



# Preliminary Results of Habitat Preference and Home Range Study on New England Cottontail at Camp Edwards

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## Introduction

New England cottontails (*Sylvilagus transitionalis*) are a candidate species for federal listing. Their habitat preference is early successional forests with dense vegetation (Tash and Litvaitis 2007). The steady loss of early successional habitat is suspected to be the cause for the species' decline across New England (Litvaitis and Villafuerte 1996). After the abandonment of agricultural land in the early 1900s, early successional habitat increased, and New England cottontails were widespread. As old fields progressed to mature forests, New England cottontail numbers declined. Development has created fragmentation and associated edges that reduce stem density required by *S. transitionalis* leading to higher risks of predation (Mirick 2010; Villafuerte, Litvaitis and Smith 1997). Additionally, the introduction of the Eastern cottontail (*Sylvilagus floridanus*) to New England and its increasing abundance may create interspecific competition (Probert and Litvaitis 1996).

Camp Edwards historically utilized pyrotechnics and fired artillery into the impact area causing fires and habitat disturbances. These disturbances promoted early successional habitat within the impact area and the surrounding areas. Since the termination of artillery fire, prescribed fires conducted by the Natural Resource Office have continued to promote early successional habitat in this fire-adapted ecosystem. Currently Camp Edwards has 2,107 acres of scrub oak shrubland, one of the largest scrub oak barrens in the Northeast and a globally rare habitat. The diversity of habitats on the base (pitch pine scrub oak forest, scrub oak shrubland, and pitch pine oak forest) give us a unique opportunity to explore the habitat preferences of New England cottontails for habitat types available on Cape Cod. Camp Edwards has been conducting research on the home range size and habitat preferences of New England cottontails to inform management for this species.

## Methods

### Pellet Searches

From May 2010 to August 2010, pellet searches were conducted in black oak scarlet oak forests, pitch pine oak forests, pitch pine scrub oak communities, scrub oak shrublands, and disturbed areas to determine New England cottontail habitat preferences and trapping locations. These habitats are representative of the habitat types available on Cape Cod. During pellet searches, surveyors used GPS to record the distance traveled through available habitat and to create points where pellets were found. The data was analyzed in GIS using the vegetation cover type data set to determine the number of meters traversed in each habitat type and the number of pellet detections in each habitat type. The amount of survey effort expended (amount of meters traversed) in each habitat type was compared to the percentage of all detections found in that habitat type to determine habitat preferences.



### Trapping

Trapping began in January 2011 using wooden traps. Trap lines were located in areas where pellets were detected during pellet searches or in areas with historic reports of rabbits. Apple pieces and sweet meadow grass were the primary bait used. Captured rabbits were collared for radiotelemetry. Total length, left ear length, left hind foot length, tail length, weight, and sex were measured and recorded. Blood samples were taken using an FTA card for analysis by the University of Rhode Island.



### Radiotelemetry

Starting on 7 March 2011, radiotelemetry was conducted at fixed stations for radio-collared rabbits. Stations were positioned on roads surrounding the area where the rabbit was captured. A minimum of six telemetry stations were put in place to acquire accurate triangulation. Telemetry is done four times per week on a rotating 24 hour schedule to determine accurate home ranges and activity periods. During telemetry, azimuths were recorded and later analyzed using Location of a Signal (LOAS). Minimum Convex Polygons were used to determine home range size.



## Results

### Pellet Searches

Pellet searches carried out in the summer of 2010 were primarily in pitch pine oak forests, pitch pine scrub oak communities, and scrub oak shrublands (Figure 1). Throughout the summer over 33,000 meters were walked in search of pellets. Pellets were found in a total of 34 locations. Although there was more search effort allotted to pitch pine oak forests and pitch pine scrub oak communities, *S. transitionalis* pellets were most often detected in scrub oak shrublands (Figure 2). Only 19% of the search effort was expended in scrub oak shrublands; yet 44% of the pellet locations were in scrub oak shrublands.



Figure 1. Summer 2010 pellet searches and pellet locations at Camp Edwards, Massachusetts.

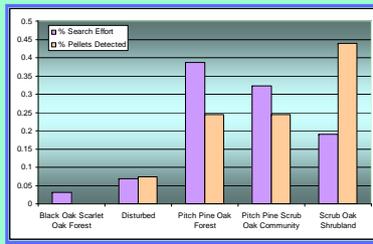


Figure 2. Comparison of percent search effort and percent pellet detections based on vegetation cover type during the summer of 2010 at Camp Edwards, Massachusetts.

### Trapping

Twelve rabbits were captured during trapping. All rabbits had short, black tipped ears. Blood samples were taken for all rabbits; however the results of the blood tests have not been received. All rabbits were radiocollared for radiotelemetry.

### Radiotelemetry

Of the twelve rabbits collared for radiotelemetry, nine have more than ten point locations determined. The number of point locations obtained ranges from 11-19 with an average of 15 (Table 1). The minimum convex polygons for each of these rabbits ranges from 10.10 - 64.92 acres with an average of 36.17 acres. Males tended to have a larger home range area than females. During radiotelemetry New England cottontails were recorded as having crossed powerlines and roadways (Figures 3 and 4).

Table 1. Minimum Convex Polygon of telemetry locations for rabbits with more than 10 point locations.

Sex	# of Points	Area (acres)
Female	14	43.08
Female	19	46.07
Female	19	21.20
Female	11	43.41
Female	14	10.10
Female average	15.4	32.77
Male	16	64.92
Male	13	14.93
Male	17	24.47
Male	15	57.37
Male Average	15.25	40.42
Overall Average	15.34	35.83



Figure 3. Locations and minimum convex polygon (MCP) for the late winter and early spring locations of a female New England cottontail at Camp Edwards, Massachusetts.



Figure 4. Locations and minimum convex polygon (MCP) for the late winter and early spring locations of a female New England cottontail at Camp Edwards, Massachusetts.

## Discussion

### Habitat Preferences

New England Cottontails prefer scrub oak shrublands on Camp Edwards. Pellet search results show rabbits using disturbed areas. The species also occurs in pitch pine scrub oak shrublands, and were detected less in pitch pine oak forests. Pellets were not detected in black oak scarlet oak forests. Further information on habitat preferences will be obtained from location data from radiotelemetry. Further pellet searches will focus on scrub oak shrublands, disturbed areas, such as the impact area, and areas of prescribed burns to determine habitat preference, trapping locations, and necessary management efforts to support the species. Survey locations will be determined based on cover type and fire history. Determining the age and fire history of preferred stands will aid managers in determining proper management.



### Home Ranges

Rabbit home ranges were larger than expected based on anecdotal observations. Camp Edwards is a largely unfragmented habitat, which may allow rabbits to occupy larger home ranges. Males utilized a larger area than females suggesting they may be moving for breeding. During late winter, rabbits traveled shorter distances than during early spring. In early spring, rabbits began making movements into new areas. Rabbits crossed roads and powerlines suggesting these features are not barriers for movement. Rabbits in areas of scrub oak shrublands or pitch pine scrub oak forest surrounded by pitch pine oak forest tended to restrict their movements to the areas with scrub oak. Rabbit locations tend to be in old fire scars or in kettle holes; these areas tend to be dominated by shrubs. Radiotelemetry on these rabbits will continue throughout the season to determine seasonal patterns in habitat use as well as to better determine home range requirements.



## Conclusions

Past military training created the extensive scrub oak shrublands on Camp Edwards, and the active training on base continuously creates early successional habitat. The results of this study suggest that the habitat types created by military training are the preferred habitat of this species. Off base, the suppression of fire has created more homogenous mature forests, which from our results is less suitable for this species. At Camp Edwards, military training and the prescribed burn program have been successful at creating habitat for New England cottontails. Given the diversity of habitat types at Camp Edwards, we believe we have a unique opportunity to observe New England cottontail preferences for specific site conditions and hope to aid partners regionally in determining the most effective management to best support this threatened species.



## Literature Cited

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## Acknowledgements

This project is supported by the Massachusetts Army National Guard, U.S. Fish & Wildlife Service, Massachusetts Department of Fish & Wildlife, and Senior Environmental Corps.