A Note on the Status of the Endangered Red-backed Vole (*Clethrionomys gapperi*) in Iowa

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The red-backed vole, *Clethrionomys gapperi*, is an endangered species in Iowa that has only been found in a small area in the north-central portion of the state. An extensive survey in 1967 suggested that *C. gapperi* was once abundant in that area, but work in 1982 suggested that its abundance had dramatically declined. In April 2000, we sampled areas in Pilot Knob State Park where *C. gapperi* was found in 1982 to determine the current status of the population. During 1080 trapnights of effort at 5 locations, no *C. gapperi* were captured. The most abundant small mammal collected during sampling was the white-footed mouse, *Peromyscus leucopus*. Although we captured no *C. gapperi*, greater sampling effort and sampling during summer months or fall months are necessary before concluding that *C. gapperi* is extinct in Iowa.

INDEX DESCRIPTORS: *Clethrionomys gapperi*, endangered, Iowa, population, red-backed vole, small mammal.

The red-backed vole, *Clethrionomys gapperi*, is arvicoline rodent generally associated with wooded, mesic habitats (Merritt 1981). The geographic range of *C. gapperi* stretches across most of Canada and northern portions of the United States, and extends south along mountain ranges in the eastern and western United States (Merritt 1981). *Clethrionomys gapperi* probably was widespread in Iowa prior to European settlement (Bowles et al. 1998). From 1961 to 1966, Blagen (1967) sampled 17 counties in Iowa and found *C. gapperi* only at Pilot Knob State Park and five wooded areas located within 8 km of the park. Later, Lampe (1982) revisited these sites and concluded that only one population remained, located within the confines of Pilot Knob State Park. This population was separated from the nearest populations in Minnesota by approximately 65 miles of agricultural land that probably prevents migration (Blagen 1967, Hazard 1982).

The status of the only known relict population of *C. gapperi* in Iowa has not been examined since the study of Lampe (1982). We examined areas within Pilot Knob State Park where *C. gapperi* was found during past sampling efforts (Blagen 1967, Lampe 1982) to document the current status of this population. Additionally, data regarding other small mammal species within the park was also obtained.

METHODS

Pilot Knob State Park is a 283-ha park located in Hancock and Winnebago Counties in the northern portion of central Iowa. Within Pilot Knob, five sites were sampled. Because of the extensive survey of the region by Blagen (1967), habitats within the park that historically did not contain *C. gapperi* were not examined in this effort (Blagen, pers. comm., Lampe 1982). Three sites, the amphitheater, the knoll, and the lake, were sampled with trapping grids with 10-m spacing between traps to estimate small mammal density (see Orrock 2000 for more details). An 8 × 8 sampling grid was established at the amphitheater site, located southeast of the amphitheater at the east end of the park, along a north-facing hillside. Trees at the amphitheater site consisted mostly of oak (*Quercus* spp.) and ash (*Fraxinus* spp.). The knoll site was located north of the highest point in the park, the 'knoll', where the lookout tower is situated (Orrock 2000). The 8 × 8 trapping grid was established along a hillside just north of the horse trail, with a small bog located in the northeast corner. The knoll site was characterized by oak (*Quercus* spp.) and Hickory (*Carya* spp.), but also included hackberry (*Celtis occidentalis*) and aspen (*Populus* spp.). The lake site was located in a portion of forest due east of Deadman's Lake. The 9 × 9 trapping grid began on the north side of the road through the park, and extended to the other side of the road. Tree species at the lake site consisted of oak (*Quercus* spp.) and ash (*Fraxinus* spp.) in the overstory and dogwood (*Cornus* spp.) and ironwood (*Ostrya virginiana*) in the understory.

Sampling was conducted from 10–16 April 2000. All sites were sampled over the same time period to eliminate temporal bias among sites and facilitate comparison of sampling results among sites. We used live traps to reduce the potential impact on extant *C. gapperi* populations (Blagen, pers. comm.). One 8 × 9 × 23 cm Sherman live trap (H. B. Sherman Traps, Inc., Tallahassee, FL) was at each trap station within a grid. Leaf litter was removed to facilitate trap placement directly on the ground, and traps were placed in areas where rodent activity was likely to be high (e.g., along downed woody debris). Traps were baited with whole oats scented with peanut butter. Cotton bedding material was placed in traps to provide bedding material and warmth for captured rodents. Traps were prebaited for two days and then opened for five consecutive days. Traps were checked daily for captures and rebaited as necessary. Animals were marked with an ear tag (National Band and Tag Co., Lexington, KY), and species, sex, age, and weight recorded before release. Trapping methods followed established guidelines (American Society of Mammalogists 1998; ISU Committee on Animal Care # 3-0-4485W-1; Iowa DNR Permit SC 97 0001) to ensure safe and humane treatment of captured rodents.

In addition to the three trapping grids, two additional sites were sampled less intensively during the effort by placing traps within likely capture areas. The 'campground' site consisted of 8 traps set
for two nights in aspen forest along the road to the campground, and the 'picnic' site consisted of 10 traps set for two nights in a strip of aspen across from a picnic area.

RESULTS AND DISCUSSION

Evidence collected during this study suggests that the relict population of *Clatyroamys gapperi* within Pilot Knob State Park may be locally extinct: in 1081 trapnights at 5 sites from 12–16 April 2000, no *C. gapperi* were caught. During this time, 35 individuals representing four species and 76 total captures were recorded. Captures were dominated by white-footed mice, *Peromyscus leucopus* (30 individuals), but chipmunks, *Tamias striatus* (2 individuals), meadow voles, *Microtus pennsylvanicus* (2 individuals), and a red squirrel, *Tamiasciurus hudsonicus*, were also captured. While the dispersal ability of *M. pennsylvanicus* is well-known (Reich 1981), a noteworthy capture of one adult male meadow vole occurred in the small bog within the knob site, approximately 400 meters from a field, the nearest suitable habitat.

Although habitats sampled were selected based upon the locations of previous captures of *C. gapperi* (Blagen 1967, Lampe 1982), we cannot be certain that red-backed voles are locally extinct. There was a full moon and clear skies during the sampling period, both of which are known to reduce capture success of small mammals in Pilot Knob (Blagen 1967). Additionally, while *C. gapperi* is active all year, population size trends to be lowest just prior to the onset of spring and subsequent reproduction (Merritt 1981). These climatic and temporal factors may have prevented detection of *C. gapperi* during the sampling effort, and more sampling (e.g., the Iowa NatureMapping Program) is warranted to fully document the existence and status of *C. gapperi* at Pilot Knob State Park and elsewhere in Iowa (Blagen 1967).

An examination of previous work suggests that *C. gapperi* populations within Pilot Knob have been declining. Miller (1954, 1955) reports that 21 *C. gapperi* were captured in a single night at the knob using 100 snap traps in August 1953, whereas we failed to capture *C. gapperi* in the same area using 320 trapnights of effort with live traps. Furthermore, when Blagen (1967) sampled Pilot Knob with snap traps, he captured 98 *C. gapperi* at twenty locations within the park and concluded that *C. gapperi* was a dominant member of the small mammal community in suitable habitats. When Lampe (1982) later sampled Pilot Knob from 28 June–30 July 1982, he only found 18 *C. gapperi* among five sites within the park. The reduced size of the Pilot Knob population in 1982 would increase the probability of extinction due to stochastic events and also may lead to reduced heterozygosity within the population, which could also decrease fitness and population viability (Frankham 1995). In light of generally high capture probabilities observed in other studies (Blagen 1967; Merritt 1981), our inability to capture *C. gapperi* suggests that remnant populations of *C. gapperi*, if they exist, are not likely to be large.

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LITERATURE CITED


