

# Evaluating the Effects of Exclosures on Spring Ephemerals in Cincinnati Parks



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## Introduction

An overabundance of herbivorous white-tailed deer (*Odocoileus virginianus*) may have a negative effect on the abundance of native spring ephemerals in urban southwestern Ohio (Christopher et al. 2014). Cincinnati Parks built exclosures in Alms, California Woods, Drake, Mount Airy, and Stanbery, paired with control plots of the same size in order to evaluate the effects that meso herbivores have on the local flora. Our study seeks to examine the effects that herbivory has on spring ephemerals. We sampled ephemerals from each of the exclosures and compared them to samples from the matching control plots and past data to estimate the effects that herbivores have on ephemerals. We hypothesize that spring ephemeral diversity and abundance will be greater in treatment than control plots due to greater herbivory in the control plots. We will continue to collect data throughout the season to assess additional effects on plants with later phenologies.

## Methods

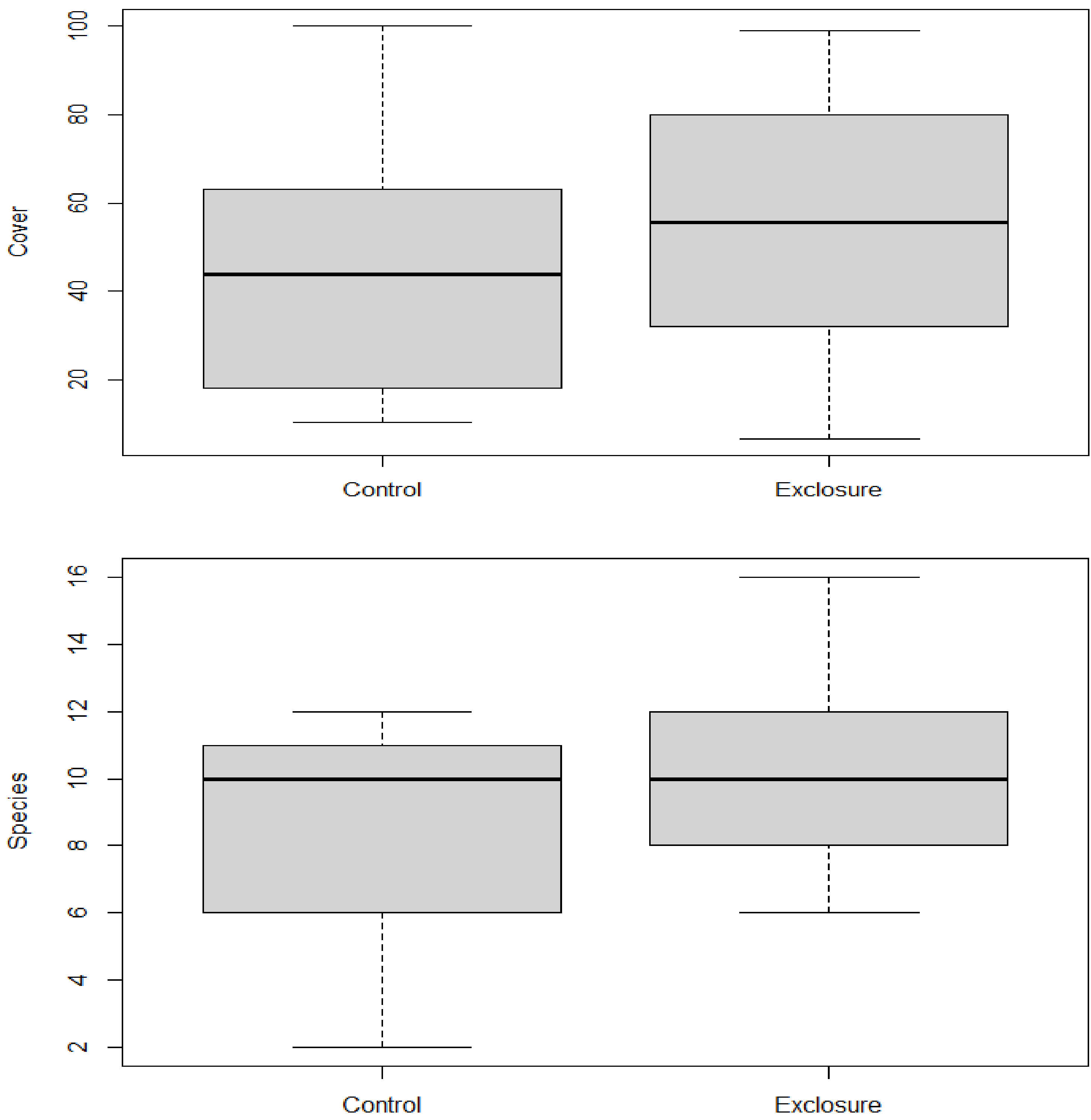
The exclosures were recently constructed in five Cincinnati Parks. To evaluate the effects of these exclosures (Fig. 1 and 2) on spring ephemerals (Fig. 3), we placed six 1m<sup>2</sup> quadrats randomly inside each exclosure and in a paired area of equal size adjacent to each exclosure, then recorded the percent cover of individual plant species within these quadrats. Sampling took place in mid-April 2021 and 2022.

The data was analyzed using a paired t-test for both the effects of the exclosures on plant species richness and on total plant cover.

## Results

The mean number of plant species recorded in the control plot (8.3 species) was not significantly different compared to the number of plant species recorded in the exclosures (10.3 species) ( $t = 1.6$ ,  $df = 8$   $p = 0.15$ ).

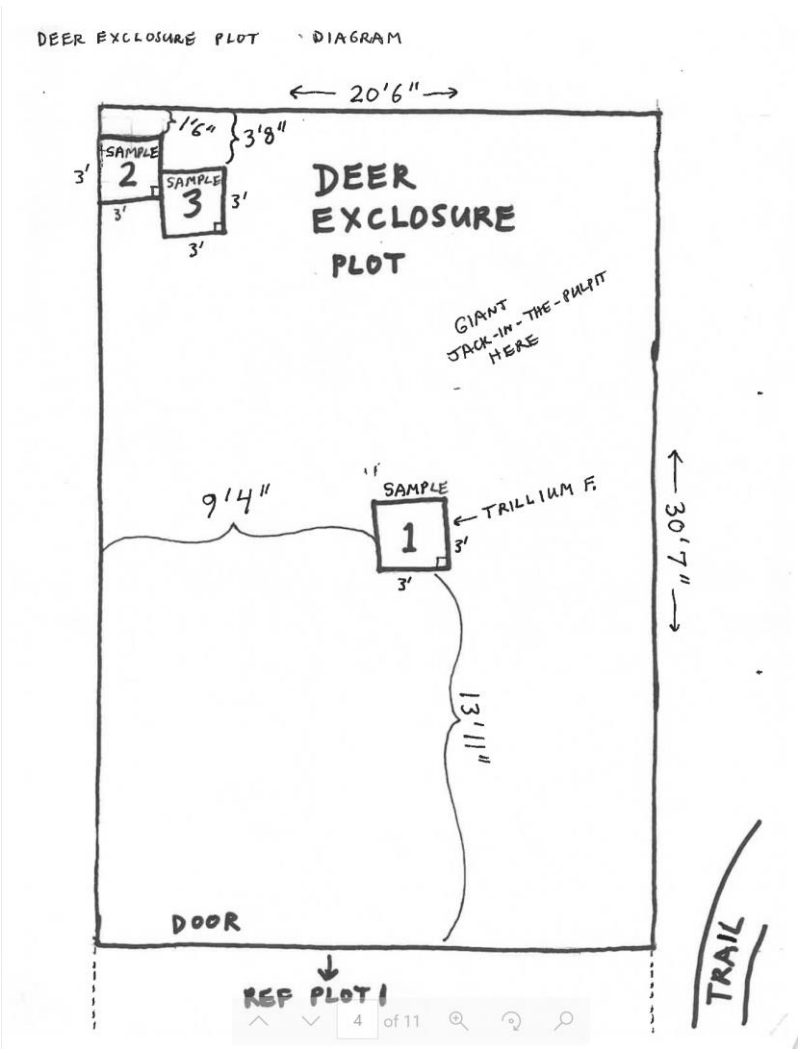
The mean individual plant cover recorded in the control plots (44.4%), though very close, was not significantly different than plant abundance recorded in the exclosures (54.1%) ( $t = 2.30$ ,  $df = 8$ ,  $p = 0.05$ ).



**Figure 5:** Mean plant species richness in controlled and exclosure conditions (top) and mean plant cover in controlled and exclosure conditions (bottom). The dark bar represents the median.



**Figure 1.** Exclosure in California Woods where data was collected.



**Figure 2.** Exclosure example drawing.



**Figure 3.** Spring ephemeral (Drooping Trillium).



**Figure 4.** Deer caught on camera near a California Woods exclosure.

## Conclusions

We found no evidence that deer and meso mammal herbivory affects the plant species richness or plant cover of the spring ephemeral community. This indicates that deer management may be at an appropriate level to preserve species.

## References

Christopher, C., G. Cameron, & S. Matter. (2014). Individual and interactive effects of Amur honeysuckle (*Lonicera maackii*) and white-tailed deer (*Odocoileus virginianus*) on herbs in a deciduous forest in the eastern United States. *Biological Invasions*. 16:2247-2261.

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