STATUS REVIEW AND RECOVERY OUTLINE

MARSH RICE RAT – *ORYZOMYS PALUSTRIS*

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Current status

The marsh rice rat (*Oryzomys palustris*) is currently listed as a state-threatened species (Herkert 1992) in Illinois due to historical wetland loss in conjunction with being at the edge of its range. It is a semi-aquatic rodent in wetland habitats throughout the southeastern United States and along the Atlantic Coast that reaches the northern extent of its range in southern Illinois (Hoffmeister 1989, Wolfe 1982). Distribution of the rice rat in southern Illinois has expanded from initial sites consisting of remnant wetlands, ditches, and wet meadows (Hofmann et al. 1990) to more recent records (see below) associated with moist soil and emergent wetlands dominated by common reed (*Phragmites australis*). These wetlands are often associated with surface mines and subsidence basins of underground coal mine (Feldhamer and Carter 2004, Nielsen et al. 2006).

Small-scale studies have provided new records in recent years. Feldhamer and Carter (2004) documented rice rats in mine-associated wetlands at the recently acquired Pyramid State Park in Perry County, Illinois while conducting a small mammal survey. This record was the first for rice rats in Perry County, Illinois as Hofmann et al. (1990) failed to capture rice rats at their Perry County site. Nielsen et al. (2006) captured rice rats approximately 3 km from previous known locations near Harrisburg, Saline County, Illinois. These new records suggest rice rats may be extending their distribution in Illinois or may be more common throughout the state than previously reported.

Rice rats have been documented in the Big Muddy, Cache, Saline, Mississippi, Ohio, Wabash, and Kaskaskia watersheds of southern Illinois (Hofmann et al. 1990). These major drainages, combined with an increase in mine-associated wetlands, may have provided rice rats with opportunities for dispersal and population expansion in the last 2 decades. Recent data for this species, which is considered in the greatest need of conservation, are lacking.

Historical Status

Archeological records indicate the distribution of *Oryzomys* was once as far north as Peoria County, Illinois (McLaughlin and Robertson 1951). Hofmann et al. (1990) also reported the findings of Purdue and Styles (1986. Dynamics of mammalian distribution in the Holocene of Illinois. Illinois State Museum Reports of Investigations Number 41. original not seen) that rice rat remains had been identified in "Indian midden materials and paleontological deposits" in several northern Illinois counties. The first modern records of rice rats in Illinois were reported by Cory (1912) and Necker and Hatfield (1941) in Alexander County. These records led McLaughlin and Robertson (1951) to conclude that rice rats were limited to areas south of the

Shawnee Hills Division (Schwegman 1973). Studies in the past 50 years have provided live rice rat specimens from Franklin, Hamilton, Jackson, Johnson, Massac, Perry, Pope Pulaski, Saline, Union, and Williamson counties (Fig. 1), which suggests this species may occur throughout the Southern Till Plain Division (Feldhamer and Carter 2004, Hoffman et al. 1990, Hofmann and Gardner 1987, Klimstra 1969, Klimstra and Roseberry 1969, Klimstra and Scott 1956, Rose and Seegert 1982, Schwegman 1973, Urbanek and Klimstra 1986). Casson (1984) also provided a new record of distribution in Washington County by finding remains of a rice rat while examining mink (*Mustela vison*) stomach contents.

The only widespread assessment of the distribution of the marsh rice rat in Illinois was conducted in 1987 (Hofmann et al. 1990). The study provided new county records for rice rats in 4 counties and records at new localities in 6 counties (Fig. 2). Specimens were captured in a variety of wetland types, including palustrine emergent wetlands, palustrine scrub-shrub wetlands, palustrine aquatic beds, and riverine aquatic beds (Cowardin et al. 1979, Hofmann et al. 1990). Hofmann et al. (1990) concluded that "optimal habitat" for the species in southern Illinois included standing water and emergent wetland vegetation.

Status Review Criteria for Rice rat

The proposed status review criteria represent measures of distribution and abundance to prompt the Endangered Species Protection Board to review the status of rice rats and consider status changes. 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.

Evaluate Change in Status to Not Listed as Threatened or Endangered –
Rice rats will be considered recovered and eligible for a change in status to "not listed" when it is demonstrated that:

1. Two distinct, reproductively viable populations (composing a watershed metapopulation) persist in each of at least 3 major watersheds (i.e., Big Muddy, Saline, Ohio, Cache, Mississippi, Kaskaskia, Little Wabash, Wabash) in southern Illinois for 5 years.

2. Habitats used by rice rats show a stable or increasing trend in area over the most recent 5 years.

Reasons for Decline

The rice rat was listed as state threatened due to its unique habitat affiliation, limited distribution, and historical wetland loss. No recent (last 100 years) evidence exists regarding changes in population abundance and distribution. However, Hofmann et al. (1990) opined that the species is limited by climate to the southern region of Illinois and by declines in wetland areas to small, isolated populations. They noted anthropogenic forces responsible for decreases in wetland areas in the region. Rice rat populations in disjunct and ephemeral wetlands may be vulnerable to stochastic forces, and recolonization of suitable areas may be hindered by the isolated nature of suitable habitat (Hofmann et al. 1990).

Recovery Actions

Action 1: Determine Distribution and Abundance of Rice Rats in Illinois — A comprehensive survey for rice rats in southern Illinois counties should be conducted. Results of this survey could be used to begin to address the proposed status review criteria for the species.

Action II: Quantify Extent and Distribution of Suitable Rice Rat Habitat — The above-mentioned survey should provide additional information supplementing and refining Hofmann's (1990) findings on habitat preferences of rice rats. Following the definition of rice rat habitat, its current extent and distribution can be modeled.

Action III: Determine Trends in Important Wetland Habitats for Rice Rats — Documentation of historic trends and modeling of future projections in availability of rice rat habitats would provide input to a status review by the Endangered Species Protection Board.

Action IV: Monitor abundance of rice rats in identified metapopulations — If Action I succeeds in identifying ≥2 populations in at least 3 southern Illinois watershed, long-term monitoring of the status of these populations should be implemented in conjunction with periodic surveys of formerly unoccupied but suitable habitat within these watersheds.

Recovery Timing and Estimated Costs

Action 1: Determination of Distribution and Abundance — A survey of the major watersheds in southern Illinois could document the current distribution and relative abundance of rice rats in the region. This survey could also provide the initial data directed toward addressing the first review criterion of 2 populations existing in each of 3 watersheds.

Time to complete this action: 2 years
Cost to complete this action: $50,000

Action II: Quantify Extent and Distribution of Suitable Rice Rat Habitat— This action will be addressed in association with the survey of distribution and abundance. Habitat types of capture sites for rice rats will be determined, and GIS modeling in conjunction with Illinois land cover data and National Wetlands Inventory data will be used to estimate extent and distribution of those habitats within the 2-year time frame of the rice rat survey.

Action III: Determine Trends in Important Wetland Habitats for Rice Rats — This action will require assistance from an updating of the National Wetlands Inventory being conducted through a State Wildlife Grant 2007 to Ducks Unlimited.

Action IV: Monitor Abundance of Rice Rats in Identified Metapopulations— Monitoring segments of identifiable metapopulation of rice rats within watersheds from the rice rat survey (Action I) should be conducted at least twice in the subsequent 5-year period to document persistence of watershed metapopulations.

References

Casson, J.E. 1984. A new distribution suggested for the rice rat (*Oryzomys palustris*) in southern Illinois. Transactions of the Illinois Academy of Science 77:285.

Cory, C. B. 1912. The mammals of Illinois and Wisconsin. Field Museum Natural History Zoology Series 11:1-505.

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRue. 1979. Classifications of wetlands and deepwater habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service. FWS/OBS-79/31.

Feldhamer, G., and T. Carter. 2004. Small mammal survey of ark land acquisition property, Perry County, Illinois, with special emphasis on the threatened rice rat (*Oryzomys palustris*). Carbondale, Illinois. Unpublished report.

Herkert, J. R., ed. 1992. Endangered and threatened species of Illinois: status and distribution. Vol. 2: Animals. Illinois Endangered Species Board, Springfield, Illinois.

Hoffmeister, D. F. 1989. The mammals of Illinois. University of Illinois Press, Urbana, Illinois.

Hofmann, J. E., and J. E. Gardner. 1987. Investigations of the distribution, abundance and status of the marsh rice rat (*Oryzomys palustris*) in Illinois. Section of Faunistic Surveys and Insect Identification Technical Report. Springfield, Illinois. Unpublished report.

Hofmann, J. E., J. E. Gardner, and M. J. Morris. 1990. Distribution, abundance, and habitat of the marsh rice rat (*Oryzomys palustris*) in southern Illinois. Transactions Illinois State Academy of Science 83:162-180.

Klimstra, W. D., and T. G. Scott. 1956. Distribution of the rice rat in southern Illinois. Chicago Academy of Science Natural History Miscellaneous Note 154.

Klimstra, W. D., and J. L. Roseberry. 1969. Additional observations on some southern Illinois mammals. Transactions Illinois State Academy of Science 62:413-417.

McLaughlin, C. A., and W. B. Robertson. 1951. A new record of the rice rat, *Oryzomys palustrus palustris*, from southern Illinois. Chicago Academy of Science Natural History Miscellaneous Note 80.

Necker, W. L. and D. M. Hatfield. 1941. Mammals of Illinois. Bulletin of the Chicago Academy of Science. 6:17-60.

Nielsen, C. K., J. Nawrot, and S. Cooper. 2006. Site Investigation: Rice rat (*Oryzomys palustris*) presence at AMAX Delta Mine Project. Final Report. Carbondale, Illinois. Unpublished Report.

Schwegman, J. E. 1973. Comprehensive plan for the Illinois nature preserve system part 2: The natural divisions of Illinois. Illinois Nature Preserves Commission. Rockford.

Urbanek, R. P., and W. D. Klimstra. 1986. Vertebrates and vegetation on a surface-mined area in southern Illinois. Transactions of the Illinois State Academy of Science 79:175-187.

Wolfe, J. L. 1982. *Oryzomys palustris*. Mammalian Species 175:1-5.

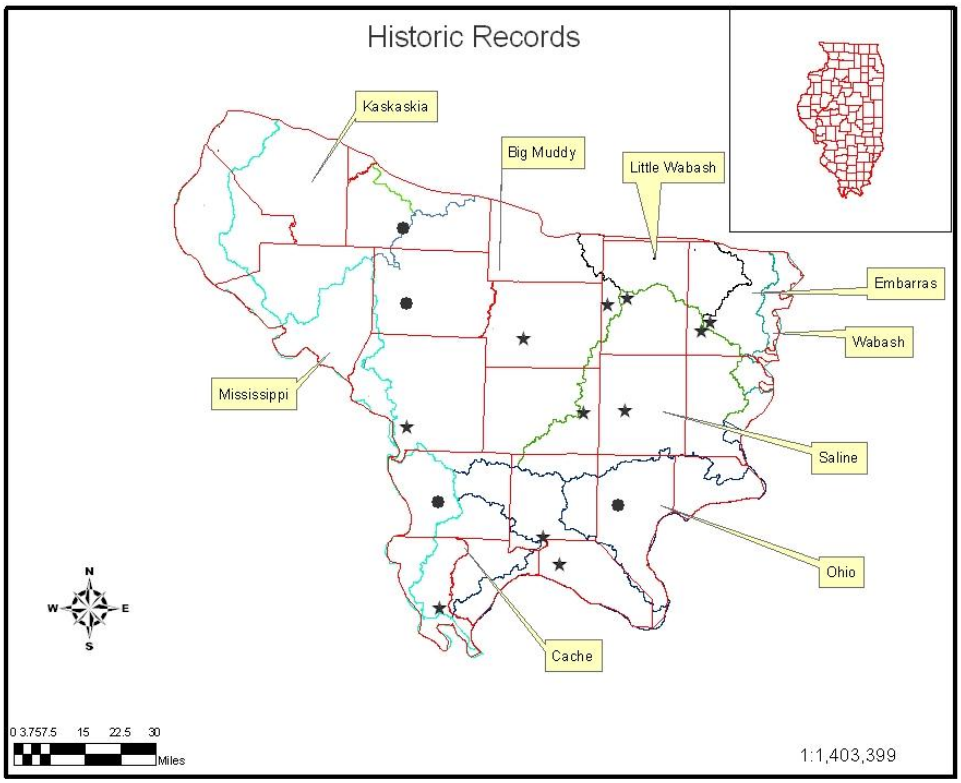

Figure 1. Locations of marsh rice rats documented from previous studies in Illinois. Watershed labeled with box and arrows. Stars depict exact locations of rice rat captures. Circles are not in exact locations but represent historical county records.