

# Seattle Urban Carnivore Study

## *July 2017 Progress Report to Seattle Department of Parks & Recreation*

Prepared by:

Mark J. Jordan  
Associate Professor  
Department of Biology  
Seattle University  
901 12th Ave., Seattle, WA 98122  
(206) 220-8265, [jordanma@seattleu.edu](mailto:jordanma@seattleu.edu)

## **Background**

The Seattle Urban Carnivore Study is an ongoing research project to increase our understanding of the wildlife that inhabits our city. Although the focus of the study is carnivorous mammals (e.g. raccoons, opossums), we incidentally collect data on other mammals as well as some species of birds. Our primary methods are noninvasive camera traps and genetic analysis of hair samples. The primary goals of the study area to

- Document the mammalian species that inhabit the Seattle area
- Determine the factors that affect the presence of different carnivorous species.
- Identify areas of high habitat connectivity for these species.

## **Description of methods**

Every summer since 2014, we have deployed baited wildlife survey stations in parks in southeast and West Seattle in three-week sessions (Table 1, Figure 1). The south Seattle stations are set up during July and the West Seattle ones in August. We visit each station twice per week to refresh bait and lure.

After each field season, we process the images from the camera traps and analyze them using a method called occupancy modeling. This method allows us to evaluate which environmental variables can be used to predict the presence or absence of particular species. Starting with 2016, we are using the Smithsonian's eMammal camera trap data platform to code our data. Our project page is at <https://emammal.si.edu/seattle-university>, where you can view camera trap locations and see some of our "Five Star" images.

For genetic analysis, we extract DNA from hair samples. We are currently developing protocols to identify the sample to the species level and to generate a "fingerprint" of each

sample that will allow us to estimate movement of raccoons and opossums throughout urban habitats in southern Seattle.

## **Results**

We have detected a variety of mammal species in parks and greenspaces in south and West Seattle (Table 2). Opossums and raccoons accounted for the highest number of total photographs, although opossums were not as widespread as raccoons or domestic dogs and cats. Occupancy analysis suggests that opossums respond negatively to increasing levels of urbanization, while raccoon response is neutral or even positive. Photographs of coyotes were relatively rare, which may be attributable to the design of the camera trap; our survey stations tend to be located in brushy areas away from trails, and coyotes might be wary of entering these locations.

## **Future directions**

In spring 2017, we completed some preliminary surveys along the Duwamish River between Tukwila and Harbor Island, which filled in a geographical gap in our surveys (data not shown here). We are continuing the same sampling protocol in summer 2017, although we are placing some of our cameras along game trails to hopefully increase our capture rates of coyotes. We are also continuing to develop our genetic methods in order to evaluate habitat connectivity.

## **Further information**

If you would like more detailed information about a particular park or natural area, please contact Dr. Mark Jordan (contact information on pg. 1). I will attempt to honor any reasonable request for information.

## **Acknowledgments**

Thanks to the Seattle Department of Parks and Recreation for their continued support of this project, particularly Lisa Ciecko, Barb DeCaro, and Michael Yadrick. The following Seattle University students have contributed to the field or lab component of this project: Nicolás Cruz, Lorraine Davis, Nicholas Iapoce, Stephanie Ingle, Sam Levy, Meike Lobb-Rabe, Vincent Mai, Destiny Mims, Peter Reinhardt, Dylan Rich, and Gabrielle Warner.

**Table 1.** Number of camera sampling units at each park during summer camera trapping sessions in 2014, 2015, and 2016. Cells with an “X” represent parks that did not have any camera traps during a particular summer.

Park	2014	2015	2016	Park	2014	2015	2016
Cheasty Greenspace	5	5	3	Maple School Ravine	2	2	1
Colman Park	2	2	2	Me-Kwa-Mooks Park	1	1	1
Dearborn Park	1	1	X	Mount Baker Park	1	1	1
Duwamish Head Greenbelt	2	2	1	Orchard Street Ravine	X	X	1
East Duwamish Greenbelt	5	5	4	Pigeon Point Park	1	1	1
Fairmount Playground	X	X	1	Puget Creek Greenspace	2	2	2
Fauntleroy Park	2	2	1	Puget Park	1	1	X
Hitts Hill Park	X	X	1	Schmitz Preserve Park	2	2	1
Lewis Park	1	1	1	Seward Park	6	6	2
Lincoln Park	3	3	1	West Duwamish Greenbelt	3	3	2
Longfellow Creek Greenspace	2	2	2				



**Figure 1.** Wildlife survey station. Motion-sensitive camera trap (LEFT), which is enclosed in a protective security housing locked to a tree. The camera trap is aimed at a baited survey station (RIGHT). We use a black box made of corrugated plastic and baited with a piece of chicken to collect hair samples. Three gun brushes cross the entrance of the box to snag hair samples from any animal that enters the box (INSET RIGHT). We hang a pie plate nearby as a visual attractant, and we attach a scent lure (catnip oil) to the plate.

**Table 2.** Species captured at each park that we surveyed during summer camera trapping sessions in 2014, 2015, and 2016. A filled circle indicates at least one capture of the species over the duration of the study.

Park	Virginia opossum	Rabbit <sup>a</sup>	Mountain beaver	Squirrel <sup>b</sup>	Domestic cat	Domestic dog	Coyote	Striped skunk	Raccoon
Cheasty Greenspace	•			•	•	•			•
Colman Park				•	•	•			•
Dearborn Park					•				•
Duwamish Head Greenbelt	•	•		•	•	•			•
East Duwamish Greenbelt	•	•		•	•	•	•		•
Fairmount Playground					•	•			•
Fauntleroy Park				•		•			•
Hitts Hill Park				•	•				•
Lewis Park				•	•				•
Lincoln Park	•			•		•			•
Longfellow Creek Greenspace	•			•	•	•	•		•
Maple School Ravine				•	•				•
Me-Kwa-Mooks Park		•		•	•	•	•	•	•
Mount Baker Park	•			•	•				•
Orchard Street Ravine	•			•	•	•			•



Park	Virginia opossum	Rabbit <sup>a</sup>	Mountain beaver	Squirrel <sup>b</sup>	Domestic cat	Domestic dog	Coyote	Striped skunk	Raccoon
Pigeon Point Park	•	•		•	•	•			•
Puget Creek Greenspace	•			•	•				•
Puget Park	•			•					•
Schmitz Preserve Park				•		•	•		•
Seward Park	•	•	•	•	•	•			•
West Duwamish Greenbelt	•	•		•	•	•	•		•

a) We did not identify rabbits to species level, but most if not all are Eastern cottontails (*Sylvilagus floridanus*).

b) Although we have not identified them to species level, almost all squirrels are probably Eastern grey squirrels (*Sciurus carolinensis*). The only location where we confirmed a Douglas' squirrel (*Tamiasciurus douglasii*) was in Seward Park.