

Nesting Habits of *S. carolinensis* and *T. hudsonicus* on Concordia College Campus in

Moorhead, MN

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Abstract

Sciurus carolinensis (grey squirrel) and *Tamiasciurus hudsonicus* (red squirrel) are two species of squirrels found on the Moorhead Concordia College campus. In order to determine their nesting behaviors based on tree species and height, methods of telemetry and hypsometry were used. We concluded that there was significant evidence for differential selection of nests based on tree species between the two species, although there was no significant evidence for differential nest height squirrel species.

Introduction

Two common species of squirrels found in Minnesota, *S. carolinensis* and *T. hudsonicus*, are found in both wooded and residential settings. *T. hudsonicus* are typically found in coniferous woods and *S. carolinensis* in hardwoods (DNR 2014 A DNR 2014 B). Nest site selection is crucial for winter survival, thermoregulation, winter use, and protection of food caches (Steele 1998). Research conducted by Bryce et al (2002) had found that the two species living in the same microhabitat had shown *T. hudsonicus* had a tendency to select Norway spruce trees and *S. carolinensis* a mix of conifers and broad leaved trees. Nest heights for *T. hudsonicus* have been found to be 2-20 meters tall (Hatt 1929). Therefore, we hypothesized that there would be differential nesting habitats between *T. hudsonicus* and *S. carolinensis* based on tree species and nest height proportional to the tree height.

Methods

4 radio-collared *T. hudsonicus* and 4 radio-collared *S. carolinensis* were tracked on Concordia College's campus boundaries in Moorhead, MN. The location of the nests of the squirrels was determined using telemetry. The squirrels were tracked for three nights. The nest location and trees were recorded via GPS (trees were assigned a number). The tree type (coniferous or deciduous) was recorded for each nest. In order to determine to nest height, a hypsometer was constructed. The angle from the observer to the top of tree nest was recorded, along with the distance from the observer to the tree. The nest height was determined using trigonometry. During the observation period, some squirrels died/went missing and were omitted from final analysis.



Fig 1. (left) *S. carolinensis* on Concordia College's campus

Fig 2. (right) *T. hudsonicus* on Concordia College's campus (photo credit: Dr. Joseph Whittaker)



Results

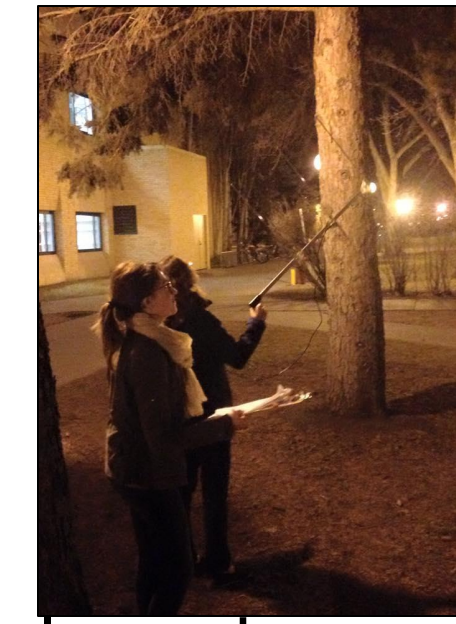


Fig. 4, 5 Research Students using telemetry (photo credit: Marcus Comstock and Dr. Joseph Whittaker)

There was a relationship between squirrel species and tree type ($\chi^2= 19$; DF=1) . *T. hudsonicus* exhibited a preference for nesting in coniferous trees, while *S. carolinensis* exhibited a preference for deciduous trees. The relationship between the proportion of nesting tree height and squirrel species was not significant ($p= 0.139$).

Table 1. Observed individual's nests by location, tree type, and height.

Radio Collar Frequency	Species	Location (GPS)	Nights Observed	Tree Type	Nest to Tree Height Ratio
150.355	<i>T. hudsonicus</i>	N: 46.86343 W: 096.76959	3	Coniferous	0.576544
150.305	<i>T. hudsonicus</i>	N: 46.86518 W: 096.76942	3	Coniferous	0.899811
150.255	<i>T. hudsonicus</i>	N: 46.86448 W: 096.75895	3	Coniferous	0.568557
150.236	<i>T. hudsonicus</i>	N: 46.51864 W: 096.46188	3	Coniferous	0.578947
150.024	<i>S. carolinensis</i>	N: 46.86469 W: 096.76957	3	Deciduous	0.507282
150.135	<i>S. carolinensis</i>	N: 46.86465 W: 096.76960	3	Deciduous	0.507282
150.575	<i>S. carolinensis</i>	N: 46.86379 W: 096.77097	3	Coniferous	0.524672
150.405	<i>S. carolinensis</i>	N 46.86422 W 096.77152	3	Deciduous	X

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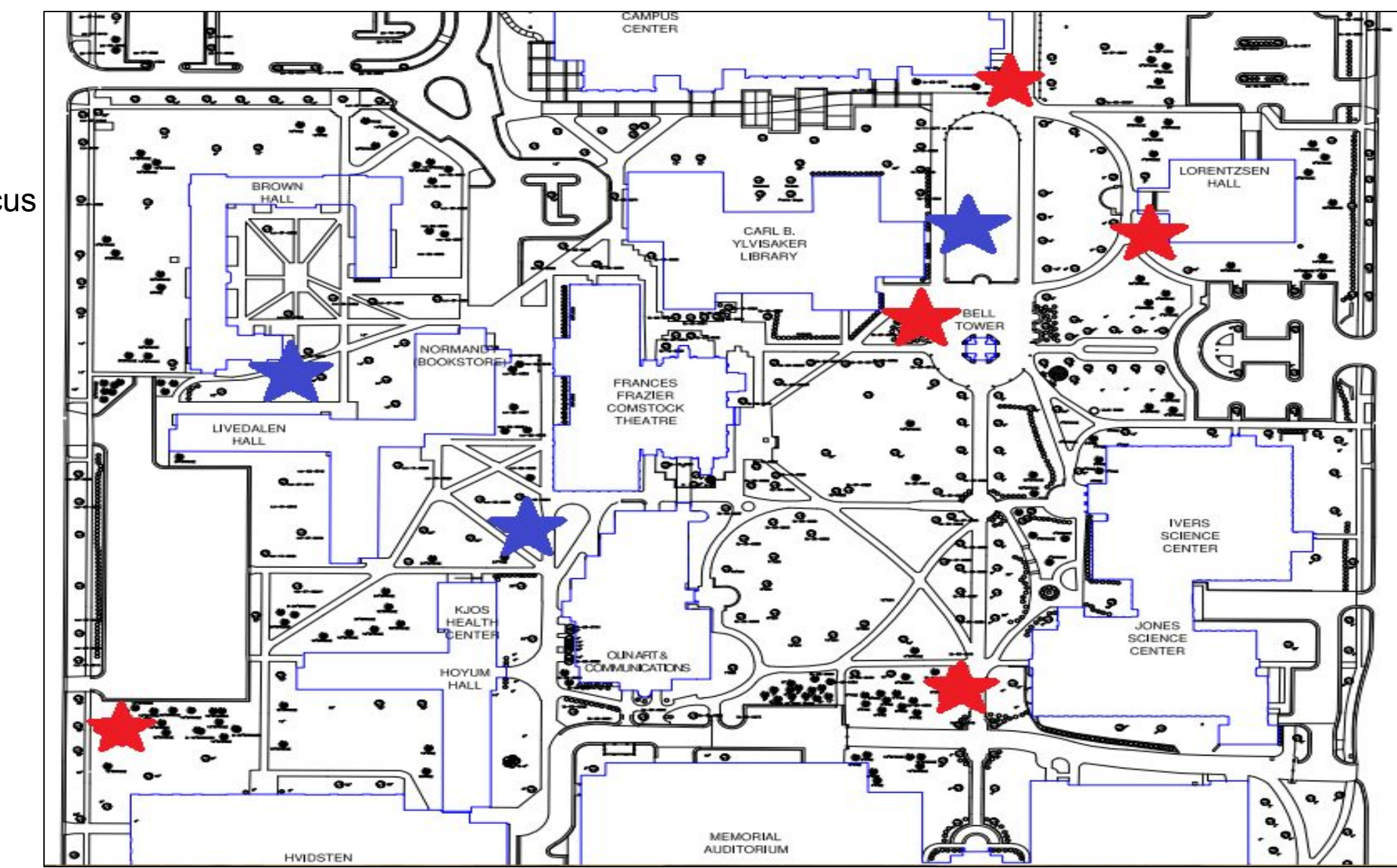


Fig 3. Map of Concordia College Campus (N of 8th St S). Grey squirrel nest = blue; red squirrel nest = red

Discussion

Our research found that *T. hudsonicus* and *S. carolinensis* exhibit a preference between species for deciduous and coniferous tree types for nesting ($\chi^2=19$), which is supported by other literature (DNR 2014 B). However, there was not significant evidence to support that there was differential nesting height proportions between the species ($p=0.139$). One *S. carolinensis* had a nest inside a tree cavity, so the nest to tree height ratio could not be determined. More research with a greater number of data points should be conducted in order to determine if there is a trend between nest height and tree height at Concordia College campus. One nuance to take into consideration for this study is that it only focused on one small area with a small sample and thus should not be applied to larger-scale ecosystems. Further research could expand out onto different local colleges of the Fargo-Moorhead area to study if similar patterns between squirrel behavior emerge.

Literature Cited

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