



Effects of Growing Season Prescribed Burns on the Movement of *Peromyscus leucopus*



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Abstract

Prescribed burns have the potential to alter small mammal movement and activity rates as a consequence of altered habitat structure. We compared relative abundance, movement distances, and recapture rates of small mammals between sites burned during the early growing season (April 26, 2013) (n=3) and controls (n=3) at the Bent Creek Experimental Forest in the southern Appalachian mountains of western North Carolina. Small mammals were trapped for seven nights during the last week of June 2013 using a 60m x 100m trapping grid of Sherman live traps with traps placed every ten meters, in each treatment unit. Rodents were marked using individually numbered ear tags, and released at point of capture. We estimated distances travelled by individual rodents by mapping distances between capture and recapture locations. The white-footed mouse (*Peromyscus leucopus*) was the only species that was commonly captured and frequently recaptured. White-footed mice travelled similar average distances in both the growing season burn replicates and the untreated control replicates. The potential similarities in distance moved by white-footed mice indicated that changes to habitat structure created by prescribed burns during the growing season did not affect movements. Most recaptures of multiple individuals occurred within the same half of trapping grids. The spatial distribution of the recaptured population may be biased toward the location of resources within sites. A more thorough evaluation of white-footed mouse movements within treatment units is needed to determine this.

Introduction

The Bent Creek Experimental Forest, located in Asheville, North Carolina, is primarily defined as a mesic mixed upland hardwood forest composed of valuable fruiting species of oaks that are increasingly being outcompeted by species such as the tulip poplar (Piedmont). This forest acts as the habitat for wide diversity of wildlife species, ranging from black bears to white-footed mice.



Figure 1: *Peromyscus leucopus*, or white-footed mice, the most commonly captured small mammal species. The ear tag shown is similar to the one used for identification purposes in this study.

Introduction (con't)

Multitudes of forestry techniques are used in order to maintain the health of the forest to best serve the needs of its inhabitants. One of these techniques, growing season prescribed burns, aid in opening the canopy of the forest (NCCES, 2013). This may serve to eliminate non-fruiting species in the forest in order to allow less competitive fruiting species to grow, and increasing the long term availability of food for those species reliant on nuts and acorns as their primary food source. Additionally, the burning of leaf litter increases seed exposure, therefore improving food availability for seed consumers (Keyser, 2001).

Previous studies have had mixed results in their effect on white-footed mice, varying from finding no significant effect on white-footed mice populations to increasing their numbers (Keyser, 2001), (Greenberg, 2006). If this species can adapt well enough to prescribed burns to maintain their numbers, it is perhaps indicative of the lack of effect the burns would have on their activity as well. Conversely, the increased availability of food, as well as the change in habitat structure to be expected in the aftermath of a burn, could potentially alter the activity of white-footed mice. These changes in wildlife activity can be indicative of the effects of prescribed burns on wildlife.

Methods

- Sherman live traps were established in a 60m x 100m trapping grid in three prescribed burn units and three control units
- Captures were sexed, weighed, measured, and marked using individually numbered ear tags, and released at point of capture
- Distance travelled by each individual was determined by mapping point of capture and successive recapture sites, and estimated assuming the most efficient path to each trap was used
- Individual distances were averaged to determine an average estimated travel distance in each unit, to compare differences between treatments
- Data was collected during the last week of June 2013

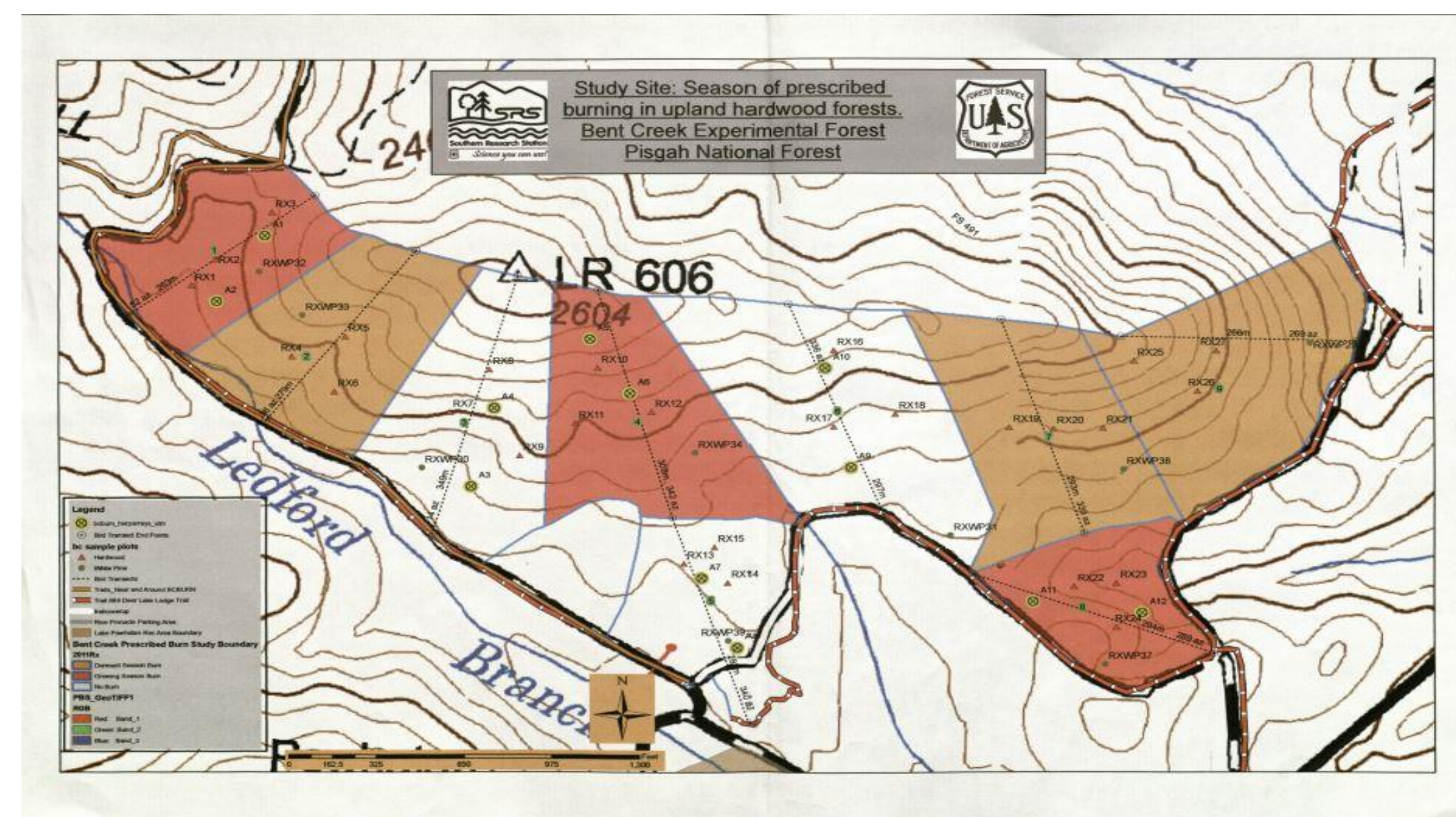


Figure 2: Map of the growing season burn (red) and controls (tan). Trapping grids were evenly placed between drift fence areas (green circle) with center transect in the middle.

Results

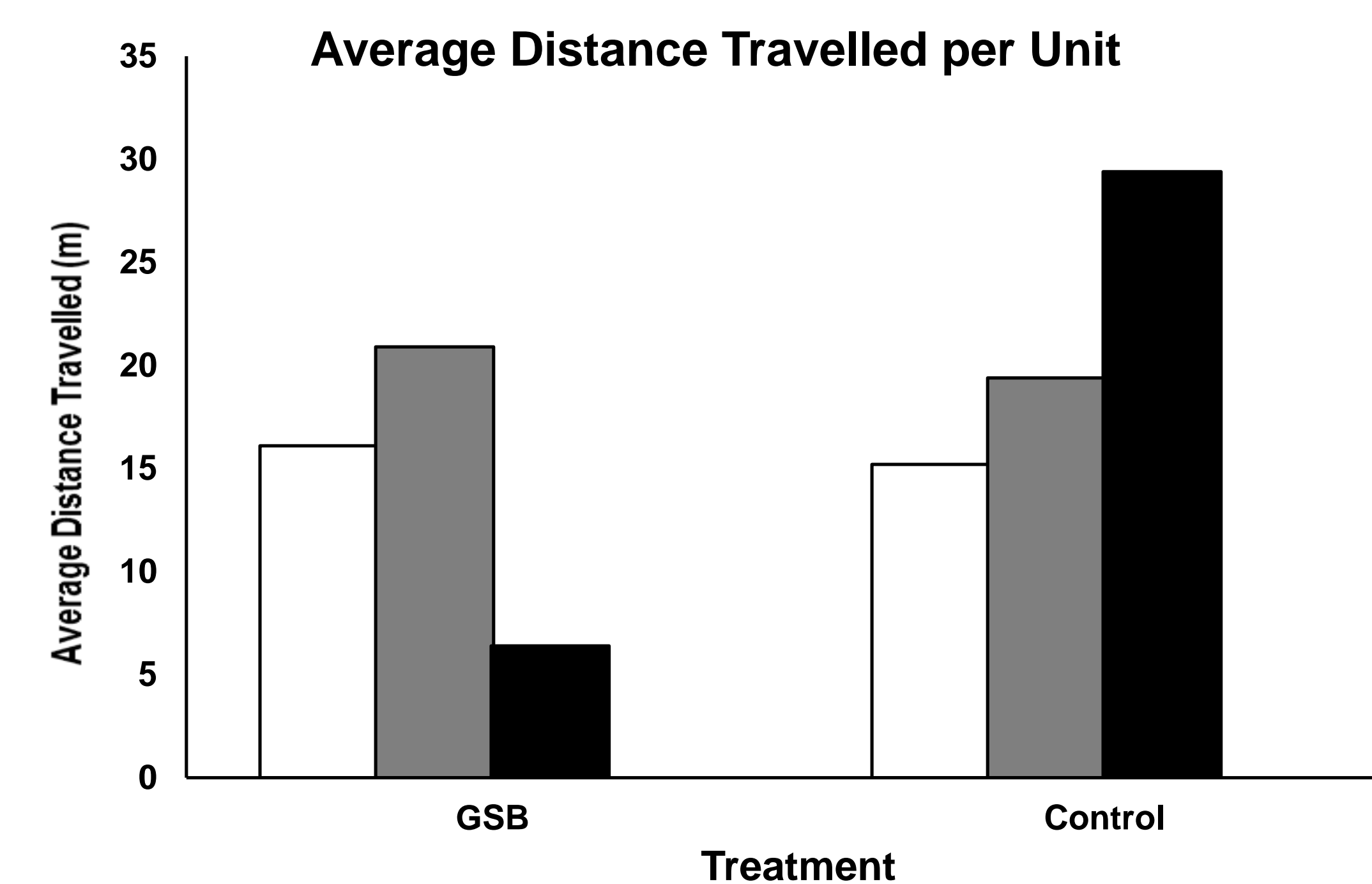


Figure 3: Average distance travelled per treatment type. Average distances travelled per unit, in meters, was determined and categorized by treatment type.

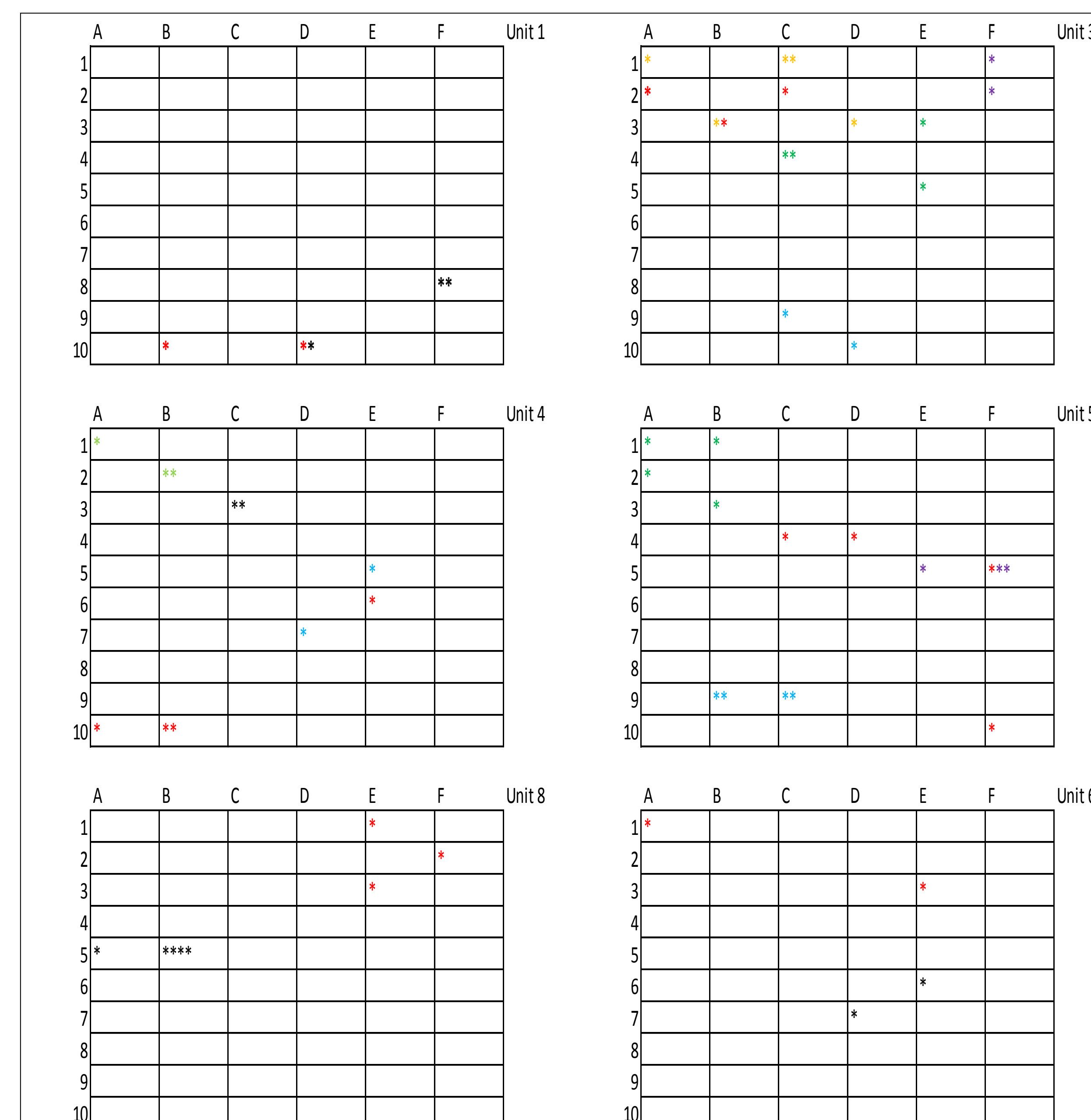


Figure 4: Map of capture and recapture points per individual. In addition to illustrating the movement pattern of each mouse, these diagrams illustrate the aggregation of the mice in specific areas of the unit. Each different color asterisk represents a distinct individual. Growing season burn units are on the left, control units on the right.

Results (con't)

Table 1: Comparison of captures as a reflection of white footed mice populations in each treatment. Overall, the same number of mice were captured in each treatment type, although recapture rates differed in each treatment.

Treatment	Abundance	Recaptured Individuals	Number of Recaps
Growing Season Burn	14	8	16
Control	15	11	25

Conclusions

- Habitat disturbance did not appear to affect the distances travelled by mice in the growing season burn units compared to those in the control units.
- Mice tended to aggregate within the same part of the units, possibly due to the distribution of optimal resources.
- The abundance of white footed mice did not differ between the two treatments, signifying no difference in emigration from the burn treatment unit.
- More research is needed on white-footed mice behavioral adaptations to fire.

References

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