



Movements and Habitat Selection by Raccoons in a Fragmented Agricultural Landscape in Illinois

Erin Barding & Thomas Nelson

Dept. Biological Sciences, Eastern Illinois University, Charleston



Introduction: Raccoons are found throughout most of North America, occupying a wide variety of habitats from swamps to prairies, farms and cities. During the past 20 years, populations have increased dramatically in Illinois due in part to low pelt prices and reduced hunting pressure (Gehrt et al. 2002). Illinois' rural landscape also supports high raccoon densities because corn fields provide important supplemental food during winter. On a gradient from forested to cultivated, raccoon densities tend to be highest in mid- to highly cultivated areas (Pedlar et al. 1997).

At these densities, raccoons may exert levels of predation rarely seen in natural settings. For example, extremely high rates of nest predation have been reported near forest edges in Illinois (Robinson 1992). A recent study reported that "raccoon-vulnerable" birds (those nesting below 8') have declined during the past 20 years, whereas "raccoon-invulnerable" birds increased (Schmidt 2003). Collectively, these studies suggest that high raccoon densities may be an important factor influencing the abundance and diversity of songbirds in Illinois.

Numerous studies have reported generalized habitat use by raccoons, but few have been conducted in highly fragmented, agricultural landscapes or focused on habitat selection by raccoons during the avian nesting season. We investigated summer movements and habitat selection by raccoons occupying a rural Illinois landscape at two spatial scales, the home range and habitat types within the home range. This information may help us identify those habitat complexes most vulnerable to raccoon predation.

Objectives:

1. Evaluate the movements and home ranges of raccoons during the avian nesting and brood rearing season.
2. Describe patterns of habitat selection at two spatial scales during the summer.

Methods: Research was conducted on the Richardson Wildlife Foundation (RWF) property in northern Illinois. This 1,000 ha site is composed of wetlands (10%), restored prairies (28%), forests (37%) and crops (22%). Raccoons were live-trapped, sexed, aged, and radio-collared. Collared raccoons were located 3-4 times weekly from May to September. Individual animals were tracked during continuous 4-hour intervals at night to investigate movements and habitat use while foraging. Locations during these periods was recorded every 15 min and recorded in UTM coordinates. We used the Animal Movement extension and ArcView software to estimate MCP and 95% kernel home ranges. Home ranges were intersected with a GIS habitat map of the study area to estimate the habitat composition of each range.

Habitats were classified as forest, forest edge, wetland, grassland, crops, or residential (Fig. 1). We assessed habitat use at 2 scales using compositional analysis (Aebischer et al. 1993). First we compared the habitat composition of home ranges to the composition of the study area. We then compared habitat associated with raccoon locations to habitat composition of the home range. When overall use of habitat was non-random, we tested all possible habitat pairs and ranked them according to relative use.

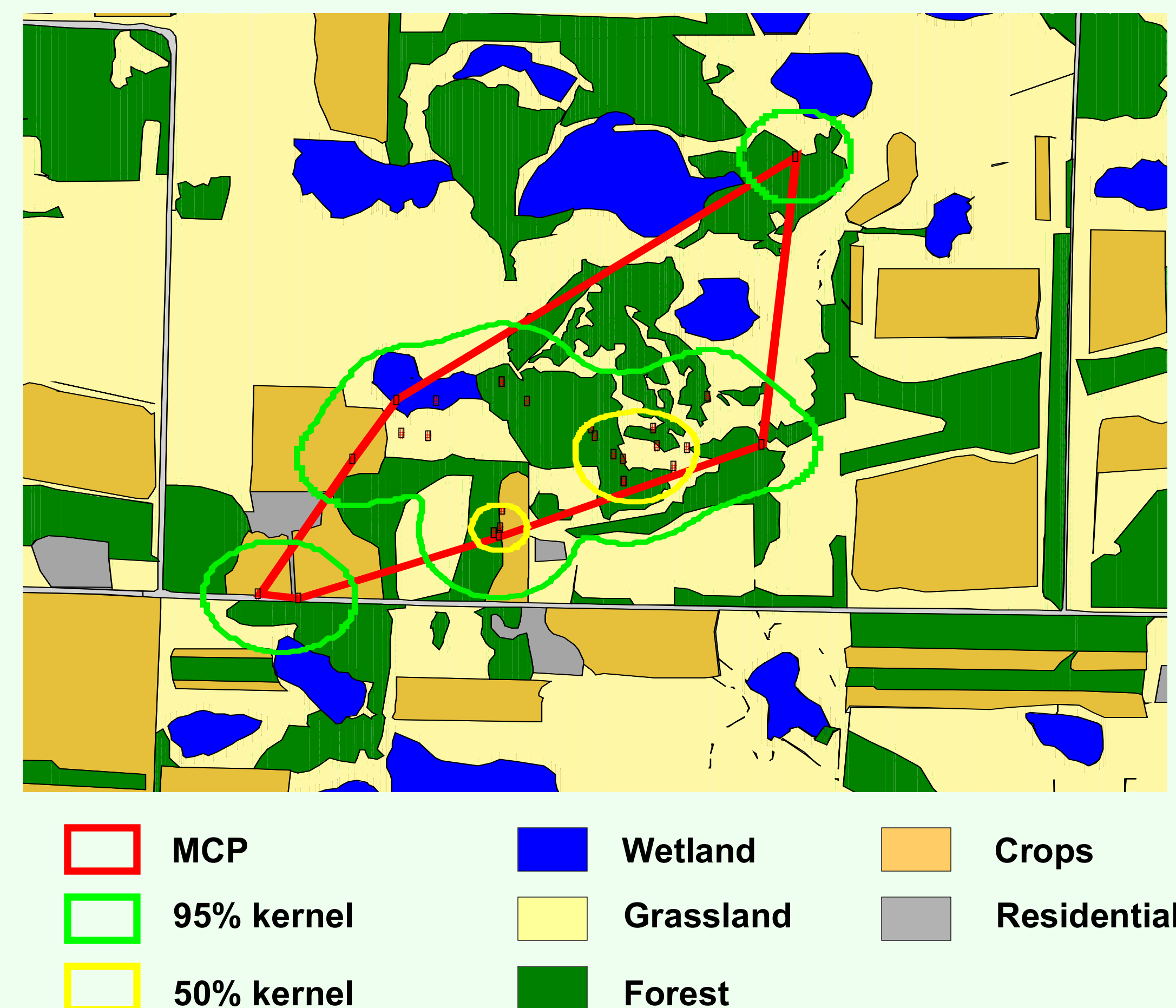


Fig. 1. Example of MCP, 95% kernel and 50% kernel for a raccoon radio-tracked on RWF during summer 2002.

Results:

- The median MCP summer range was xx.x ha (range:) and did not differ between males and females ($U = 26.0$; $P = 0.09$).
- Median core area (50% kernel) was xx.x ha (range:) and did not differ between the sexes ($U = 37.0$; $P = 0.37$).
- During foraging bouts males averaged xx.x m/hr; whereas females moved less, averaging xx.x m/hr ($U = 4.0$; $P = 0.04$).
- Proportions of habitats within home ranges were different than proportions available in the study area ($\Lambda = 0.26$, $P < 0.01$). Home ranges contained more forest edge and less cropland than study areas (Fig 2.).
- Proportions of raccoon locations within habitats differed from proportions within home ranges ($\Lambda = 0.04$; $P < 0.01$). Within their home ranges, raccoons selected forest edges and wetlands for foraging and avoided grasslands and cropland (Fig. 2).

- Based on relative use of habitats within home ranges, foraging habitats rank in order of preference as: forest edge, wetlands, residential, forest interiors, grasslands, and cropland.

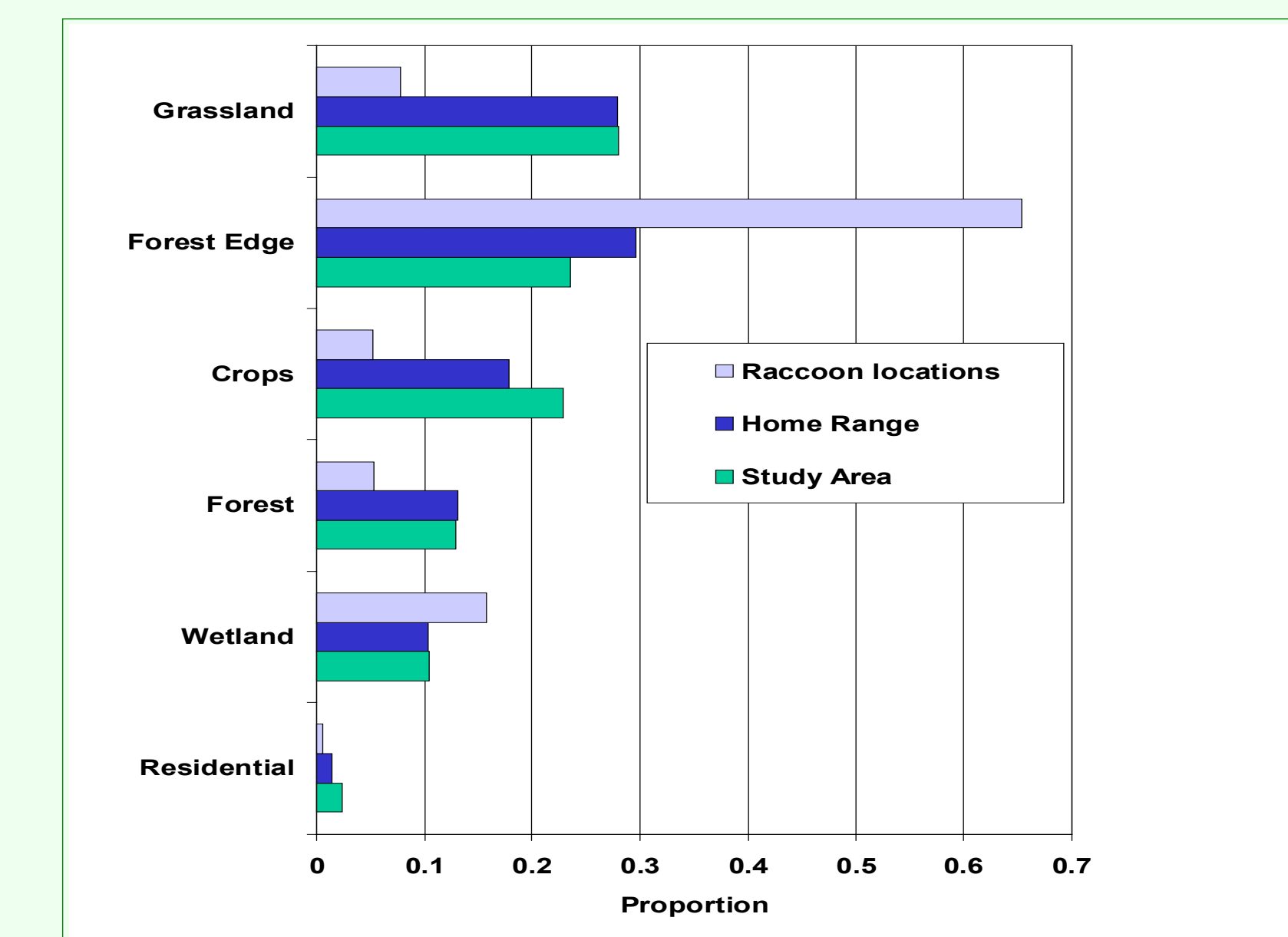


Fig. 2. Mean habitat availability (study area) and use (within study areas and radio locations) by raccoons during summer.

Conclusions: Raccoons foraged predominantly in forest edges and wetlands during the summer, but grasslands were used infrequently. Cornfields were avoided early in the summer when they provided little cover, but use increased as these fields matured in late summer. Forest/cropland and forest/grassland edges were used extensively as travel lanes. If raccoons predate nests incidentally while foraging on other foods, nest predation on grassland birds may be reduced by maintaining or restoring large grassland tracts and separating nesting habitat from raccoon travel lanes and foraging areas.

Acknowledgements: This research is funded by the IL Natural History Survey and EIU. Thanks to J. Crawford, Dr. P. Brown (INHS) and T. Moyer (RWF) for assistance and Richardson's Wildlife Foundation for providing housing and access to the study area.

Literature Cited:

- Aebischer, N., P. Robertson, and R. Kenward. 1993. Compositional analysis of habitat use from animal radio-tracking data. *Ecology* 74:1313-1325.
- Gehrt, S., G. Hubert, Jr., and J. Ellis. 2002. Long-term population trends of raccoons in Illinois. *Wildlife Society Bulletin* 30:457-463.
- Pedlar, J., L. Fahrig, and H. Merriam. 1997. Raccoon habitat use at 2 spatial scales. *J. Wildl. Manage.* 61:102-112.
- Robinson, S., F. Thompson III., T. Donovan, D. Whitehead, and J. Faaborg. 1995. Regional forest fragmentation and the nesting success of migratory birds. *Science* 267:1987-1990.
- Schmidt, K. 2003. Nest predation and population declines in Illinois songbirds: a case for mesopredator effects. *Cons. Biol.* 17:1141