# Species Conservation Guidelines

# South Florida

# Rice Rat

The Species Conservation guidelines for the rice rat (*Oryzomys palustris natator = Oryzomys argentatus*) provides a tool to assist the user in determining if their project, *i.e.*, a Federal permit, a Federal construction project, or other such action, may adversely affect the rice rat. Here we describe what actions might have a detrimental impact on the rice rat and how these effects can be avoided.

The U.S. Fish and Wildlife Service (Service) listed the rice rat as an endangered species in 1991 primarily because its wetland habitat had been destroyed by residential and commercial construction activities. The rice rat is a subspecies of the wider ranging marsh rice rat (*Oryzomys palustris*). The distribution and ecology of the rice rat are summarized in Service (1999).

## Life History

The rice rat is a small, primarily nocturnal, wetland rodent adapted to the unique island habitats of the Florida Lower Keys. It depends on both freshwater and saltwater wetlands, especially large areas of adjacent or contiguous habitat. The large home ranges it occupies (up to 11 ha [27.2 acres] for males [Spitzer 1983]), and the very low densities at which it is found (fewer than 3 per ha [7.4 acres]), may be the result of limited food or freshwater resources (Forys et al. 1996).

Reproduction occurs throughout the year, influenced by a variety of ecological factors (Wolfe 1982). Rice rats construct simple spherical nests (diameter = 15 cm [5.9 in]) that are usually built on the ground or slightly elevated in grasses (Spitzer 1983). They forage along the edges of flooded areas or in recently flooded areas feeding on a variety of animals and plants. They depend on several sources of fresh water including freshwater lenses, water droplets on vegetation, and pools of water collected in tree holes (Spitzer 1983; Goodyear 1987).

### Habitat

Rice rats typically use three zones that are delineated by their salinity and topography: 1) low intertidal areas, 2) salt marsh flooded by spring or storm tides, and 3) buttonwood transitional areas that are slightly more elevated and only flooded by storm tides (Goodyear 1987). In general, they use mangrove habitats primarily for foraging, and higher-elevation salt marsh habitat for nesting and foraging (Forys et al. 1996). They also tend to use various vegetation zones during different seasons. During the dry season (March to April, and December to January) they use low marsh more, while during the wet season, they use mid- and higher-

elevation salt marsh habitats more (Forys et al. 1996). They may also move from one patch of habitat to another in response to seasonal fluctuations in water levels or food availability (Smith and Vrieze 1979).

Critical Habitat for the rice rat was designated in 1993 (50 CFR 17.95) (Appendix A). Some of the major constituent elements of this Critical Habitat that require special management considerations or protection are mangrove swamps containing red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*), white mangrove (*Laguncularia racemosa*), and buttonwood (*Conocarpus erectus*); salt marshes, swales, and adjacent transitional wetlands containing saltwort (*Batis maritima*), saltgrass (*Distichlis spicata*) and coastal dropseed (*Sporobolus virginicus*); and freshwater marshes. (Appendix A gives more specific details regarding important plants to protect in these communities.)

Saltgrass and coastal dropseed are the main materials used in nest construction, though other materials such as buttonwood, mangrove, or saltwort are also used (Spitzer 1983).

Distribution

Populations of the rice rat are widely distributed and occur at extremely low densities. The rice rat is known to occur on 12 islands (Fig. 1) in the Florida's Lower Keys, Monroe County: Little Pine, Howe, Water, Middle Torch, Big Torch, Summerland, Raccoon, Johnston, Cudjoe, Upper Sugarloaf, Lower Sugarloaf, and Saddlebunch Keys (Vessey et al. 1976; Goodyear 1984, 1987; Wolfe 1986, 1987; Goodyear 1992; Forys et al. 1996; Mitchell 1996). Critical Habitat is designated on all of these islands, and several of them are within the National Key Deer Refuge boundaries. (See Appendix A for more specific details regarding Critical Habitat.) Based on the availability of suitable habitat and proximity to existing populations, the rice rat may also occur on several other islands in the Lower Keys, including but not limited to Big Pine, No Name, Little Torch, Ramrod, and Boca Chica Keys. The subspecies is not found in the Middle or Upper Keys presumably because of the lack of suitable habitat (Goodyear 1987). The consultation area for the rice rat is delineated in Figure 1.

## Determination

The SLOPES flowchart in Figure 2 and this section can help you determine the impact of your project on the rice rat.

If your project area is outside the consultation area (Fig. 1), then no effect to the rice rat is anticipated. If, by chance, you encounter a rice rat on your site outside the consultation area, appropriate conservation measures must still be implemented (see below).

If your project area is inside the consultation area, but outside the critical habitat, you should check for the presence of suitable habitat. Suitable habitat for the rice rat is freshwater marsh, saltwater marsh, mangrove, and any area within 1 km (0.6 mi) of mangrove. If there is no suitable habitat or buffer present in your project area, then no effect to the rice rat is anticipated.

If your project area is inside the consultation area and suitable habitat or buffer is present, you should assume that the silver rice rat is present and the project may affect it.

If suitable habitat is protected and its integrity is maintained in the project area, and there is a buffer of 1 km (0.6 mi) around any mangrove habitat, the project is not likely to adversely affect the rice rat. If the project will modify or destroy suitable habitat or buffer, then the project is likely to adversely affect the rice rat, and formal consultation is required. Early contact and discussion with the Service can facilitate the completion of the project.

## Conservation Measures

Freshwater marsh, saltwater marsh, and mangrove habitats have many beneficial qualities, and Federal, State, and Monroe County permits are required for residential or commercial construction that impact them. The main threat to the rice rat is degradation and loss of habitat due to urbanization. Construction activities typically result in the direct loss of habitat as well as secondary effects that extend into surrounding habitats. Related secondary effects include habitat fragmentation, resource limitation, and an increase in the densities of black rats and domestic cats, which are known predators. The following are conservation measures that could be incorporated into your project to minimize the impacts to the rice rat.

1. Protect and retain the integrity of the larger contiguous wetlands and prevent further fragmentation and destruction. Fragmentation interferes with rice rat dispersal, foraging, and nesting, and connectivity of suitable habitat is important.

2. Include a 1 km (0.6 mi) buffer between the project area and any suitable habitat, including marshes as well as mangroves. Marshes that are close to human impacts may still be capable of supporting rice rats (Forys et al. 1996). However, development in or immediately adjacent to rice rat habitat could adversely affect the survival and recovery of the species. A 1 km (0.6 mi) distance would serve as a buffer from the majority of adverse effects resulting from residential and commercial construction projects.

3. Maintain natural hydrology, and re-establish natural hydrology and water circulation patterns in rice rat habitat where they have been altered. Maintain and manage mosquito ditches so they do not impact rice rat habitat. The alteration of the natural hydrologic regime by dredge and fill activity alters nesting behaviors by causing rice rats to nest in nearby spoil areas. Alteration has also facilitated the ability of exotic plants and animals to invade rice rat habitat. As a result, habitat quality and availability has been reduced or eliminated. Water level variations influence where rice rats can forage.

4. Restore wetland habitats by reestablishing historical tidal conditions, removing solid wastes, controlling non-native vegetation, and preventing vehicular access to the habitat.

5. Restore rice rat habitat that has been degraded by road construction, mosquito ditching, fill excavation, illegal solid waste disposal, and exotic vegetation to historical, natural conditions.

6. Improve water quality in freshwater sources and create new freshwater sources. The availability of freshwater is important to rice rat survival.

7. Create habitat by refilling and creating suitable habitat areas. Restore or create habitat in areas that have been dredged or altered. Mulch areas or regrade roads to create habitat. Remove any fill associated with roads, mosquito ditches, and other development-related activities to deter domestic cats and imported red fire ants from colonizing the habitat.

8. Eliminate exotic vegetation. Remove exotic vegetation in rice rat habitat and in adjacent upland buffers. Improve habitat by planting or encouraging native plant species. Plant native vegetation in areas that have been scarified or degraded.

9. Minimize raccoon impacts on rice rats. Raccoons are capable of killing both adult and juvenile rice rats, and their populations are unnaturally high in some areas of the Lower Keys. Eliminate supplemental food sources, feeding by humans, outdoor cat-feeding stations, and open dumpsters to reduce raccoon populations.

10. Minimize cat predation on rice rats. Cats are known predators of rice rats. Remove all free-roaming cats from the project area, and do not allow any cat-feeding stations.

11. Eliminate fire ant colonies in and near rice rat habitat. Fire ant colonies have been found in rice rat habitat. Fire ants can prey on young rats.

12. Minimize competition and predation by black rats. Black rats may be able to outcompete rice rats for food and habitat resources, and they prey on young rice rats. Eliminate black rat food, shelters, and sources. Dispose of refuse properly.

13. Control inadvertent killing and prevent poisoning. Rice rats may be intentionally killed by humans in an effort to get rid of black rats. Pesticides used to control black rats also pose a threat to the rice rat.

14. If destruction of portions of suitable habitat is unavoidable, compensate for the loss by purchasing suitable habitat for the rice rat elsewhere in its historical range. This should be a last resort option. Remember that habitat modification will be regulated by other Federal, State, and Monroe County permitting requirements.

## Literature Cited

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**GIS Layers**

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| Silver Rice Rat Consultation Area | Rice Rat_CA.shp |
| Sliver Rice Rat Critical Habitat | Rice Rat_CH.shp |

**Appendices**

Appendix A. Critical Habitat Designation.

# APPENDIX A

## Critical Habitat Designated for the Silver Rice Rat