Relative Activity of Domestic Cats (*Felis catus*) in Two Parks in South Central Pennsylvania

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Introduction

- Domestic cats are estimated to have a population of over 58 million, with a large percentage being allowed outside without supervision, being coined indoor/outdoor hunting cats (IOHC) (USA 2018).
- IOHC are considered an invasive species in many environments because they are not a native predator in the US and can reach densities 100 times or higher than that of native carnivores (Kays and DeWann 2004, Cove et al. 2017).
- Previous studies have shown that the more care a cat is receiving, the less distance they travel into forest, but increases their damage on environments (Baker et al. 2004).
- Wildlife cameras are used to track species abundance, species interactions, and measure relative activity (Baker et al. 2004).
- Surveys provide helpful observations from nearby residents that cannot always be captured on cameras (Baker et al. 2004).

Objective

- To compare IOHC activity between Richard Nixon County Park and John Rudy County Park.
- To determine how observations from residents compare to the activity recorded with wildlife cameras.

Hypothesis

- **The closer to the forest edge, the activity rates of domestic cats would be highest compared to further into the forest edge.**
- **Residents next to the parks will tend to overestimate how often cats are observed.**

Methods

Nixon County Park	John Rudy Park
August 17, 2020: 8 Bushnell 20MP Trophy Cam HD cameras were placed 0-30 meters from the forest edge (Figure 1). September 14, 2020: Catnip oil was spray on the tree below the camera and on an adjacent one	September 7, 2020: 3 Bushnell 20MP Trophy Cam HD cameras were placed along the park edge (Figure 1).
October 2020: 220 residents received an informed consent with a QR code attached to an online survey and were asked to complete it.	December 2020: 291 residents received an informed consent with a QR code attached to an online survey and were asked to complete it.
November 17, 2020: All cameras were removed and a total of three trap sessions were completed.	November 23, 2020: All cameras were removed and a total of three trap sessions were completed.

- Memory cards were collected every two weeks for image analysis.
- Independent capture was determined when an individual from a species passed in front of a camera once within a 30-minute trap event
- Activity rate was calculated measured by capture success, or the number of independent trap events per species for 28 days

Methods

Figure 1. Left image is Richard Nixon County Park and right image is John Rudy County Park. Yellow pins represent camera locations.

Results

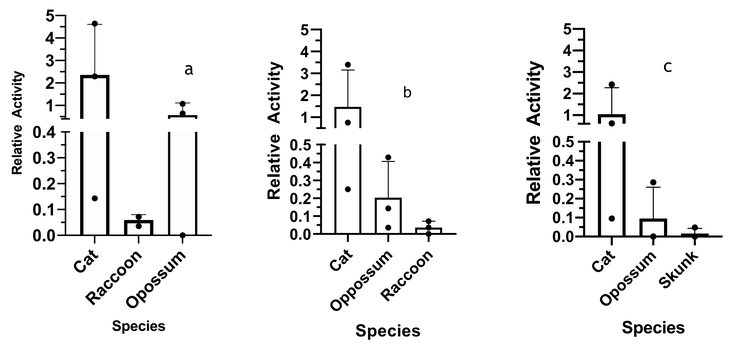

Figure 2. Mean activity of domestic cat (*F. catus*), raccoon (*Procyon lotor)*, and opossum (*Didelphidae*) for wildlife cameras (n=3) in John Rudy Park. Error bars represent SD a) Trap session 1: September 7th to October 5th, 2020. b) Trap session 2: October 5th to November 9th, 2020. c) Trap session 3: November 9th to November 23rd, 2020. Capture success # independent captures/14 days.

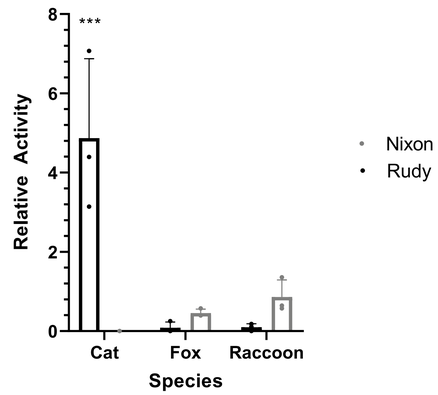

Figure 3. Mean activity level of domestic cat (*Felis catus)*, red fox (*Vulpes vulpes)*, and raccoon (*Procyon lotor)* for three trap sessions at both John Rudy and Richard Nixon parks in South Central Pennsylvania. Error bars represent SD. Species that were significantly different are indicated by *** (p<0.05).

Table 1. Percentage of respondents for survey questions that participants were asked to complete.

Question	% of Respondents	
	Nixon[1]	John Rudy[2]
In one month, how often do you see cats on your property?		
• **Never**	**32.5%**	**30.5%**
• **1-2 times**	**47.5%**	**33%**
• **3-5 times**	**15%**	**15.9%**
• **6 or more times**	**5%**	**20%**
In one month, how often do you see cats in the surrounding area of the park?		
• **Never**	**32.5%**	**28%**
• **1-2 times**	**60%**	**38.3%**
• **3-5 times**	**5%**	**18.5%**
• **6 or more times**	**2.5%**	**14.8%**

Figure 4. Images of three different individuals collected from cameras placed at John Rudy County Park.

Results Continued

- At John Rudy Park, IOHC activity was highest during the first trap session ($F_{1.079,\ 2.158}$ = 2.812, P = 0.2295) (Figure 2a). At least 8 individual cats could be identified (Figure 4).
- Mean IOHC activity continuously decreased throughout the three trap sessions (Figure 2a-c).
- When comparing both parks, relative activity differed among species ($F_{2,12}$=12.08, P = 0.0013) and park location ($F_{1,12}$ = 9.848, P = 0.0086) (Figure 3).
- IOHC relative activity was absent at Nixon Park, but very high at John Rudy ($F_{1,2}$ = 9.848, P = 0.0086) (Figure 3).
- In both parks, residents tended to overestimate the amount of IOHC seen (Table 1).

Conclusion

- Nixon Park had no IOHC present and mean activity level remained relatively consistent at Rudy Park.
- The abundance of cat observations at John Rudy Park is likely due to cats being allowed outside more often or large colonies of cats (anecdotal).
- The location of cameras in Nixon could have influenced the capture success of IOHC, which could explain why residents state they are present.
- Educating the residents near the parks would be beneficial to explain the negative impacts that IOHC have on the environment.

Literature Cited

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