail network (Figure 3.1). The transect was selected followed the existing walking trail (Figure 3.2); this route allowed the study to be completed in an area where disturbance by people is already high, and no new trails would need to be made, minimizing impact on the forest.

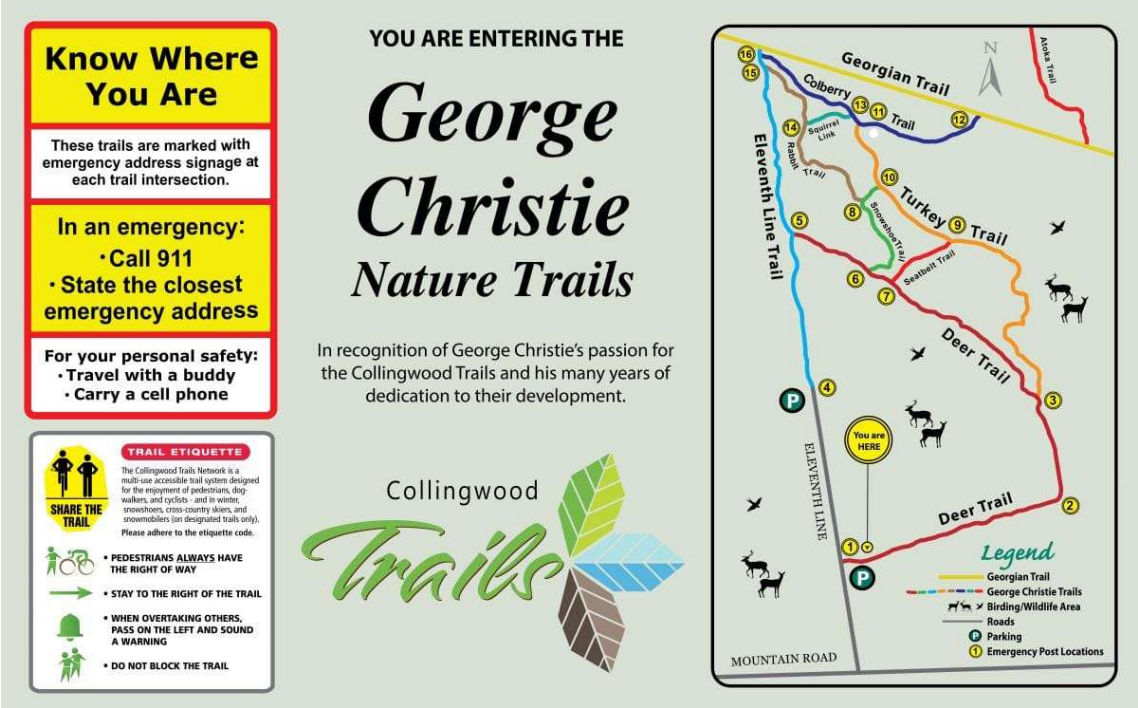

Figure 3.1: Map of the study area and trail system.

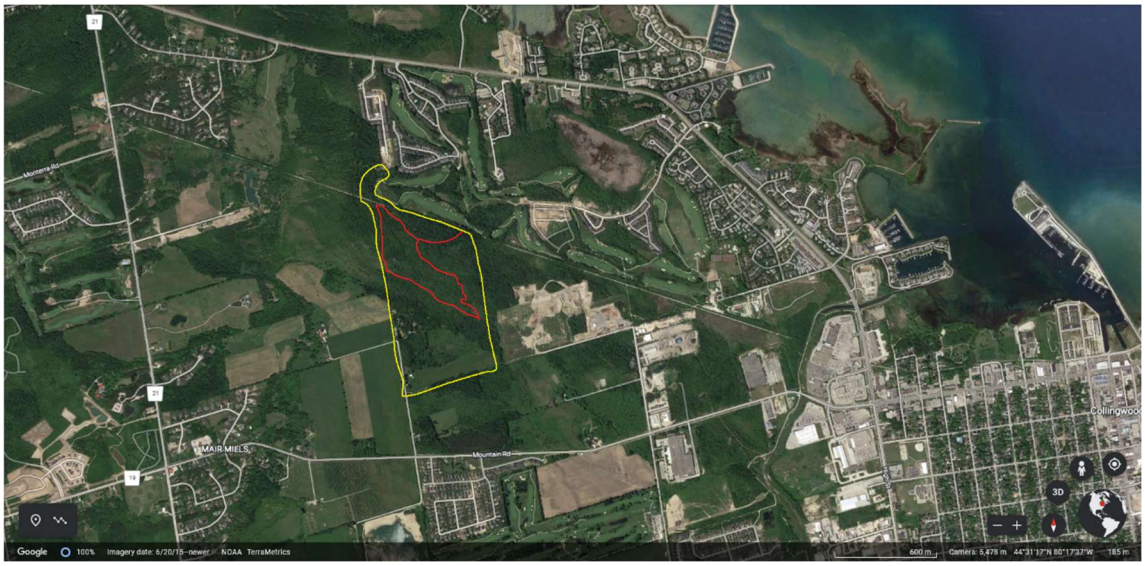

Figure 3.2. Primary transects used (red lines) and the study area boundary (yellow lines).

3.2 PRELIMINARY DATA COLLECTION

Preliminary data collection began in early January 2021, and the transect was walked a minimum of three times per week. Signs of wildlife activity, especially coyote activity, were tracked. All occurrences of coyote tracks, kill sites, scats, and other points of interest were recorded. Some photographs were taken (e.g., Figure 3.3) and a full record is found in an Appendix.

Figure 3.3: Coyote print in the snow with blood

3.3 NON-INVASIVE SCAT EVALUATION

Scat dissection methods were developed according to practices outlined in the book, *Non-invasive Survey Methods for Carnivores* (Long et al., 2018), with considerations taken from Bekoff (1978) regarding the dangers of scat handling and the

possibility of infectious disease transmission to humans. The original methods that were approved by the Lakehead University health and safety committee and animal care committee are included in an Appendix. Scat dissections occurred on average a minimum of three days per week, not usually at regular intervals, but always within two days of snowfall and one day after large rain events. Scat dissections occurred over an approximately six-week span following winter, ending when understory vegetation began to thicken (Table 3.1).

Scats were only dissected if they were identified as coyote scat, or possible coyote scat upon distant observation. When approaching a scat sample, personal protective equipment (PPE) was used, including medical grade latex gloves, safety goggles, and a properly fitting N95 mask. Hair was tied back, and all loose articles of clothing were secured. The scat was teased apart using disposable, wooden chopsticks, and features of the scat, including contents, nature, and age were recorded. When vegetation returned in the spring, the scats were placed on 0.5-mm grid paper (Figure 3.4). The use of grid paper provides scale in any the photographs taken. If scats were identified as not the product of a coyote the dissection ceased immediately. If scat contents were not able to be confidently identified using hair, bone fragments, small samples were collected in Ziplock freezer bags. After a scat was dissected, the paper and chopsticks were disposed of in a garbage bag. If samples were collected, they were labelled and placed in a second, larger Ziplock freezer bag. Gloves were removed and disposed of, hands were cleaned using hand sanitizer, and PPE was removed. Finally, before continuing the transect, final notes were taken. Bags containing samples were sanitized using a cloth with 70% isopropyl alcohol, and transferred to a larger, Ziplock freezer bag. Samples

were stored long term in the freezer, separated from household food items. Content identification was done without removing hair or bone samples from the transparent plastic bag to mitigate risk of contraction of pathogens that can occur in coyote scat. Identification was conducted using various online sources, reference images found using a web browser, and the book, *Mammals of the Great Lakes Region* (Kurta, 2017). After confident identification, the scats were replaced in the series of freezer bags, replaced in the freezer, and gloves were removed. Hands were thoroughly washed, and the workspace was sanitized.

Figure 3.4. A photograph of bone, claw, and fur samples found in a scat on March 27, 2021. The paper is a 0.5-cm grid paper.

Table 3.1. Table showing the duration of study phases.

Summary of the duration of study phases		
Study Phase	**Start Date**	**End Date**
Preliminary field investigations	January 5th, 2021	February 19th, 2021
Field investigations	February 23rd, 2021	March 12th, 2021
Scat dissections	March 19th, 2021	April 13th, 2021

4.0 RESULTS

In total, there were 76 findings, including incidental scat sightings, documented kill sites, and 28 scat dissections. The full raw data spreadsheet is in an Appendix.

4.1 PRELIMINARY OBSERVATIONS

The first phase of the field study proved to be relatively challenging as there was a high density of pedestrian traffic along the trail system throughout the entire winter and spring months, meaning that there were extremely high pet and foot traffic. This led to many of the prints being obscured or destroyed, and often identifying or recognizing coyote tracks and scats, and discerning them from domestic dog prints and tracks was a challenge (Table 4.1). Of 46 scats that were not collected for dissections, five were identified as containing eastern cottontail prey (Table 4.2). There was no garbage found in any scats. The scats contained primarily hair and bone fragments, and a large number of these scats were found to have plant matter within. Often, the plant matter was pieces of grass, cedar leaves, or pieces of bark.

Table 4.1. Summary of observations not including scats.

Case #	Date	Type of observation	Image Available (Y=1, N=0)	Description
1	2021-01-05	Kill site	1	Very bloody kill site including many paw prints, hair, small piece of bone
2	2021-01-05	Tracks	1	Several sets of tracks found near the 'busy corner'
4	2021-01-19	Tracks	1	Several sets of tracks including a trail that goes south into bush.
6	2021-01-31	Blood	1	Small blood spot near a few distinct coyote tracks
7	2021-01-31	Tracks	1	Heavy trail in 'busy corner'.
9	2021-02-03	Tracks	1	Heavy coyote traffic in 'busy corner
11	2021-02-04	Tracks	1	
13	2021-02-09	Tracks	1	Heavy coyote traffic in busy corner. Second trail evident
15	2021-02-14	Tracks	1	Continued traffic in busy corner. Few days after fresh snowfall, making new tracks apparent
16	2021-02-19	Tracks	1	Small, minimally used trail at south corner near HWY 11 trail branch.
24	2021-02-26	Kill site	1	Kill site, including chunks of hair and flesh, loose hairs, and blood
25	2021-02-26	Tracks	1	Interesting coyote print made on snow with blood
32	2021-03-11	Hair	1	Small piece of *Sylvilagus floridanus* hair found in several clusters near one another
38	2021-03-11	Hair	1	
61	2021-04-24	NOTE	0	Trail at southeast corner of transect was discovered to be multi use; rabbit poop found a few meters in and coyote tracks earlier in the season.

Case #	Date	Type of observation	Image Available (Y=1, N=0)	Description
73	2021-04-08	NOTE	0	During and following easter weekend, heavy pedestrian foot traffic in the study area may have deterred the coyotes and forced them out of the area or into hiding as no new coyote scats or signs were found.

Table 4.2. Summary of the scat observations that were not dissected

			Contents			
Case #	Date	Type of observation	Species ID	Hair	Plant matter	Bone
3	2021-01-08	Scat	*Sylvilagus floridanus*	1		
5	2021-01-21	Scat		1		1
8	2021-02-03	Scat		1		
10	2021-02-04	Scat		1		
12	2021-02-04	Scat		1		
14	2021-02-09	Scat	*Sylvilagus floridanus*	1		
17	2021-02-23	Scat		1		
18	2021-02-23	Scat		1		
19	2021-02-23	Scat		1	1	1
20	2021-02-26	Scat		1		1
21	2021-02-26	Scat		1		1
22	2021-02-26	Scat		1		1
23	2021-02-26	Scat		1	1	
26	2021-03-04	Scat				
27	2021-03-11	Scat		1	1	

			Contents			
Case #	Date	Type of observation	Species ID	Hair	Plant matter	Bone
28	2021-03-11	Scat		1		1
29	2021-30-11	Scat		1		1
30	2021-03-11	Scat		1		1
31	2021-03-11	Scat		1	1	
33	2021-03-11	Scat		1	1	1
34	2021-03-11	Scat		1	1	1
35	2021-03-11	Scat		1		
36	2021-03-11	Scat		1	1	
37	2021-03-11	Scat		1		
39	2021-03-11	Scat		1		
40	2021-03-12	Scat	*Sylvilagus floridanus*	1		
41	2021-03-12	Scat		1	1	1
42	2021-03-12	Scat		1	1	1
43	2021-03-12	Scat	*Sylvilagus floridanus*	1		
44	2021-03-12	Scat	*Sylvilagus floridanus*	1		1
45	2021-03-12	Scat		1		
46	2021-03-12	Scat		1	1	

4.2 DISSECTIONS

All dissected scats contained animal hair, yet in some cases the hair likely belonged to the coyote (Table 4.3). There were two cases where garbage was found in the scats. Identified diet components were mostly natural, including small rodents, and lagomorphs (specifically the eastern cottontail), and some plant matter.

Table 4.3. Summary of the contents of the dissections.

			Contents (1=present)						
Sample #	Case #	Date	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone
1	47	2021-03-19			1				1
2	48	2021-03-19			1				
3	49	2021-03-19			1			1	1
4	50	2021-03-19	Family Sciuridae		1	1			1
5	51	2021-03-19	*Sylvilagus floridanus*		1	1			1
6	52	2021-03-19	*Sylvilagus floridanus*		1	1			
7	53	2021-03-19	*Sylvilagus floridanus*		1	1			1
8	54	2021-03-19			1				
9	55	2021-03-23			1	1			
10	56	2021-03-23	*Procyon lotor*		1	1			
11	57	2021-03-23	*Sylvilagus floridanus*		1	1			1
12	58	2021-03-23		1	1			1	1
13	59	2021-03-24			1				1
14	60	2021-03-24	Small Rodent (Order Rodentia)		1	1		1	1
15	62	2021-03-27	Family Sciuridae		1	1			1
16	63	2021-03-27			1	1			1
17	64	2021-03-27	*Canis familiaris*		1		1		1
18	65	2021-03-27	*Canis familiaris*		1		1		1

			Contents (1=present)						
Sample #	Case #	Date	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone
19	66	2021-03-27			1	1			1
20	67	2021-03-27	*Procyon lotor*		1	1			1
21	68	2021-03-29			1				1
22	69	2021-03-30			1			1	1
23	70	2021-03-30			1				1
24	71	2021-03-30			1				1
25	72	2021-04-05		1	1				1
26	74	2021-04-13			1			1	
27	75	2021-04-13			1			1	
28	76	2021-04-13			1				

Cases 64 and 65 were the most interesting cases, where there was a substantial portion of foot bones and several claws that were identified to belong to a domestic dog (Figure 3.4). These bones were identified in at least two of the scats that were dissected (Table 4.4).

Table 4.4. Descriptions of the dissections. These descriptions appear as they were noted before formal identification of some of the contents were conducted and are the raw findings of the field dissections.

Sample #	Case #	Descriptions
1	47	Dry sample, obviously from earlier in season and was exposed by melting snow. Some bones appear to be full section of rib or similar; 1.5 to 3mm in diameter.
2	48	Also old, Similar appearance as above
3	49	Dark brown/black, several pieces of plant matter; bark and or grass. Same portion of transect as case #48
4	50	Found in puddle and very quickly disintegrated. Few degraded hairs and some small bone fragments present
5	51	Bone fragments unidentifiable, hairs indicate eastern cottontail. Case 51. 52 found near each other.
6	52	Based on colour of hairs within scat, ID'd to be Sylvilagus floridanus.
7	53	Several significant bone fragments, including the incisor of an Sylvilagus floridanus.
8	54	Scat was very slimy, degraded, and smelly. The scat was lightly teased apart before being left alone due to safety concerns about the strange colour and smell of the scat.
9	55	Large and heavily degraded. Hairs were taken home for ID but due to the nature of these hairs ID was impossible
10	56	Due to the length, thickness, and colour of the hair, it indicates that it belonged to a raccoon.
11	57	Hair could not be identified due to heavy degradation. A sample of bone was taken home, and although species could not be determined, it was part of the lower mandible of a Sylvilagus floridanus.
12	58	Close to case number 57, but different age so it was treated as an individual sample. Mostly degraded hairs and some small bone fragments, a piece of ribbon/garbage. Bones were taken home to ID, but due to the severe degradation, no conclusions could be made.
13	59	One small bone that looked like a claw but was later determined to be a fragment of a larger bone.
14	60	Based on the contents, the individual that produced this scat was self grooming. The jawbone found within the scat was not identifiable by

Sample #	Case #	Descriptions
		species but was determined to belong to a small rodent of some sort. Also, evidence that the coyote devoured some sort of plant due to the contents of small seeds in the scat.
15	62	The bone taken home for identification was not able to be identified due to its severe degradation and being broken. The hair content in the scat (length, colour), indicated that this belonged to a squirrel.
16	63	No significantly large bone fragments but based on a few of the distinct bones and the colour of the hair, determined to belong to an Sylvilagus floridanus, but cannot be sure.
17	64	Very distinct claw found
18	65	Distinct bone structures and hairs.
19	66	Case 66, 67 closes together but are treated individually due to difference in colour and space between them: Contents indicate rabbit, but no confident ID can be made.
20	67	Several small bones and one claw were found in this scat. All scats on the 27th were found within a few hundred meters of the busy corner. Claw is representative of a raccoon, and one of the bones were determined to be of a broken baculum
21	68	This scat contained large, tough, dark red piece of meat that was mostly undigested. This could give indications on the health of the individual that produced it.
22	69	some hairs and bone, too degraded for ID purposes. Th ere were small pieces of what appeared to be dead cedar leaves
23	70	Bones too large to be from a squirrel or rabbit but too broken for identification purposes, probably a larger mammal. Similar hair and plant matter as case 69
24	71	The size of bones and colour of hair indicated that this was a squirrel, but cannot make a confident ID.
25	72	There was a small piece of garbage, other hairs present indicated that this belonged to a smaller mammal like a squirrel but hairs were too bleached to make a confident ID.
26	74	Dark brown, with chalky white and black portions. Lots of hair but none of it was identifiable.
27	75	Dark brown and very wet, minimal hair but lots of cedar leaves and grasses.
28	76	Most of the scat was gone, and all that was left was hair likely due to the recent rainfall event. No other notes to make.

Although best efforts were taken to identify their contents, not all dissected scats had confident identification of their contents, and these cases are not included in analysis (Table 4.5) Most of the scats that had their contents identified were that of Eastern cottontail rabbit (*Sylvilagus floridanus*). All of the scats examined contained hair from prey species, and 70% of scats had fragments of bone. Only about 7% of scats contained traces of garbage, and the traces found were small (i.e., a small piece of foil food packaging); an identical rate of occurrence of pet remains in scats were found. Both samples that had evidence of *Canis familiaris* had pieces of bone and claw that appeared to be from the same prey individual, indicating that multiple individuals ate from one dog (Figure 4.1). Twenty percent of the scats had traces of vegetation in them. Many scats and tracks were located on what was called the 'busy corner' of the trail system (Figure 4.2).

Table 4.5. Interpretation of the contents of the scats found during dissections.

Scat Content	Total	Average Occurrence (Decimal)	Average Occurrence (%)
Garbage	2	0.071	7.143
Hair	28	1.000	100.000
Confirmed wildlife	11	0.393	39.286
Pet	2	0.071	7.143
Plant matter	6	0.214	21.429
Bone	20	0.714	71.429

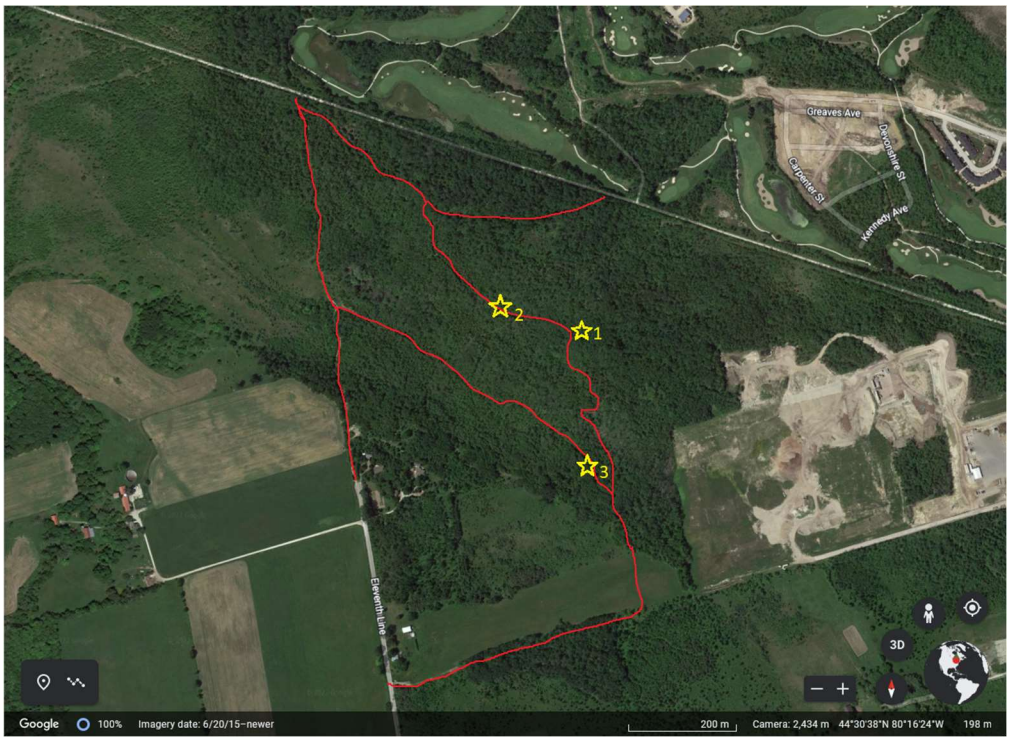

Figure 4.1. Map Highlighting Key points of interest in the results of the thesis study. Star 1: the 'busy corner', or the corner of the transect that had the highest activity and where a constant trail was observed being used by coyotes. Star 2: the location at which one of the scats containing evidence of *Canis familiaris* was found; the other was found between star 1 and 2. Star 3: The location of a large kill site, and the first strong supporting evidence of coyotes observed during this study.

Figure 4.2. Collage of images taken of the ‘busy corner,’ or star one on the map (Figure 4.2) in several different seasons from the beginning of January to near the end of the Study period. Top Left: Feb 03/21; Top Right: Feb 09/21; Bottom Left: Feb 14/21; Bottom Middle: Mar 12/21; Bottom Right; Mar 24/21.

5.0 DISCUSSION

The frequency of contents found in the coyote scats was not different from what has been found in other studies (Bekoff, 1978; Gehrt et al., 2010). However, the rates of garbage in the scats observed were extremely low considering the proximity of the study site to subdivisions and a landfill site. The scats that contained domestic dog (*Canis familiaris*) were found just after the March break holiday; during this time, there is a massive influx of tourism to the area and especially to the nearby Blue Mountain Ski Resort. During busy weekends, all hiking trails in the area are visited by many, and its proximity to the city and relatively flat terrain means that the GCNT receives a large amount of this tourism. The exact breed and origin of the dog that was found within this scat is unknown.

In many cases, identification of the species within the scats was uncertain. DNA testing would have allowed identification of the contents of each scat. A system of game cameras and GPS collars on coyotes would have allowed more information on their behaviour and movement patterns. The single dimension of data that was collected in this study prevented any statistical analysis. Further research should be conducted on the diet, distribution, and behaviour of the several coyote packs within the Town of Collingwood's area to understand interactions between packs and evaluate what risks coyotes may pose to residents. To understand the changes to coyote behaviour as they move into increasingly urban areas is a difficult question to evaluate and requires new and historic data to answer. There is no one definition of coyote diet, and their opportunistic feeding habits make diet difficult to understand. When compared to what

their pre-expansion ancestors may have fed on, coyote diet has likely been changed significantly.

It is recommended that the Town of Collingwood increase education regarding coyotes through a program of signage. Notices could be posted in places such as the town hall, in public buildings, local hotels, resorts and other high traffic areas. Specific ideas include an informative board near the waterfront or terminal area, at trailheads, and near the museum. The notices would warn tourists about the potential risks to their pets and the minimal, however present, risk to their own safety. Increasing awareness and education should prove to be an asset in mitigating risk.

6.0 CONCLUSION

The study was successful in conducting an analysis of the diet of the subject pack of coyotes. If further or more detailed information had been collected, such as the genetics of the contents of the scat, much more could be learned about their diets. Regardless, valuable data was collected during this study, and I can confidently conclude that to an extent, periurban coyote diets do contain some ‘non-natural’ food items. If the Town of Collingwood wishes to continue their co-existence management plan, it is suggested that information about coyotes be made more available to residents and visitors. Much of the risk associated with the presence of coyotes is only perceived risk exacerbated by the media, and if public education took place, then the conflicts between residents and the coyote population may be lessened.

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8.0 APPENDICES

8.1 Appendix I: Photo Library

Photographs are labelled with the date and time that they were captured at. Not all of these photos are included in the summary of the findings as they may be unrelated to the scope of the field study work. The photo library contains all images that were captured during the field work portion of this thesis study. The photograph labels can be interpreted as such: yyyymmdd_hhmmss. For example, the first image was taken on the fifth of January 2021 at 15:52:18.


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20210105_155224


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8.2 Appendix II: Raw Data Spreadsheet

						Contents (if scat)	(0=NO, 1=Yes)						
Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
1	2021-01-05	Kill Site	1	16:00	44.50630, -80.26520	Sylvilagus floridanus		1	1				Very bloody kill site including many paw prints, hair, small piece of bone
2	2021-01-05	Tracks	1	16:20									Several sets of tracks found near the 'busy corner'
3	2021-01-08	Scat	1	12:24		Sylvilagus floridanus		1	1				
4	2021-01-19	Tracks	1	12:09									Several sets of tracks including a trail that goes south into bush.
5	2021-01-21	Scat	1	10:41		Unknown		1				1	Medium sized scat with hair and a few visible bone fragments.
6	2021-01-31	Blood	1	12:25									Small Blood spot near a few distinct coyote tracks

						Contents (if scat)	(0=NO, 1=Yes)						
Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
7	2021-01-31	Tracks	1	12:34									Heavy trail in 'busy corner'.
8	2021-02-03	Scat	1	10:33		Unknown		1					Found about 150m south on trail from busy corner
9	2021-02-03	Tracks	1	10:40									Heavy coyote traffic in 'busy corner
10	2021-02-04	Scat	1	10:57		Unknown		1					Medium sized scat with hair
11	2021-02-04	Tacks	1	11:00									
12	2021-02-04	Scat	1	11:02		Unknown		1					

						Contents (if scat)	(0=NO, 1=Yes)						
Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
13	2021-02-09	Tracks	1	11:53									Heavy coyote traffic in busy corner. Second trail evident
14	2021-02-09	Scat	1	12:03		Sylvilagus floridanus		1	1				Very small scat with obvious rabbit hair
15	2021-02-14	Tacks	1	11:58									Continued traffic in busy corner. Few days after fresh snowfall, making new tracks apparent
16	2021-02-19	Tacks	1	15:22									Small, minimally used trail at south corner near HWY 11 trail branch.
17	2021-02-23	Scat	1	16:03				1					Medium sized scat with many brown, black, and white hairs

						Contents (if scat)	(0=NO, 1=Yes)						
Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
18	2021-02-23	Scat	1	16:12				1					small scat, few apparent hairs. Relatively fresh.
19	2021-02-23	Scat	1	16:12				1			1	1	medium sized scat with few apparent hairs, some small bone fragments, and what looks like pieces of plant matter
20	2021-02-26	Scat	1	12:31				1				1	medium sized chalky white and weathered scat with apparent hairs and some bones
21	2021-02-26	Scat	1	12:21				1				1	Additional white and chalky scat, this one possibly from

						Contents (if scat)	(0=NO, 1=Yes)						
Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
													same individual but was documented separately due to obvious colour difference.
22	2021-02-26	Scat	1	12:35				1				1	large scat including some hair, plant matter and one piece of undigested flesh.
23	2021-02-26	Scat	1	12:49				1			1		Medium sized scat with hair and plant matter
24	2021-02-26	Kill Site	1	12:52		Sylvilagus floridanus		1	1				Kill site, including chunks of hair and flesh, loose hairs, and blood

						Contents (if scat)	(0=NO, 1=Yes)						
Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
25	2021-02-26	Tracks	1	12:55									Interesting coyote print made on snow with blood
26	2021-03-04	Scat	1	16:39									
27	2021-03-11	Scat	1	8:34	44.40957, -80.26995			1			1		Scat with hair and grass
28	2021-03-11	Scat	1	8:35				1				1	
29	2021-30-11	Scat	1	8:36				1				1	
30	2021-03-11	Scat	1	8:37				1				1	
31	2021-03-11	Scat	1	8:37				1			1		All of the above on the 11th were found in a cluster of about 20 m portion of trail between

						Contents (if scat)	(0=NO, 1=Yes)						
Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
													southeast intersection and the busy corner
32	2021-03-11	Hair	1	8:48		Sylvilagus floridanus							Small piece of Sylvilagus floridanus hair found in several clusters near one another
33	2021-03-11	Scat	1	8:50	44.50533, -80.26314			1			1	1	Very densely populated scat
34	2021-03-11	Scat	1	8:50				1			1	1	The above 2 samples were found close to one another, could be from same specimen but were counted as individual scats

						Contents (if scat)	(0=NO, 1=Yes)						
Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
35	2021-03-11	Scat	1	8:58	44.50772, -80.26493			1					
36	2021-03-11	Scat	1	9:05				1			1		
37	2021-03-11	Scat	1	9:06	44.51022, -80.26802			1					
38	2021-03-11	Hair	1	9:06		Sylvilagus floridanus		1					
39	2021-03-11	Scat	1	9:07	44.51027, -80.26808			1					
40	2021-03-12	Scat	1	12:01	44.51229, -80.270509	Sylvilagus floridanus		1					Small tuft of rabbit hair found. Likely from earlier in the year as there was a significant amount of

						Contents (if scat)	(0=NO, 1=Yes)						
Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
													snow melt in the days leading up
41	2021-03-12	Scat	1	12:08				1			1	1	
42	2021-03-12	Scat	1	12:15	44.50507, -80.26308			1			1	1	
43	2021-03-12	Scat	1	12:16		Sylvilagus floridanus		1					Obvious Rabbit hairs within the scat
44	2021-03-12	Scat	1	12:17		Sylvilagus floridanus		1				1	Obvious Rabbit hairs within the scat
45	2021-03-12	Scat	1	12:17				1					
46	2021-03-12	Scat	1	12:23	44.50688, -80.26674			1			1		

Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Contents (if scat) Species ID	Contents (0=NO, 1=Yes) Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
						Contents (if scat)	(1=present)						
Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Species ID?	Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
47	2021-03-19	Dissection	1	14:36				1				1	Dry sample, obviously from earlier in season and was exposed by melting snow. Some bones appear to be full section of rib or similar; 1.5 to 3mm in diameter.
48	2021-03-19	Dissection	0					1					Also old, Similar appearance as above

						Contents (if scat)	(0=NO, 1=Yes)						
Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
49	2021-03-19	Dissection	1	14:45				1			1	1	Dark brown/black, several pieces of plant matter; bark and or grass. Same portion of transect as case #48
50	2021-03-19	Dissection	1	14:53	44.50673, -80.26664	Family Sciuridae		1	1			1	Found in puddle and very quickly disintegrated. Few degraded hairs and some small bone fragments present
51	2021-03-19	Dissection	1	15:03	44.504996, -80.263463	Sylvilagus floridanus		1	1			1	Bone fragments unidentifiable, hairs indicate eastern cottontail. Case 51. 52 found

						Contents (if scat)	(0=NO, 1=Yes)						
Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
													near each other.
52	2021-03-19	Dissection	1	15:12		Sylvilagus floridanus		1	1				Based on colour of hairs within scat, ID'd to be Sylvilagus floridanus.
53	2021-03-19	Dissection	1	15:15		Sylvilagus floridanus		1	1			1	Several significant bone fragments, including the incisor of an Sylvilagus floridanus.
54	2021-03-19	Dissection	1	15:15				1					Scat was very slimy, degraded, and smelly. The scat was lightly teased apart before being left alone due to safety

						Contents (if scat)	(0=NO, 1=Yes)						
Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
													concerns about the strange colour and smell of the scat.
55	2021-03-23	Dissection	1	10:53				1	1				Large and heavily degraded. Hairs were taken home for ID but due to the nature of these hairs ID was impossible
56	2021-03-23	Dissection	0	11:02	44.510491, -80.270089	Procyon lotor		1					Due to the length, thickness, and colour of the hair, it indicates that it belonged to a raccoon.
57	2021-03-23	Dissection	0			Sylvilagus floridanus		1	1			1	Hir could not be identified due to heavy

						Contents (if scat)	(0=NO, 1=Yes)						
Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
													degradation. A sample of bone was taken home, and although species could not be determined, it was part of the lower mandible of a Sylvilagus floridanus.
58	2021-03-23	Dissection	1	11:41	44.511395, -80.270074		1	1			1	1	Close to case number 57, but different age so it was treated as an individual sample. Mostly degraded hairs and some small bone fragments, a piece of ribbon/garbage. Bones were

						Contents (if scat)	(0=NO, 1=Yes)						
Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
													taken home to ID, but due to the severe degradation, no conclusions could be made.
59	2021-03-24	Dissection	1	10:30	44.50796, -80.26594			1				1	One small bone that looked like a claw but was later determined to be a fragment of a larger bone.
60	2021-03-24	Dissection	1	10:43	44.504635, -80.263346	Small Rodent (Order Rodentia)		1	1		1	1	Based on the contents, the individual that produced this scat was self grooming. The jawbone found within the scat was not identifiable by species but was determined to

						Contents (if scat)	(0=NO, 1=Yes)						
Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
													belong to a small rodent of some sort. Also, evidence that the coyote devoured some sort of plant due to the contents of small seeds in the scat.
61	2021-04-24	NOTE											Trail at southeast corner of transect was discovered to be multi use; rabbit poop found a few meters in and coyote tracks earlier in the season.

						Contents (if scat)	(0=NO, 1=Yes)						
Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
62	2021-03-27	Dissection	1	14:17		Family Sciuridae		1	1			1	The bone taken home for identification was not able to be identified due to its severe degradation and being broken. The hair content in the scat (length, colour), indicated that this belonged to a squirrel.
63	2021-03-27	Dissection	1	14:33				1	1			1	No significantly large bone fragments but based on a few of the distinct bones and the colour of the hair,

						Contents (if scat)	(0=NO, 1=Yes)						
Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
													determined to belong to an Sylvilagus floridanus, but cannot be sure.
64	2021-03-27	Dissection	1	14:40	44.506804, -80.263097	Canis familiaris		1		1		1	Very distinct claw found
65	2021-03-27	Dissection	1	14:50		Canis familiaris		1		1		1	Distinct Bone structures and hairs.
66	2021-03-27	Dissection	1	15:00				1	1			1	Case 66, 67 closes together but are treated individually due to difference in colour and space between them: Contents indicate rabbit, but no confident ID can be made.

						Contents (if scat)	(0=NO, 1=Yes)						
Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
67	2021-03-27	Dissection	1	15:05		Procyon lotor		1	1			1	Several small bones and one claw were found in this scat. All scats on the 27th were found within a few hundred meters of the busy corner. Claw is representative of a raccoon, and one of the bones were determined to be of a broken baculum
68	2021-03-29	Dissection	1	17:50				1				1	This scat contained large, tough, dark red piece of meat that was mostly undigested. This could give

						Contents (if scat)	(0=NO, 1=Yes)						
Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
													indications on the health of the individual that produced it.
69	2021-03-30	Dissection	1	14:10	44.509179, -80.267378			1			1	1	some hairs and bone, too degraded for ID purposes. Th ere were small pieces of what appeared to be dead cedar leaves
70	2021-03-30	Dissection	1	14:18	44.510591, -80.268863			1				1	Bones too large to be from a squirrel or rabbit but too broken for identification purposes, probably a larger mammal. Similar hair and plant

						Contents (if scat)	(0=NO, 1=Yes)						
Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
													matter as case 69
71	2021-03-30	Dissection	1	14:30				1				1	The size of bones and colour of hair indicated that this was a squirrel, but cannot make a confident ID.
72	2021-04-05	Dissection	1	13:31	44.508226, -80.266407		1	1				1	There was a small piece of garbage, other hairs present indicated that this belonged to a smaller mammal like a squirrel but hairs were too bleached to make a confident ID.

						Contents (if scat)	(0=NO, 1=Yes)						
Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
73	2021-04-08	NOTE											During and following easter weekend, heavy pedestrian foot traffic in the study area may have deterred the coyotes and forced them out of the area or into hiding as no new coyote scats or signs were found.
74	2021-04-13	Dissection	1	14:26	44.50779, -80.26476			1			1		Dark brown, with chalky white and black portions. Lots of hair but none of it was identifiable.

						Contents (if scat)	(0=NO, 1=Yes)						
Case #	Date	Type (Kill/feeding site, tracks, scat)	Image Available (Y=1, N=0)	Time	Location (if available)	Species ID	Garbage	Hair	Wildlife	Pet	Plant matter	Bone	Description
75	2021-04-13	Dissection	1	14:31	44.50779, -80.26518			1			1		Dark brown and very wet, minimal hair but lots of cedar leaves and grasses.

76	2021-04-13	Dissection	1	14:44	44.510836, -80.269414			1					Most of the scat was gone, and all that was left was hair likely due to the recent rainfall event. No other notes to make.

8.3 Appendix III: Original Dissection and Sampling Methods Sheet

Materials

Dissection Kit

- Disposable bamboo chopsticks
- Recycled plastic water bottle.
- White, 8.5” x 11” printer paper
- Plastic sandwich bags.
- A garbage bag.
- Grid paper.

PPE/Other Materials

- N95 Respirator
- Disposable Gloves
- Safety Goggles
- Alcohol-based hand sanitizer.
- Concentrated bleach
- Smartphone camera
- Smartphone notepad

Sampling

A pre-determined transect will be followed during each day of sampling. While following this transect, the walking trail, and the forest floor either side of the walking trail will be scanned for scats, and other signs left behind by coyotes. Scats and hair samples will be identified from no less than one- and one-half meter for identification purposes; if the scat or hair is identified as coyote related, PPE will be put on before they are handled,

PPE includes the N95 respirator to mitigate risk of contracting any illness that can be transmitted through respiration. Gloves and goggles will be worn to prevent infection of any disease or virus that can be transmitted through skin contact. After dissection, PPE will be taken off carefully, the gloves discarded, and hands will be disinfected.

Any scats that appear bloody will not be dissected to avoid any possibility of infection of any bloodborne diseases that are transmissible to humans.

First, the scat will be placed on a sheet of grid paper, pictures taken, and the scat will then be teased apart using the chopsticks. Notes (using voice to text on a smartphone) will be made about the contents of the scat, including but not limited to pieces of bone, hair, seeds, sticks, and garbage. Hairs and bones that cannot be identified in the field will be placed in plastic (Ziploc) bags to be later identified using a key. More images will be taken after the dissection of the scat including any bone or other fragments that are found within.

After dissection, the printer paper will be placed in the garbage bag, and the dirtied chopsticks will be placed in a second plastic bag so that they can be disinfected later and re-used.

Upon returning home; - the garbage bag containing the paper and gloves will be thrown away

- The hairs that were placed in bags will be identified using keys. The hairs will not be removed from the plastic bags at any time, and hands will be disinfected after handling the bags. The samples will be discarded after identification.
- The chopsticks will be cleaned using concentrated bleach before they are used in more dissections.