



Miistakis
Institute

City of Calgary: Wildlife Camera Monitoring

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Document prepared for City of Calgary

City of Calgary: Wildlife Camera Monitoring

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City of Calgary: Wildlife Camera Monitoring

Introduction

The City of Calgary is well known for its park system and the entire municipal parks system makes up over 70 km² of land. Additionally, the network is enhanced by Fish Creek Provincial Park, a large (~13 km²) park extending east from the city limits to the confluence of Fish Creek and the Bow River. The resulting riparian habitat corridors provide opportunities for wildlife movement; however, fragmentation of these areas due to urban growth is an ever-increasing threat to maintaining healthy wildlife populations. The City of Calgary (The City) recognizes this and is committed to developing strategies to best protect them.

Limited information regarding the species that inhabit our city and urban parks limit our ability to maintain healthy wildlife populations. A multiyear wildlife monitoring program will determine wildlife presence within City of Calgary Parks, to help inform our understanding and management of urban wildlife. The results of this analysis will help to inform strategic planning in relation to implementation of the Calgary BiodiverCity Strategy, Natural Areas Park Management Plan, as well as individual park management plans. In addition, a citizen science project to classify remote camera images will spread awareness and engage Calgarians in wildlife monitoring.

Objectives

(Tracy)

Study Design

61 motion-activated cameras will be deployed across 12 City of Calgary parks and 1 provincial park. 41 of these cameras are City owned. The 20 cameras deployed in Glenmore/Weaselhead Park are owned and operated by SAIT students. The study is designed to passively capture medium and large sized mammals. Cameras will be primarily placed on trails, which are known travel routes by mammals. Cameras will initially be checked every two weeks to switch out SD cards and monitor battery level.

Target Species

The project is designed to track multiple species, with intention to capture the maximum number of species. As such, camera alignment will be positioned to capture medium and large species, which are more easily detected on motion activated cameras than small species.¹ As such, target species for this project are moose, elk, deer, black bear, coyote, cougar, bobcat and fox. Small species such as skunk, raccoon, porcupine and badger, will be recorded incidentally.

Human Use

Information on off-trail human use and off-leash domestic dog presence may be useful in how the City manages off-trail park use. However, human images containing recognizable faces cannot be made public onto the Zooniverse citizen science portal, and cannot be kept on file by the City for more than two weeks. During initial project months, human and domestic dog presence will be recorded, and images deleted, by Miistakis. If this effort proves to consume more time than project resources allow, software to reduce facial recognition on images prior to upload to Zooniverse will be considered.

Camera Survey Site Selection

The City of Calgary has over 70 km² of natural areas and due to practical constraints around camera management it was not deemed possible to place cameras through-out the entire parks system. To identify natural areas for the camera survey, a workshop was held with urban conservation staff to identify and prioritize natural areas to monitor. The following parameters were considered:

- Focus on core natural areas, which we defined as over 25 hectares in size;
- Target species include large to medium sized mammals;
- Natural areas that play a key role in connecting core natural areas within the City; and
- Some representation of all four city quadrants (SE, SW, NE, NW).

The City of Calgary defines natural areas as different asset types, such as major natural environment park, special protection environment, supporting natural environment, buffering natural environment, other parks and natural zones, remnant environment and wetland environment. For consideration of urban parks for wildlife monitoring we first considered major natural environment parks and special protection environment (Figure 1).

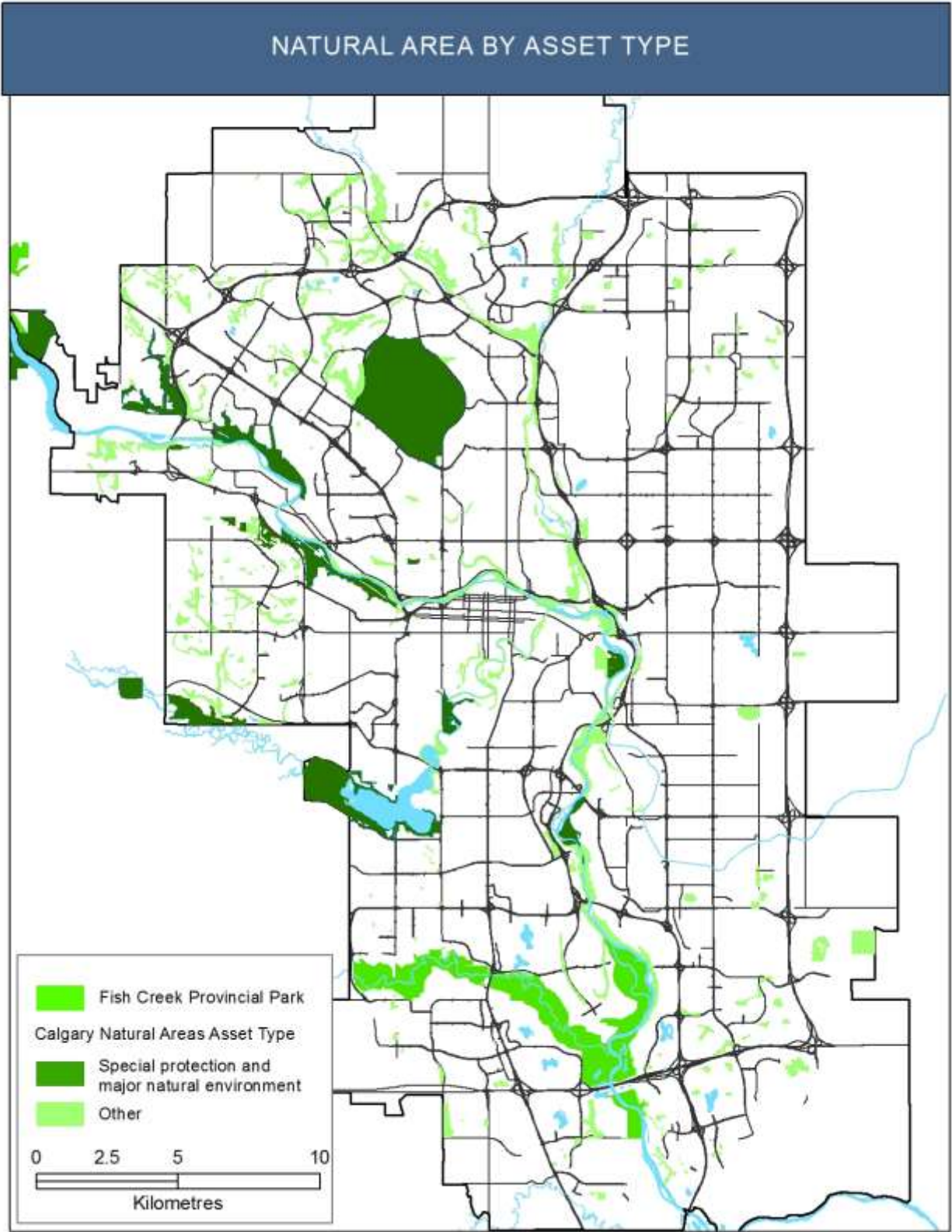


Figure 1: Natural Areas by Asset Type

To prioritize natural areas for monitoring, the following information was reviewed:

Structural connectivity analysis

311 wildlife data

Survey Duration (T)

Camera Placement(T)

Camera Management

The 41 City owned cameras will be deployed by Miistakis with support from the City, and will be maintained by Miistakis through the end of 2017. The 20 cameras owned by SAIT will be relocated throughout Glenmore/ Weaselhead to fit project needs, and will be maintained by SAIT students with support from Miistakis. Throughout the project duration, the cameras will need to be regularly maintained, to ensure battery life is sufficient, change out SD cards to collect data, and ensure the cameras have not been damaged or stolen.

Camera Equipment

The project equipment consists of Spypoint Solar trail cameras, security cases, cable locks with keys, SD cards and back-up AA batteries. The cameras have a built in solar panel and rechargeable lithium battery, with the AA batteries available as a backup. In the case all camera battery power is depleted, the camera will shut off, and will automatically resume power, retaining all previously installed settings once the solar panel has sufficiently charged the battery.

The cameras' lithium batteries must be charged for 48 hours following long periods of no use. Ensure the camera settings are updated with the correct date and time, and are consistent with the following settings.

Settings - Photo	
Delay	Instant
Multi-shot	1
Settings - General	
Sensitivity	High
Info on photos	Yes
Night mode	Optimal

Permitting and signage

The City is in the process of permitting the use of cameras within the selected parks, and for creating and installing signage. Signs will be placed at park access points, and will inform park users of the cameras' existence. Each camera has a small sticker stating "Wildlife Monitoring Study in Progress. Cameras are property of the City of Calgary. Questions please call 311."

Inventory

City cameras, corresponding security cases, cable locks and keys are labeled with small stickers numbered 1 - 41. Cameras 42-61 are SAIT student cameras. The camera number corresponds to the park and GPS location. The cameras are labeled on the left side, the security cases are labeled on the right side. Cable locks and keys are also labeled with corresponding inventory number, and keys are stored by park on keyrings. GPS locations will be recorded for each camera number upon camera installment. See Appendix I for a spreadsheet listing each camera's serial number, inventory number, park location and GPS coordinates.

Camera Maintenance

Camera maintenance includes visiting each camera to collect the SD card and check that the battery level is sufficient. Camera checks will occur every second week, for two months after the initial camera deployment. During this time, we will be monitoring that the batteries remain sufficiently charged, SD cards don't fill to data capacity, and if camera theft and/or vandalism is occurring. Findings will inform if camera checks can instead occur every third or fourth week, and if any cameras need to be placed in an alternate location. Camera checks can occur at any day during the week, as photos captured are labeled with dates and times. See Appendix 2 for the proposed camera deployment and proceeding maintenance schedule.

Camera maintenance equipment:

- Keys to the cable locks for each camera to be checked (keys are marked with the appropriate inventory number)
- One blank SD card for each camera
- SD card cases clearly labeled with the camera inventory numbers
- Extra AA batteries

Data Management

Immediately following camera tracking, camera SD cards will be uploaded, saved into folders corresponding to the parks and camera number. Images are uploaded onto the Image Loader database and then onto the Zooniverse portal to crowdsource image classification. Images will be screened for human presence prior to being uploaded onto the Zooniverse platform. After recording human use, the photos will then be deleted. Should time spent classifying and deleting human images exceed project resources, software that rids of facial recognition may be assessed and implemented.

Appendix I: Camera Inventory Spreadsheet

Figure 1: Inventory of cameras and locations.

Camera #	Inventory #	Park	GPS Location
201665075	1	Edworthy	tbd
201665978	2	Edworthy	
201665866	3	Edworthy	
201665577	4	Edworthy	
201665079	5	Edworthy	
201665824	6	Ralph Klein	
201665850	7	Ralph Klein	
201665830	8	Fish Creek	
201631499	9	Fish Creek	
201623505	10	Fish Creek	
201623137	11	Fish Creek	
201665098	12	Fish Creek	
201665090	13	Fish Creek	
201665315	14	Fish Creek	
201623059	15	Fish Creek	
201665957	16	Fish Creek	
201623065	17	Fish Creek	
201669791	18	Griffith Woods	
201665324	19	Griffith Woods	
201669762	20	Griffith Woods	
201665129	21	Inglewood Bird Sanctuary	
201623166	22	Inglewood Bird Sanctuary	
201623111	23	Tom Campbell/Tellus	
201623078	24	Confluence	
201665613	25	Confluence	
201665965	26	Nosehill	
201623058	27	Nosehill	
201669776	28	Nosehill	
201665175	29	Nosehill	
	30	Nosehill	
	31	Nosehill	
	32	Edgemont Rivine	
	33	Edgemont Rivine	
	34	Edgemont Rivine	
	35	Bowmont	

	36	Bowmont	
	37	Bowmont	
	38	Bowmont	
	39	Haskayne	
	40	Paskapoo Slopes	
	41	Paskapoo Slopes	
SAIT #	SAIT #	Glenmore/Weaselhead	
SAIT #	SAIT #	Glenmore/Weaselhead	
SAIT #	SAIT #	Glenmore/Weaselhead	
SAIT #	SAIT #	Glenmore/Weaselhead	
SAIT #	SAIT #	Glenmore/Weaselhead	
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SAIT #	SAIT #	Glenmore/Weaselhead	

Appendix II: Draft Schedule of Camera Deployment and Checks

Figure 2: Draft camera deployment schedule.

Park	# of cameras	Proposed Deployment Date
Fish Creek	10	May 2nd
Glenmore/Weaselhead	20 (SAIT)	May 3rd
Griffith Woods	3	May 3rd
Ralph Klien	2	May 4 th
Edworthy	5	May 9 th
Paskapoo Slopes	2	May 9 th
Bowmont	4	May 9 th
Haskayne	2	May 10 th
Nosehill	6	May 11 th
Edgemont	2	May 11 th
Confluence	2	May 16 th
Inglewood Bird Sanctuary	2	May 16 th
Tom Campbell/Tellus	1	May 16 th

Figure 3: Draft camera maintenance schedule. Cameras are to be checked every two weeks, through the end of June, when altering schedule to every third or fourth week will be considered. Parks will be grouped into two rotations to stagger the maintenance schedule.

Rotation one: Glenmore/Weaselhead, Fish Creek, Griffith Woods, Ralph Klein and Edworthy.
Rotation two: Inglewood, Tom Campbell/ Tellus, Confluence, Nosehill, Edgemont, Bowmont, Paskapoo and Haskayne

MAY

SUN	MON	TUES	WED	THURS	FRI	SAT
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
	Rotation One					
21	22	23	24	25	26	27
	Rotation Two					
28	29	30	31			
	Rotation One					

JUNE

Sun	Mon	Tues	Wed	Thurs	Fri	Sat
				1	2	3
				Rotation One		
	5	6	7	8	9	10
	Rotation Two					
11	12	13	14	15	16	17
	Rotation One					
18	19	20	21	22	23	24
	Rotation Two					
25	26	27	28	29	30	
	Rotation One					

