

Status Review Criteria for De-listing the Golden Mouse from Its State Threatened Status

Developed by the Endangered Species Protection Board

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Obtaining quantitative estimates of a species' distribution, and particularly its abundance, is a difficult task. The problem can be acute for endangered and threatened species because their rarity and/or patchy distribution prevent efficient detection. Therefore, most status determinations are recommended by panels of experts who consider the best available data. This approach is credible, but tends to be subjective (Clark et al. 2006).

Listing a species as endangered or threatened conveys protection under state and/or federal laws. This action can incur social and economic costs such as reviews for incidental take, surveys to determine a species' presence or absence in a project area, modifications to civil and private construction/development, and mitigation for projects that diminish the quality and/or quantity of a species' habitat. Litigation can occur when these costs are perceived as excessive (e.g., Yaffee 1994). Therefore, objective criteria for listing (and de-listing) species are desirable if resource agencies responsible for protecting endangered and threatened species want to fulfill their statutory obligations, allocate resources to species most in need of conservation actions, and avoid frequent challenges in courts and other venues.

Research priorities recommended by Illinois' Endangered Species Technical Advisory Committee for mammals included assessing the status of the golden mouse. This document proposes specific criteria for de-listing the golden mouse to help define an appropriate scope for the research project and a clear, objective outcome when it is completed.

The following background information and criteria were developed by Dr. George Feldhamer (Zoology Department, Southern Illinois University) in anticipation of the study:

Introduction

Rarity of a species—and enhanced potential for extinction—is a fundamental concept in wildlife management and conservation biology. Most mammalian species in North America are neither widespread nor abundant (Gaston 1994). Resource managers working with rare species that may be identified as threatened or endangered at the state or national level face many ecological and methodological uncertainties. A species may actually *be* rare or it may only appear to be rare because it is highly elusive, spatially clustered throughout its range, or it exhibits temporal (seasonal) variation in abundance. The golden mouse (*Ochrotomys nuttalli*) is a prime example

of the uncertainties faced by managers attempting to determine the current status of listed species.

Current Conservation Status of the Golden Mouse

Golden mice are distributed throughout the southeastern United States, and are on the periphery of their geographic range in Illinois (Figure 1), where they are currently listed as a state threatened species (Herkert 1992). The golden mouse is considered “secure” in most of the other states where it occurs although it also is a state-listed species in Texas, Missouri, and West Virginia (Feldhamer and Morzillo 2007).

This project is proposed to quantitatively assess populations of golden mice throughout Illinois in comparison with populations throughout their core geographic distribution. Assessment will involve mark-recapture of individuals to determine the percentage of sampled sites that are occupied by golden mice, and their relative abundance on occupied sites. If there is no significant difference in these two quantitative factors, the golden mouse could be considered for removal from the list of threatened species in Illinois.

Geographic Range and Density

The golden mouse is restricted to the southeastern United States from the Appalachian Mountains in northwestern Virginia south to central Florida and from extreme eastern Texas and Oklahoma through southeastern Missouri to southern Illinois and most of Kentucky (Figure 1). Often found in deciduous hardwood and coniferous forests, the golden mouse occupies a variety of habitats including the borders of old fields, swampy lowlands, canebrakes, and xeric wooded uplands. Its occurrence is usually associated with dense understory vegetation and the presence of abundant climbing vines such as greenbrier (*Smilax* sp.), Japanese honeysuckle (*Lonicera japonica*), grape (*Vitis* sp.), blackberry (*Rubus* sp.), poison ivy (*Toxicodendron radicans*), and cane (*Arundinaria* sp.). It is generally regarded as a habitat specialist (Dueser and Hallett 1980, Knuth and Barrett 1984, Seagle 1985) as opposed to sympatric species such as white-footed mice (*Peromyscus leucopus*) or cotton mice (*Peromyscus gossypinus*) that are more habitat generalists.

Although it may be fairly common in localized areas, as a general rule the golden mouse is uncommon, with population densities well below those of sympatric species of *Peromyscus* (Feldhamer and Morzillo 2007). The species lives in highly localized populations. Population densities reported in the literature are highly variable (Linzey and Packard 1977; Rose 2007). Although to some extent the reported variation in densities may reflect different trapping protocols, site-specific and seasonal differences are no doubt significant as well. Densities of golden mice are usually lower than that of sympatric *Peromyscus*. Also, there may be inverse relationships between population densities of golden mice and co-occurring *Peromyscus* (Linzey 1968, Furtak-Maycroft 1991). Finally, there also are behavioral differences between golden mice and *Peromyscus* that may affect perceived densities. Feldhamer and Maycroft (1992) found that individual golden mice were trapped significantly fewer times, and in fewer traps, than sympatric white-footed mice.

Proposed De-Listing Criteria to be Considered for Golden Mice in Illinois

The following criteria will be used to address the question of de-listing. Criteria 1-6 are those for listing a species from the Administrative Code, Title 17 Conservation, Chapter 1 Department of Natural Resources, Subchapter c Endangered Species. In many cases, data are available to address these criteria as noted below. Data to address the final two criteria—which are not part of the Administrative Code—will result from the study.

1. Species included in the Federal list of Endangered or Threatened Species

Golden mice are not federally listed as endangered or threatened.

2. Species proposed for Federal Endangered or Threatened status that occur in Illinois

Golden mice are not being proposed for federal threatened or endangered status. As noted, they are generally considered secure throughout most of their range.

3. Species which formerly were widespread in Illinois but have been nearly extirpated from the state due to habitat destruction, collecting, or other pressures resulting from the development of Illinois

There is no historical evidence that golden mice were ever widespread in Illinois. Given land management practices the past 50 years, density and distribution of the species may be greater than ever, although recent management trends toward reduced cutting and burning of forested sites may negatively impact golden mice.

4. Species which exhibit very restricted geographic ranges of which Illinois is a part

The geographic range of most species of North American mammals is fairly limited. The median geographic range of close to 700 mammalian species is only about 1% of the total area of North America; only about 14 species have ranges > 50% of the area of North America. Thus, one in six species of North American mammals has a range smaller than the state of Connecticut. Most have ranges smaller than the states of California, Oregon, and Washington combined (Pagel et al. 1991; Pimm and Jenkins 2005). Also, as a general rule small species such as rodents have smaller ranges than large species. The golden mouse is a prime example of a small species with a relatively extensive geographic range. The extent of occurrence of golden mice is well above the average for most North American mammals, especially for a small rodent.

5. Species which exhibit restricted habitats or low populations in Illinois

As noted above, golden mice are often found in deciduous hardwood and coniferous forests, but they also occupy a variety of habitats including the borders of old fields, swampy lowlands, canebrakes, and xeric uplands. Populations generally are low, but may not be different from other populations in the core area.

6. Species which are significant disjuncts in Illinois, i.e., the Illinois population is far removed from the rest of the species' range

This is not the case for golden mice. Their range in Illinois is contiguous with the core distribution.

The following two criteria will be addressed through the study:

These proposed status review criteria represent measures of distribution and abundance to prompt the Endangered Species Protection Board to review the status of golden mice and consider de-listing. Status review criteria do not prompt an automatic change in status, and the Endangered Species Protection Board may review the status or status review criteria of the species at any time.

- Determine if the percentage of sites sampled in Illinois (with appropriate habitat) that contain golden mice is significantly different ($P < 0.05$) from sites sampled in the core of the distribution that contain golden mice.
- Determine if the average number of individual golden mice trapped per unit effort on all occupied sites within Illinois is significantly different ($P < 0.05$) from that within the core of the range of golden mice.

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Figure 1. Range map of the golden mouse with currently recognized subspecies: (1) *O. n. aureolus*; (2) *O. n. flammeus*; (3) *O. n. floridanus*; (4) *O. n. lisae*; and (5) *O. n. nuttalli*.

