

Central Park Squirrel Behaviors

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Description, Outline, Questions to Answer

- Brief analysis of squirrel behaviors observed in Central Park, NYC in 2018
- Correlation between location and behavior?

More specifically,

- Correlation between primary fur colors and location?
- Correlation between primary fur colors and interactions with other squirrels?
- Correlation between primary fur colors and interactions with humans?



Pre-Data

(Or stuff you should know before we dive in to the data)

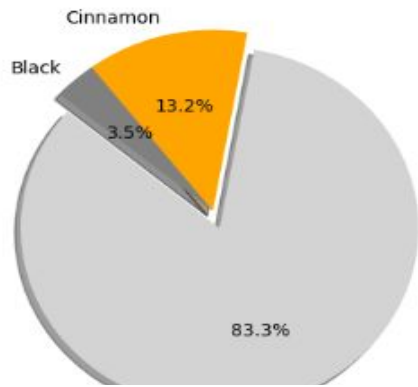
Census from Central Park Conservancy. “Jamie Allen is the creator of the Squirrel Census, a data, science, design, and storytelling team... With the help of 323 volunteer Squirrel Sighters, the six-person team performed a count of Eastern grays in Central Park in October 2018. The following year, they released the Central Park Squirrel Census 2019 Report.”

<https://www.thesquirrelcensus.com/>

Limitations of Data

- These were only observed behaviors. Presence of observer(s) may have influenced behavior, i.e.: squirrel was going foraging, but saw a human and approached in hopes of human giving them food
- Certain statistics implied unreliable extrapolations, i.e. black squirrel population was too small - a handful of squirrels may have represented the entire population
- Observational research does not account for times that the squirrels were not observed

Population breakdown



Gray squirrels dominate the park based on observations of the primary fur colors. These maps speculate that cinnamon, and especially black squirrels, have created “colonies”. In other words, hotspots for one color of squirrels may deter a different color of squirrels from inhabiting that area

Population

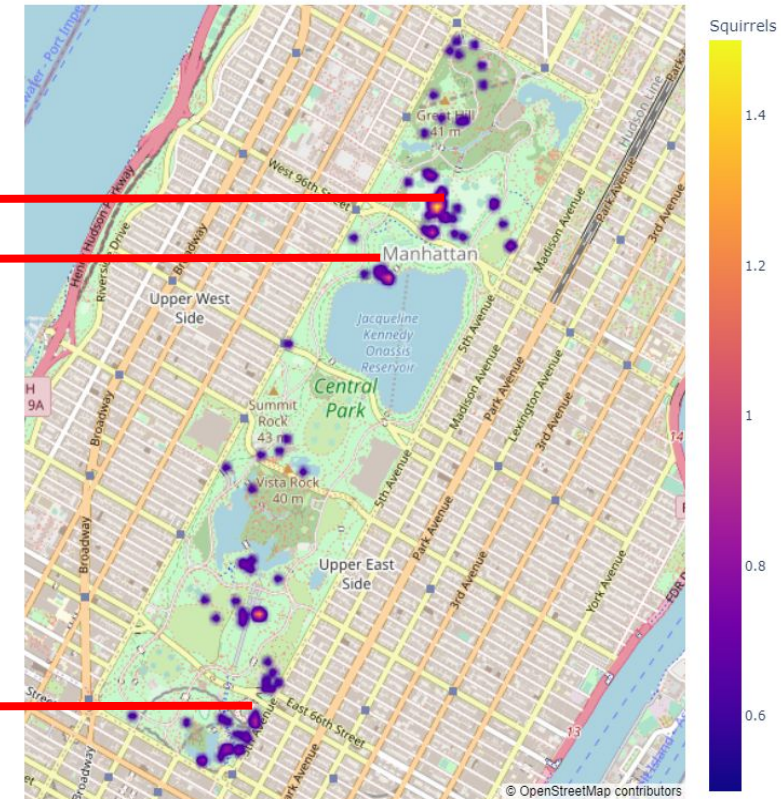
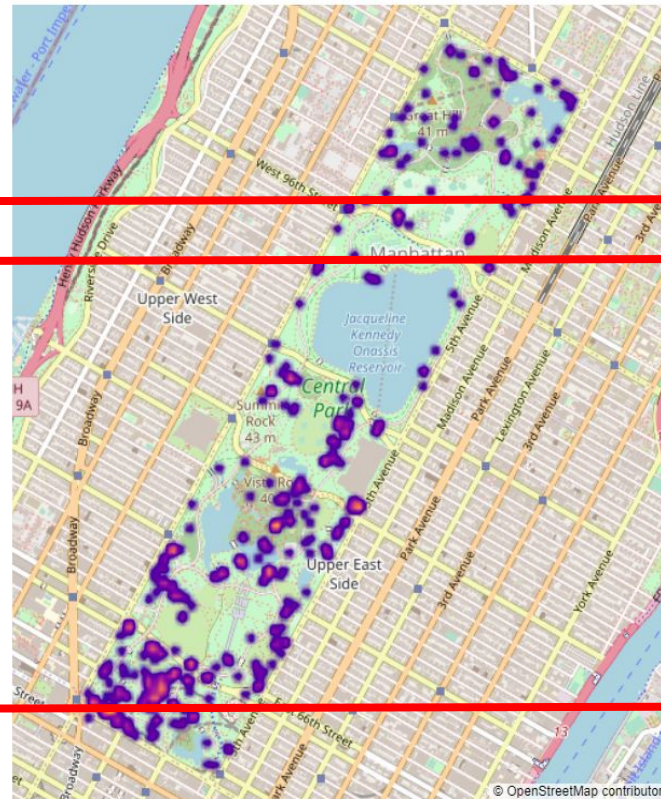
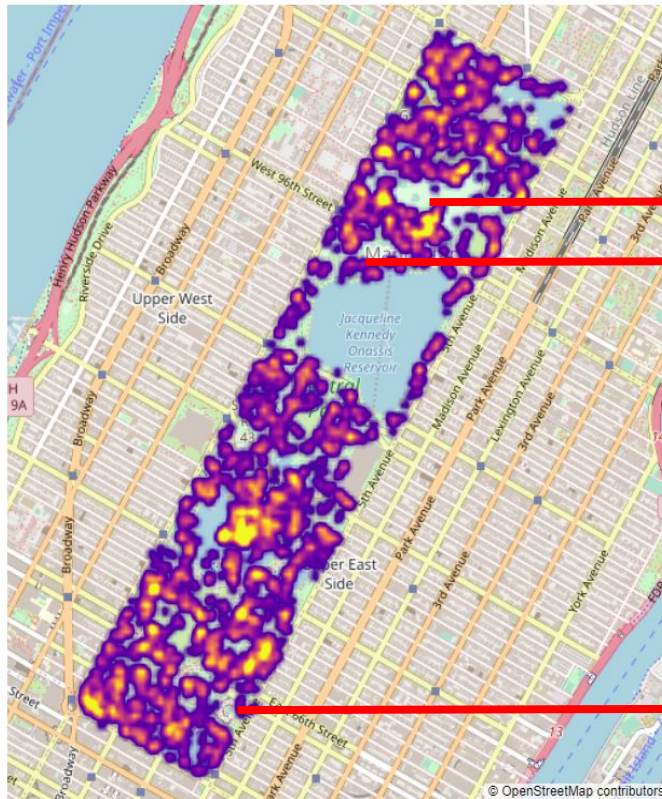
Primary Fur Color

Gray	2473
Cinnamon	392
Black	103

Density Map of Squirrel Fur Color: Gray

Density Map of Squirrel Fur Color: Cinnamon

Density Map of Squirrel Fur Color: Black



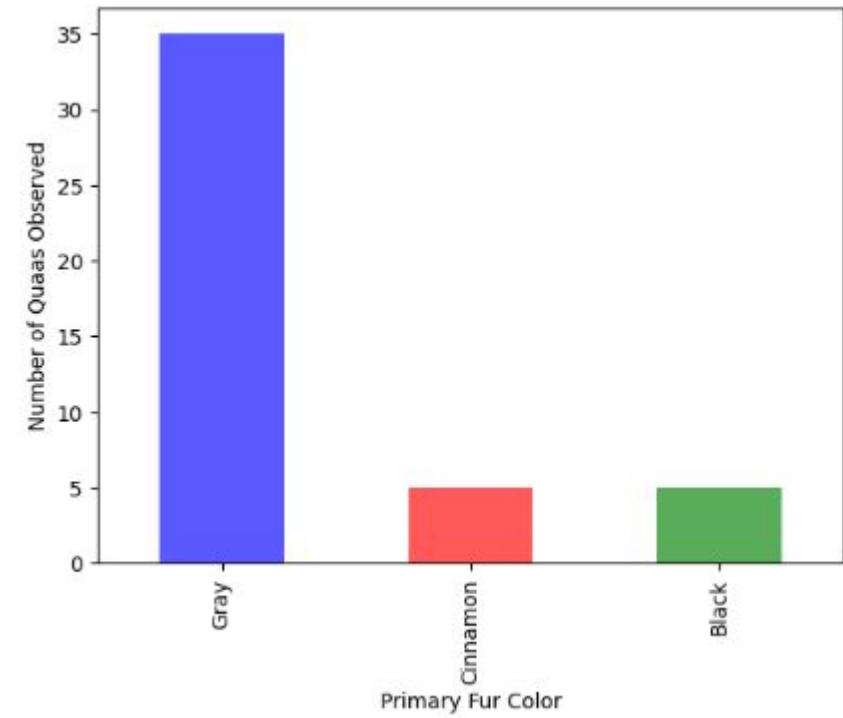
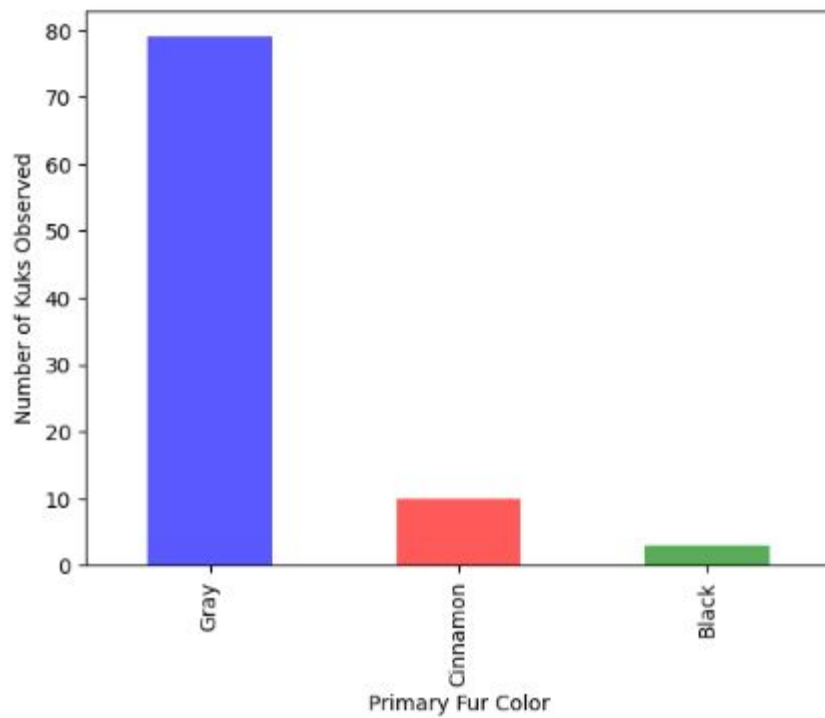
Vocalizations/Squirrels Behavior Towards Squirrels

Kuks are sharp alarm barks to alert other squirrels of danger

Quaas are longer kuks that communicate that a predator has passed but is still in the area

Moans are quiet calls to indicate to other squirrels that a predator may have left but they are not sure

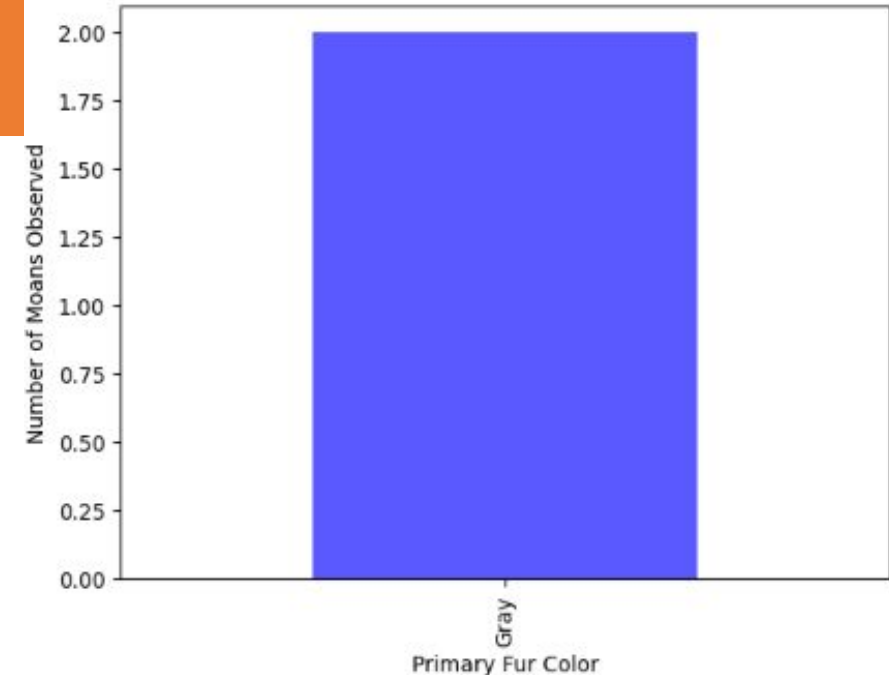




Vocalization Data

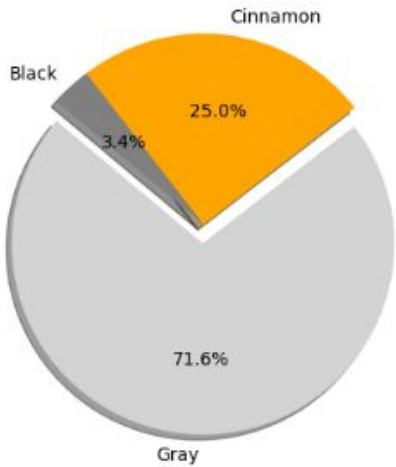
Gray squirrels represent the bulk of our data set, so it was not surprising when they received the most observations

Primary Fur Color	Population	Kuks_Percentage	Quaas_Percentage	Moans_Percentage
Gray	2473	3.19%	1.42%	0.08%
Cinnamon	392	2.55%	1.28%	NaN
Black	103	2.91%	4.85%	NaN

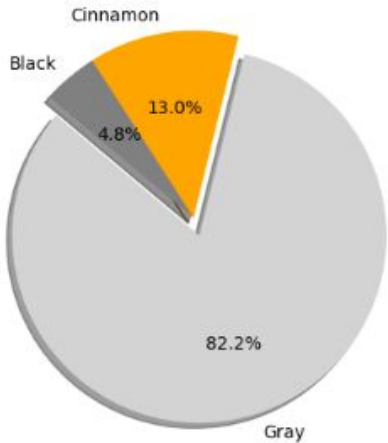


Squirrel Interactions with Humans

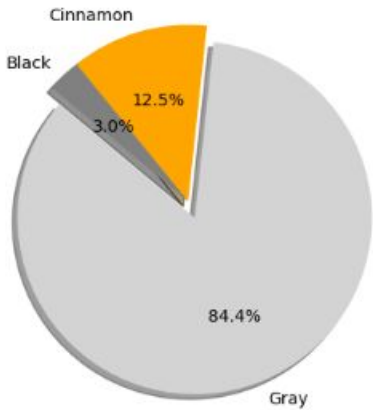
Percentage of Squirrels that Approach by Color



Percentage of Squirrels that Ran From by Color



Percentage of Squirrels that were Indifferent by Color



	Population	Approaches_Percentage	Indifferent_Percentage	Runs_From_Percentage
Primary Fur Color				
Gray	2473	5.10%	49.29%	22.28%
Cinnamon	392	11.22%	46.17%	22.19%
Black	103	5.83%	42.72%	31.07%

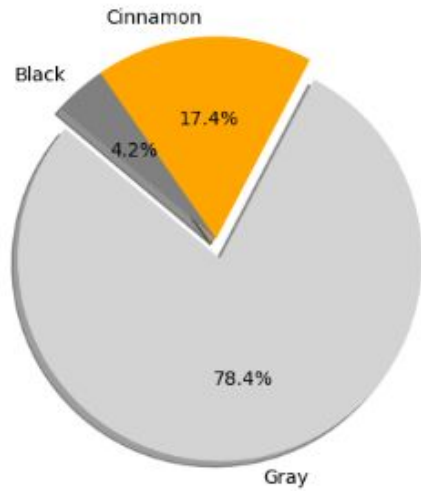


“And now for something completely different”

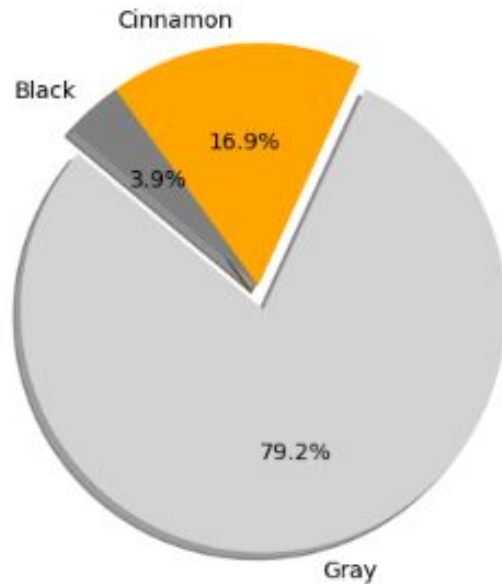


Tail Movements

Percentage of Squirrels that Twitched their Tail by Color



Percentage of Squirrels that Flag their Tail by Color



	Population	Twitches_Percentage	Flags_Percentage
Primary Fur Color			
Gray	2473	13.67%	4.93%
Cinnamon	392	19.13%	6.63%
Black	103	17.48%	5.83%





Mapping Squirrel Activities

Squirrel activities and coordinates were noted by the observers. Using this information, we plotted five different activities on a map to see where some hot spots may occur.

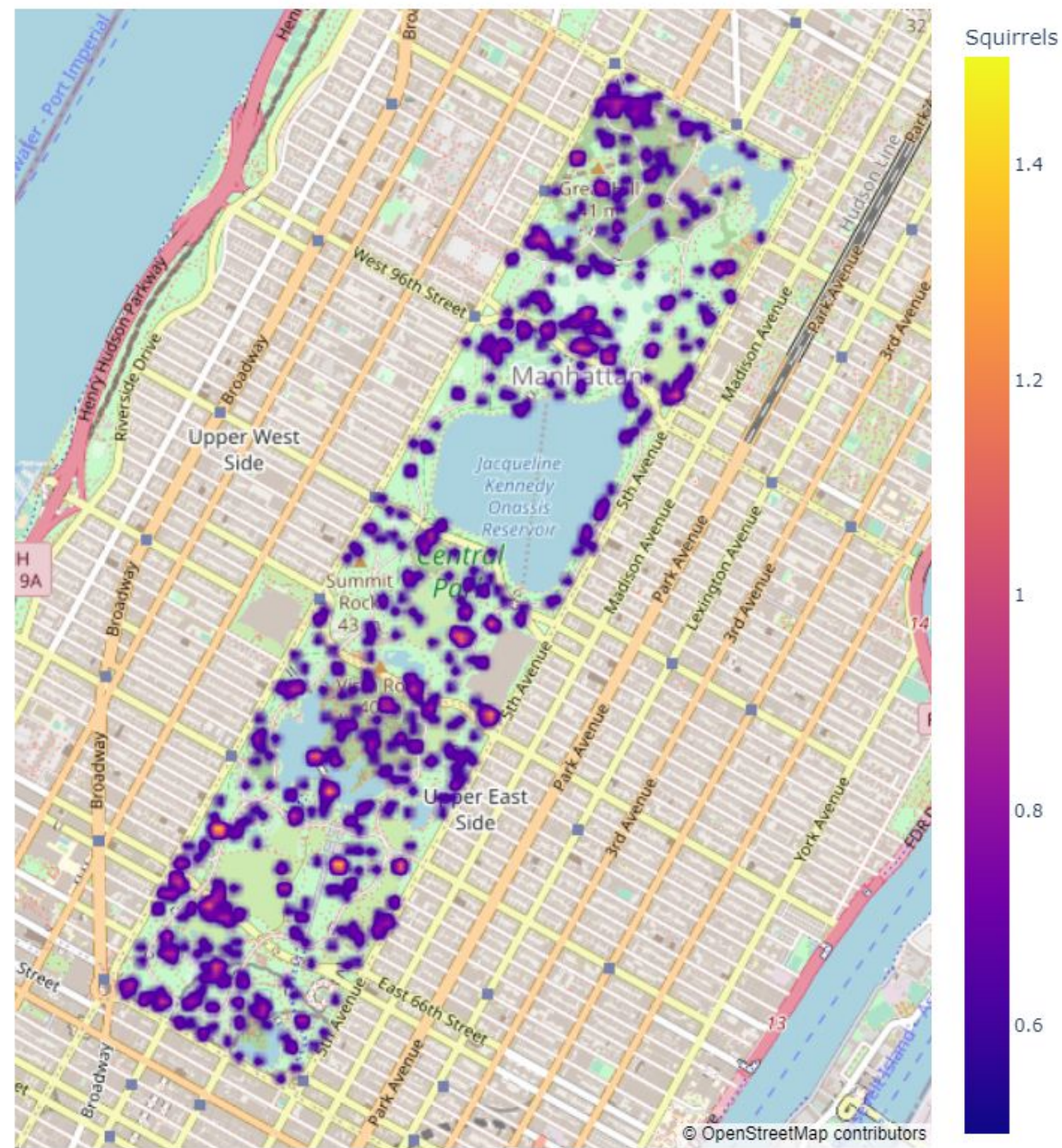
These activities include:

- Climbing, foraging, eating, chasing, and running



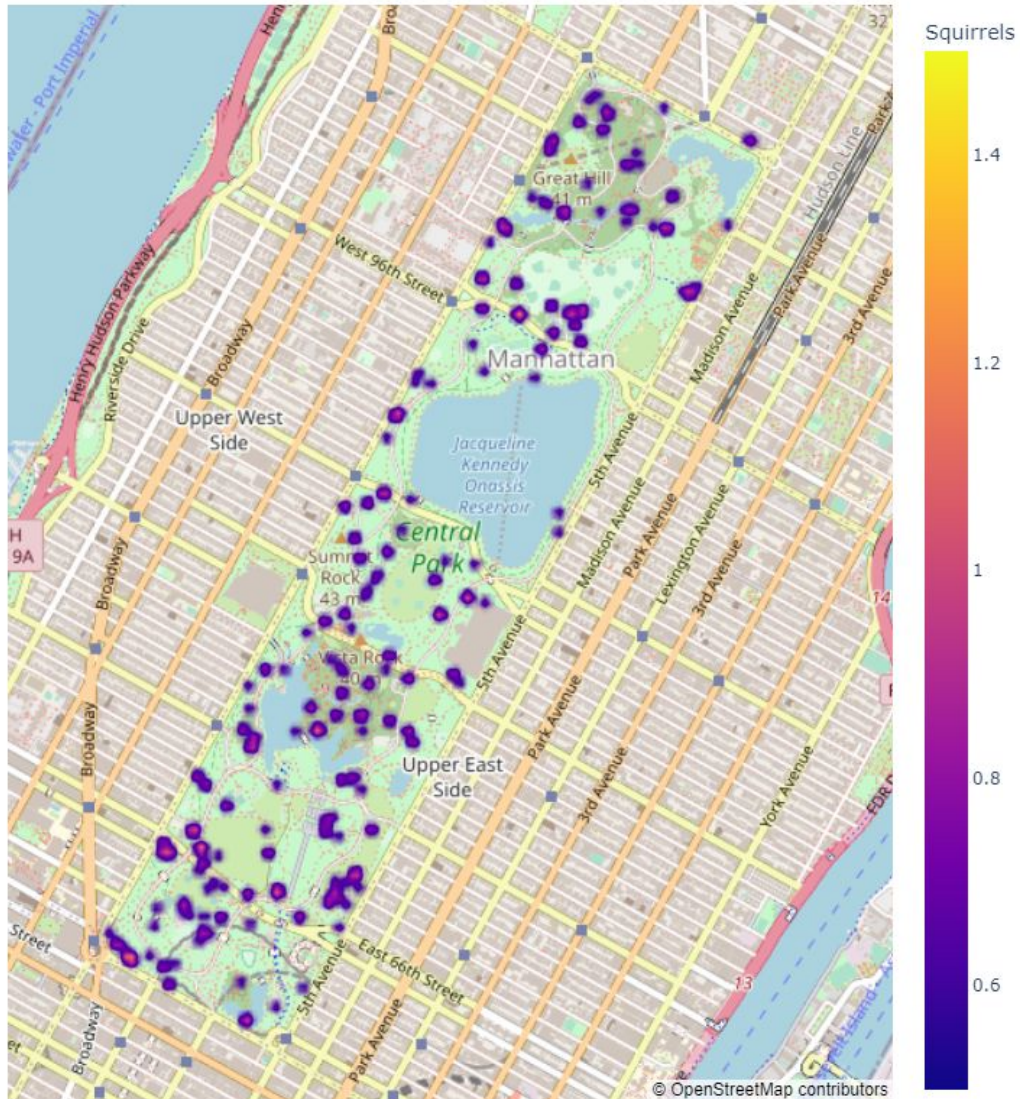
Squirrels are seen climbing throughout the park and have no clear hotspot for this activity

Density Map of climbing Squirrels

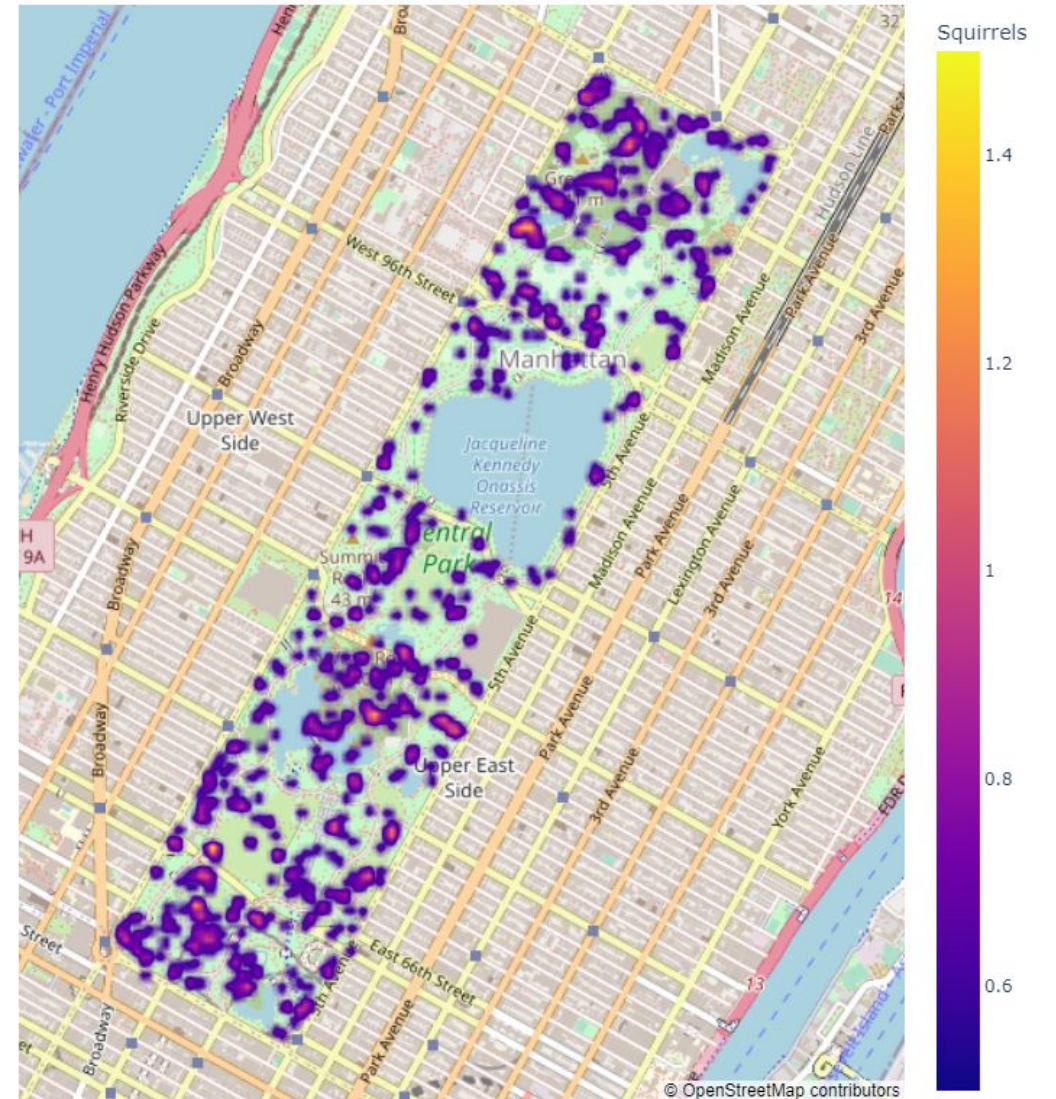


Squirrels were seen chasing and running throughout the park. There doesn't seem to be any large congregation of running or chasing in any particular part of the park

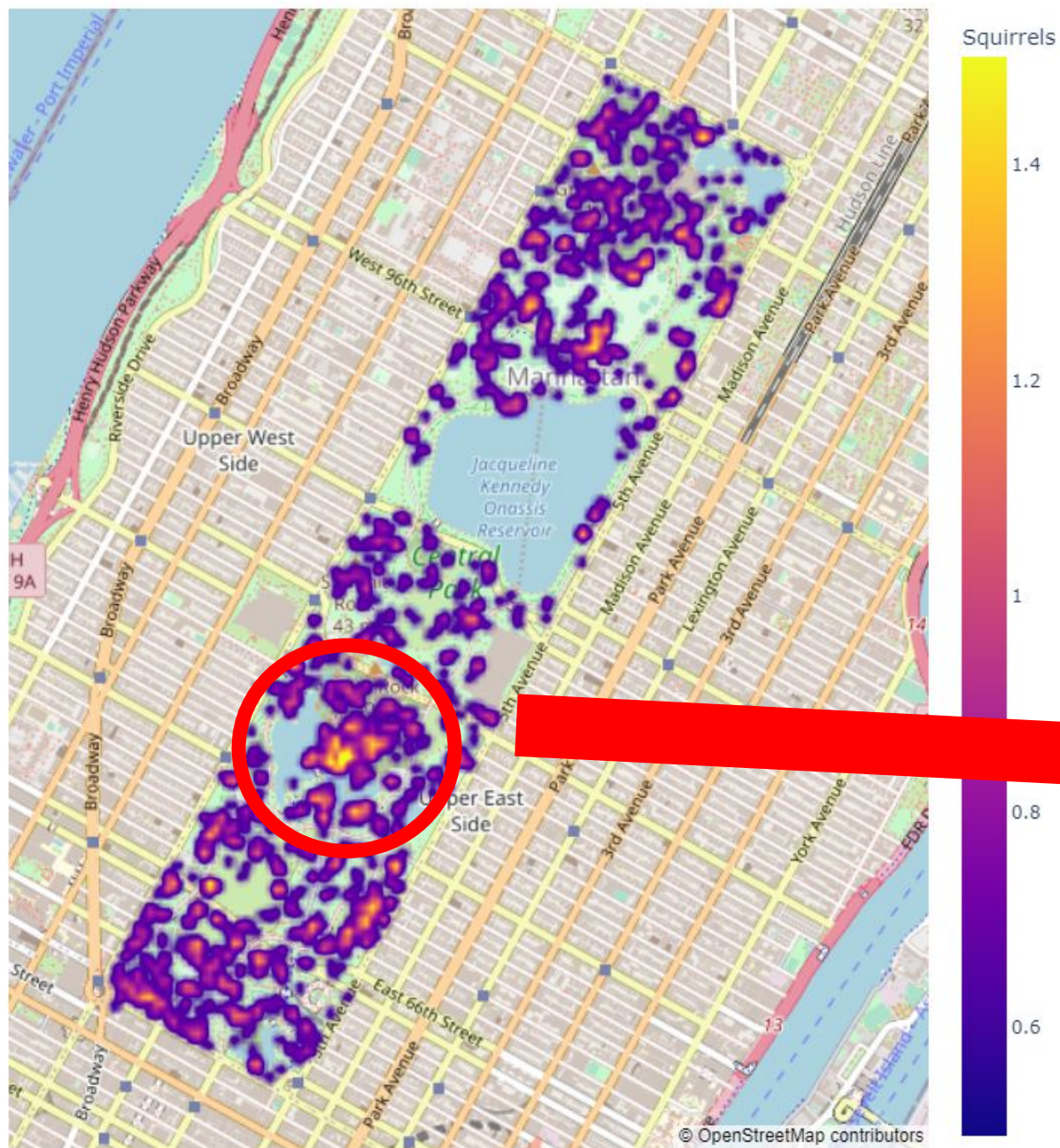
Density Map of chasing Squirrels



Density Map of Running Squirrels

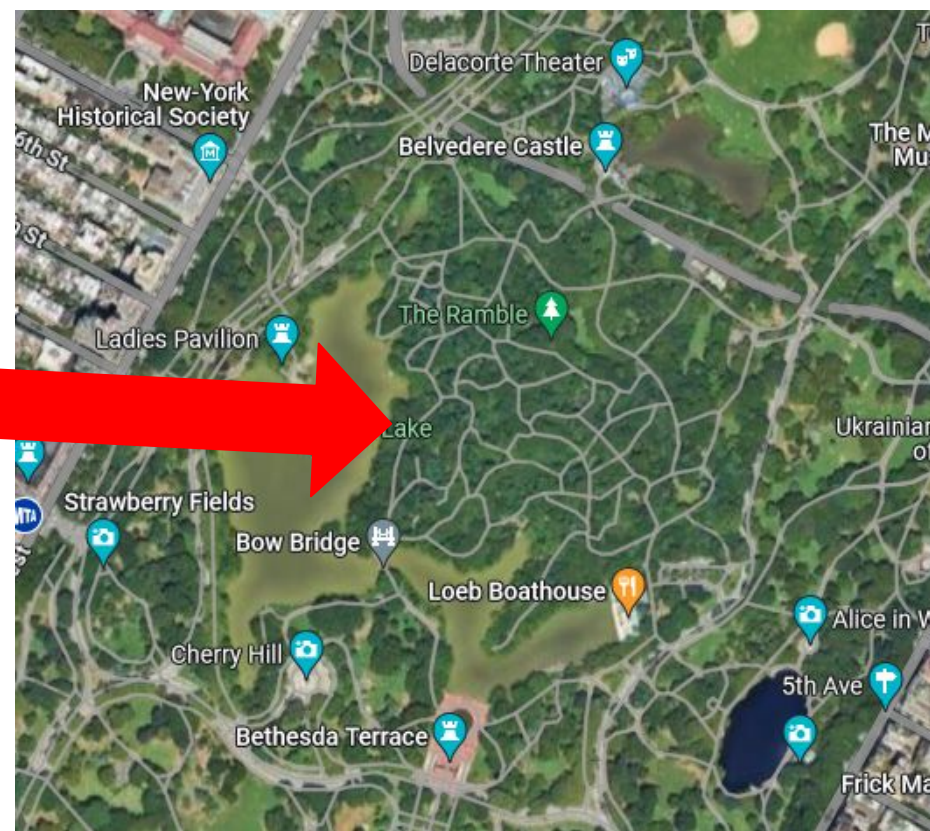


Density Map of foraging Squirrels



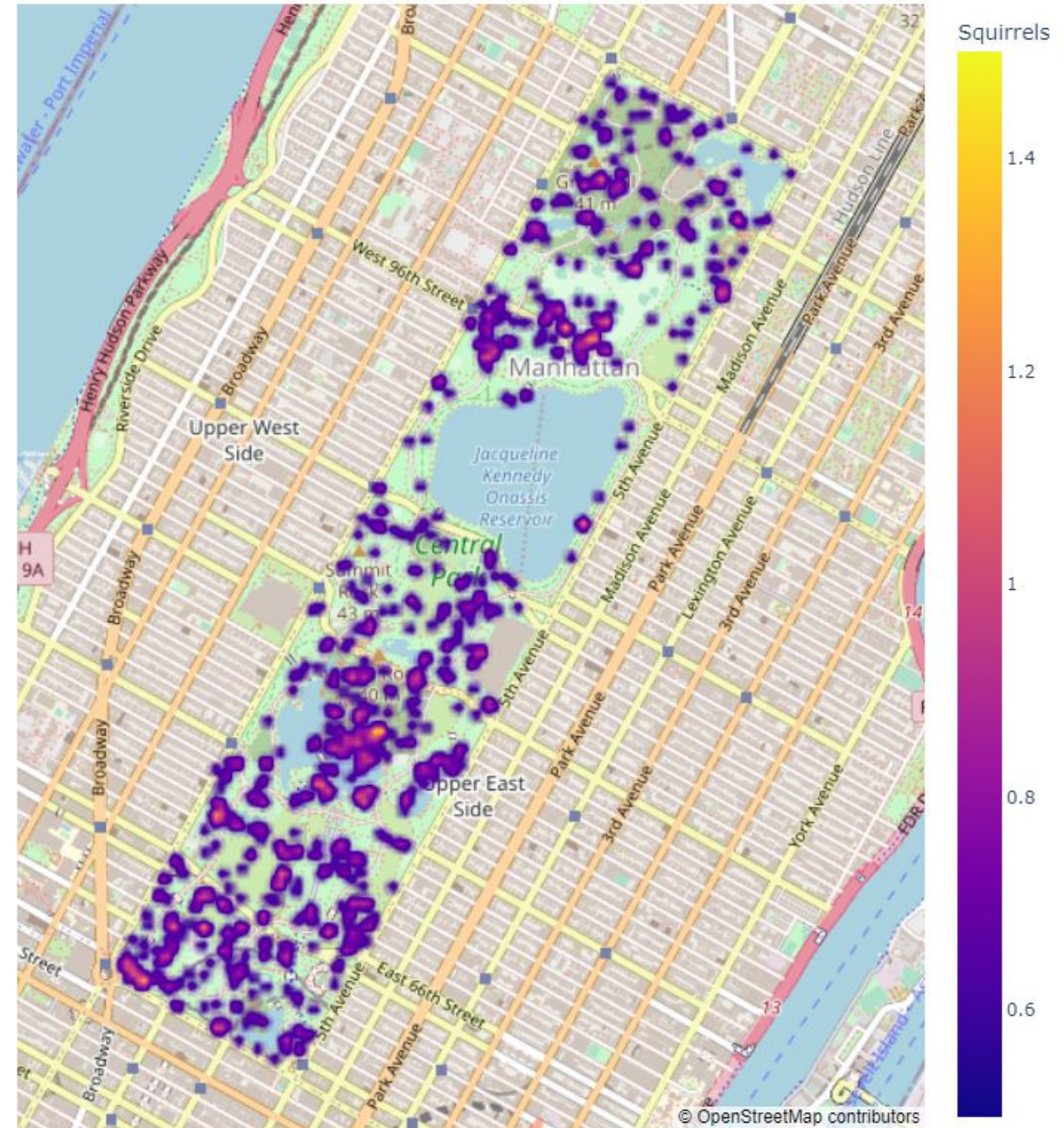
Overall Squirrels can be seen foraging all over Central Park but there is one location that stands out as a hotspot of activity

This corresponds to a large wooden area within the park. The large density of trees creates a prime location for foraging their food sources



Density Map of eating Squirrels

A density of squirrels eating is seen in the same area that foraging occurs but not to the same degree of squirrels foraging. This may suggest that squirrels are stockpiling for winter, as this data set was collected in October



What We Gathered

- There is a positive correlation between primary fur colors and location. Same-color squirrels were observed being together much more often than not
- Vocalization- the “Quaas” statistic showed higher propensity for black squirrels. This could be indicative of a sample-size issue, where a few squirrels represent a high percentage of the data set
- Tail movement data rendered an unremarkable correlation
- Positive correlation between locations where trees are and squirrels foraging
- Mixed results in the correlation between primary fur color and interaction with humans. Black squirrels ran away from humans more, cinnamon squirrels approached humans more, and gray squirrels were the most indifferent

Sources:

Backyard Wildlife Enthusiast Blog-

<https://www.squirrelsatthefeeder.com/what-sounds-and-noises-do-squirrels-make-and-what-do-they-mean/>

Central Park Conservancy-

<https://www.centralparknyc.org/articles/getting-to-know-central-parks-squirrels>

Squirrel Census

<https://www.thesquirrelcensus.com/>

<https://data.gov/>



Any Questions?

