

**Recovery Plan for the Endangered Silver Rice Rat  
(*Oryzomys palustris natator*)**

<https://www.fws.gov/verobeach/MSRPPDFs/RiceRat.pdf>

**Original Approved:** May 18, 1999

**Original Prepared by:** South Florida Ecological Services Office staff

**DRAFT AMENDMENT 1**

We have identified the need to amend recovery criteria for the Silver rice rat (*Oryzomys palustris natator*; SRR) with the best available information discovered since the recovery plan was completed. In this proposed modification, we synthesize the adequacy of the existing recovery criteria, show amended recovery criteria, and provide rationale supporting the proposed recovery plan modification. The proposed modification is shown as an addendum that supplements the South Florida Multi-Species Recovery Plan (MSRP; USFWS 1999) by adding delisting criteria for the SRR that were not developed at the time this recovery plan was completed. The original recovery objectives and the step-down outline are described on page 4-187 of the MSRP. Recovery plans are a non-regulatory document that provide guidance on how best to help recover species.

**For  
U.S. Fish and Wildlife Service  
Region 4  
Atlanta, Georgia**

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**METHODOLOGY USED TO COMPLETE THE RECOVERY PLAN AMENDMENT**

These proposed amendments to the recovery criteria were developed using the most recent and best available information for the species. Primary sources of information included this species' most recent 5-year review (USFWS 2008) and the current recovery plan (USFWS 1999). This information was prepared by the U.S. Fish and Wildlife Service (Service) biologists and managers in the South Florida Ecological Services Field Office in order to develop the recovery criteria for the SRR.

**ADEQUACY OF RECOVERY CRITERIA**

Section 4(f)(1)(B)(ii) of the Endangered Species Act (Act) requires that each recovery plan shall incorporate, to the maximum extent practicable, "objective, measurable criteria which, when met, would result in a determination...that the species be removed from the list." Legal challenges to recovery plans (see *Fund for Animals v. Babbitt*, 903 F. Supp. 96 (D.D.C. 1995)) and a Government Accountability Audit (GAO 2006) also have affirmed the need to frame recovery criteria in terms of threats assessed under the five listing factors.

## Recovery Criteria

The MSRP only provides downlisting criteria for the SRR, and they can be found on page 4-187 of the document (<https://www.fws.gov/verobeach/MSRPPDFs/RiceRat.pdf>).

## Synthesis

New information, attained after the MSRP was finalized, is detailed in the SRR 5-Year Status Review (USFWS 2008) and synthesized below. The assessment of threats, suggested recovery actions, and life history information included in the MSRP largely remain applicable and relevant. Issues related to habitat (i.e., loss, fragmentation, need for management or restoration of freshwater wetlands; Factor A) and predation from non-native, invasive species and free-roaming pets (Factor C) are still directly pertinent to the SRR's recovery. Relevant, ongoing issues and important advances in our understanding of the SRR that have been made since the MSRP are summarized below.

SRR habitat generally includes tidal mangrove and saltmarsh areas, but habitat associations for SRR are not completely understood. These habitat types have been significantly altered in the Lower Keys, fragmented by roads and canals, and lost through residential and other development (Forys and Humphrey 1999, Lopez 2001). Hydrology of these habitats has also been transformed through both development and pervasive mosquito ditching.

Overall, genetic variation within SRR is low, but three genetically distinct groups exist (Crouse 2005). These eastern (Big Pine Key area) and western (Saddlebunch area) metapopulations exhibit genetic differentiation and very limited genetic exchange. SRR in the north/central portion of the range share alleles in common with both east and west areas, but have more in common with the eastern area. This is likely due to dispersal barriers, but maintaining these unique genotypes should be considered in any future translocation or captive breeding planning.

Sea level rise is a complex issue for the SRR. Due to its semi-aquatic nature and use of tidal areas, the SRR may be able to tolerate habitats transitioning or increasingly inundated by salt water. This may delay more severe impacts, but in less than 45 years an estimated 3 feet of sea level rise will result in permanently brackish conditions within representative wetlands on Big Pine Key (FWC 2017; NOAA 2017). At that level of inundation, if not before, remaining SRR is expected to be caught in slivers of habitat between development and water levels too high for persistence (i.e., coastal squeeze), further aggravated by habitat fragmentation and invasive species.

Free-ranging cat populations in the Florida Keys are primarily comprised of house cats and semi-feral, "managed" cat colonies. Feral cat densities on Big Pine Key are over 4 times that in Key Largo (Cove et al. 2018a), where they are documented predators of endangered rodents. Reducing the number of free-ranging cats was found to be an effective management practice that promotes Lower Keys marsh rabbit colonization of vacant habitats (Cove et al. 2018b). This finding is likely to translate to SRR though no similar research has been conducted. Burmese

pythons (*Python bivittatus*) were not a threat, or known to be a threat, at the time of the MSRP, but were first documented in the Keys in 2007. At least 4 pythons have been captured west of the Seven-mile Bridge (just east of Big Pine Key) since then (EDDMapS 2018; Hanslowe et al. 2018). No efforts have been made to confirm or quantify predation of SRR by pythons.

The SRR is infrequently studied and much is unknown about the species' life history and threats to its persistence. Additional information needs and data gaps still remain that could impede recovery. For example, further information regarding pesticide use and its effects on SRR, disease, altered hydrology, and competition with black rats is needed to determine their scope, severity, and potential effects.

## **AMENDED RECOVERY CRITERIA**

Recovery criteria serve as objective, measurable guidelines to assist in determining when an endangered species has recovered to the point that it may be downlisted to threatened, or that the protections afforded by the Act are no longer necessary and the SRR may be delisted. Delisting is the removal of a species from the Federal Lists of Endangered and Threatened Wildlife and Plants. Downlisting is the reclassification of a species from an endangered species to a threatened species. The term "endangered species" means any species (species, sub-species, or distinct population segment) which is in danger of extinction throughout all or a significant portion of its range. The term "threatened species" means any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Revisions to the Lists, including delisting or downlisting a species, must reflect determinations made in accordance with sections 4(a)(1) and 4(b) of the Act. Section 4(a)(1) requires that the Secretary determine whether a species is an endangered species or threatened species (or not) because of threats to the species. Section 4(b) of the Act requires that the determination be made "solely on the basis of the best scientific and commercial data available." Thus, while recovery plans provide important guidance to the Service, States, and other partners on methods of minimizing threats to listed species and measurable objectives against which to measure progress towards recovery, they are guidance and not regulatory documents.

Recovery criteria should help indicate when we would anticipate that an analysis of the species' status under section 4(a)(1) would result in a determination that the species is no longer an endangered species or threatened species. A decision to revise the status of or remove a species from the Federal Lists of Endangered and Threatened Wildlife and Plants, however, is ultimately based on an analysis of the best scientific and commercial data then available, regardless of whether that information differs from the recovery plan, which triggers rulemaking. When changing the status of a species, we first propose the action in the *Federal Register* to seek public comment and peer review, followed by a final decision announced in the *Federal Register*.

Herein, we provide delisting criteria for the SRR as the MSRP only developed downlisting criteria as discussed above.

## **Downlisting Recovery Criteria**

We are not amending the existing downlisting criteria (please refer to page 4-187 of the MSRP).

## **Delisting Recovery Criteria**

The SRR will be considered for delisting when all of the following criteria have been met:

1. SRR populations on at least twelve (12) islands of the Lower Keys exhibit a stable or increasing trend, as evidenced by natural recruitment for multiple generations. (Factor A)
2. The SRR populations are connected to the extent that genetic diversity of the three genetic groups can be naturally maintained without translocations or captive breeding. (Factor A, D, E)
3. Predation and competition from non-native species (e.g., Burmese pythons, black rats, and free-roaming pets) are low enough for SRR to remain viable for the foreseeable future. (Factor C, D)
4. In addition to the above criteria, it can be demonstrated that habitat loss associated with development, lack of natural disturbance, and other factors particularly affecting tidal mangrove and salt marsh habitat, are diminished or reversed such that enough suitable habitat remains for SRR to remain viable for the foreseeable future despite anticipated sea level rise. (Factor A, E)

## **Justification**

The proposed delisting criteria reflect the best available and most up-to-date information of the SRR, while incorporating information still relevant from the MSRP. Furthermore, the delisting criteria developed reflect the species' overarching recovery strategy and are consistent with current goals, objectives, and known risk levels.

Specifically, each delisting criterion ensures that the underlying causes of decline and impediments to recovery will be addressed and mitigated by:

Criterion 1. Providing redundancy through multiple populations and sufficient habitat, and reaching demographic parameters that allow for resilient and stable populations. Since populations of many small mammals, including the SRR, typically fluctuate, it is necessary to evaluate population demographics across multiple generations to assess true trends. Before more recent threats were identified, eight islands were designated as critical habitat (USFWS 1993), but viable populations on a minimum of 12 islands are required for long-term persistence not only to comprise the amount and diversity of habitat needed and redundancy in light of known threats and increased habitat fragmentation, but also to maintain the SRR's three disparate genetic clades.

Criterion 2. Providing representation through maintenance of genetic diversity in order to preserve population variability (i.e., maintain unique local adaptations) and population

adaptability (i.e., capability to adapt to environmental stressors). Providing natural, functional connectivity is also critical to counteract fragmentation and allow for natural gene flow.

Criterion 3. Providing a long-term solution to significantly reduce or eliminate the threat of predation and competition by non-native species.

Criterion 4. Providing redundancy and resiliency through management, restoration, or acquisition of sufficient habitat that allows for stable populations, and ensuring sufficient habitat is expected to remain for long-term persistence, despite habitat changes and habitat loss projected due to sea level rise and development. Altered habitat that has not been appropriately managed or restored is of too low quality to support healthy populations. Coastal squeeze results in populations that are increasingly vulnerable to threats from non-native species, and demographic limitations (i.e., populations too small to withstand natural levels of predation, environmental variation).

Together, these recovery criteria cover threats related to habitat loss and fragmentation, non-native predators, genetic diversity, and climate change; all of which are likely drivers of the SRR's population demographics and the species' long-term persistence.

### **Rationale for Amended Recovery Criteria**

The existing criteria for SRR on page 4-187 in the MSRP (Service 1999) ([https://ecos.fws.gov/docs/recovery\\_plan/sfl\\_msrp/SFL\\_MSRP\\_Species.pdf](https://ecos.fws.gov/docs/recovery_plan/sfl_msrp/SFL_MSRP_Species.pdf)) included only downlisting criteria. With these proposed amendments, delisting has been clearly defined with measurable, objective criteria in keeping with the recovery strategy and goals outlined in the MSRP. These criteria address what is necessary to ensure resiliency, redundancy, and representation by addressing factors that threaten the species. In achieving these criteria, we expect the SRR to have a low probability of extinction for the foreseeable future and have stable populations needed for long-term recovery. We will work together with our partners to strategically and efficiently implement the new criteria.

### **LITERATURE CITED**

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