Sanibel Island Rice Rat

Oryzomys palustris sanibeli

Photo by Chris Lechowicz, Sanibel-Captiva Conservation Foundation.

Species Overview

Status: Listed as state Threatened on Florida's Threatened and Endangered Species List.

Current protections

- 68A-27.003(2)(a), F.A.C., No person shall take, possess, or sell any threatened species included in this subsection or parts thereof or their nests or eggs except as authorized by Commission rule or by permit from the Commission or when such conduct is authorized in a management plan as defined in this chapter and approved by the Commission, or as authorized in Commission-approved guidelines.
- 68A-27.001(4), F.A.C., Take – to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct. The term "harm" in the definition of take means an act which actually kills or injures fish or wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. The term "harass" in the definition of take means an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering.

Biological Background

This section describes the biological background for this species and provides context for the following sections. It focuses on the habitats that support essential behavioral patterns for the Sanibel Island Rice Rat, threats faced by the species, and what constitutes significant disruption of essential behavioral patterns.

The Sanibel Island rice rat (SIRR; *Oryzomys palustris sanibeli*) is a subspecies of the marsh rice rat (*Oryzomys palustris*) endemic to Sanibel Island, Florida (Indorf and Gaines 2013). The SIRR is genetically unique and recognized as a distinct subspecies (Indorf and Gaines 2013). The SIRR is a semi-aquatic, medium-sized rat; similar in size to cotton rats (*Sigmodon hispidus* spp.), but smaller than the non-native black rat (*Rattus rattus*). Appendix A provides an overview of identifiable differences between these species. Adult SIRR average 257 mm (10.1 in) total length, 124 mm (4.9 in) tail length, and 31 mm (1.2 in) hind foot length (Whitaker and Hamilton 1998). The SIRR has a sparsely-haired tail that is about equal to the length of the head and body. Its water-repellent fur varies is brown to gray on the dorsal side, grayish-white on the underside, and white on the feet. The tail is brown above and grayish-white below, and the ears are small, round, and well haired (Florida Natural Areas Inventory [FNAI] 2001, Wolfe 1982).

Because of considerable knowledge gaps regarding the life history, behavior, and biology of the SIRR, much of this information has been synthesized using information from the marsh rice rat and the closely-related silver rice rat (*O. p. natator*) that occurs in the Florida Keys. Breeding can occur throughout the year, though it may be affected by population size and environmental variables. Gestation is between 21 and 28 days, and the average litter size is typically 4 or 5 individuals. Weaning occurs between 11 and 20 days, and rice rats reach sexual maturity around 50 to 60 days of age. Marsh rice rats (*Oryzomys* spp.) generally have a life span of less than 1 year (Nowak 1999). Rice rat nests are located on the ground or slightly elevated in vegetation like cordgrasses (*Spartina* spp.; USFWS 1999). Nests are typically grapefruit-sized, spherical, and constructed from

woven sedges and grasses. Occasionally, the silver rice rat may construct nests in mangrove swamps using seaweed and other marine vegetation (Goodyear 1987). In other locations, rice rats have been observed modifying and using marsh wren (*Cistothorus palustris*) and round-tailed muskrat (*Neofiber alleni*) nests (Wolfe 1982), but little is currently known of SIRR utilizing nest structures of other species.

Rice rats can have large home ranges and may require large, contiguous areas of mangrove and salt marsh to sustain viable populations (USFWS 1999). Average home ranges for rice rats have been estimated at 0.23 ha (0.56 ac) for males and 0.29 ha (0.72 ac) for females, with observed extremes of 0.05 and 0.73 ha (0.12 and 1.80 ac; Birkenholz 1963). In the absence of other information, it is assumed the SIRR uses habitat similarly and exists at similar densities to other rice rats. Previous studies found rice rat densities ranged from 0.1 to 87 individuals/ha (Wolfe 1982, Bloch and Rose 2005). Season and vegetative structure may affect population densities, however densities of rice rats within a wetland inundated by water for several months have not been shown to differ significantly from those estimated during normal hydroperiods (Kruchek 2004, Bloch and Rose 2005, Abuzeineh et al. 2007). Rice rats readily enter the water, often swimming to escape predators, and are almost entirely nocturnal (Wolfe 1982). Rice rats eat a wide variety of foods including insects, crabs, snails, fishes, clams, birds, fungi, vegetation, and seeds (Wolfe 1982, Whitaker and Hamilton 1998). Rice rats are preyed upon by native species such as owls, hawks, snakes, weasels, foxes, and raccoons (Wolfe 1982, Whitaker and Hamilton 1998). Non-native species such as feral and free-ranging cats may also prey on SIRR.

Habitat Features that Support Essential Behavioral Patterns

The marsh rice rat occurs in salt marshes, freshwater marshes and wet prairies, forested wetlands, and transitional habitats (Wolfe 1982). Rice rats also use mangrove swamps in coastal areas of Florida. The related silver rice rat typically uses freshwater marshes, saltwater marshes, transitional zones, and mangrove swamps (Goodyear 1987, USFWS 1999). Recent work on Sanibel Island showed SIRR primarily use freshwater marsh communities but were sometimes found in mangrove swamps and transitional areas between mangroves and the freshwater marsh (McCleery et al. 2019).

Freshwater marsh (left), transition zone (center), mangrove swamp (right). Photographs by FWC.

Marsh rice rats are typically found in areas where dense herbaceous groundcover is present, which provides cover from predators (Whitaker and Hamilton 1998). Upland communities may be used as refuges when wetlands are flooded and may be used by juveniles (Kruchek 2004). The freshwater marsh communities on Sanibel Island are located throughout the interior of the island. These wetland communities, referred to as the Sanibel Slough, are divided into an eastern and western basin by two weir structures managed by the City of Sanibel. These freshwater marsh communities are typically dominated by cordgrass, leather fern (*Acrostichum danaeifolium*), and other herbaceous species. In the absence of fire, these marshes can develop a woody vegetation component dominated by wax myrtle (*Myrica cerifera*), buttonwood (*Conocarpus erectus*), and Carolina willow (*Salix* caroliniana), which replace the herbaceous vegetation component important for rice rats. Beyond the freshwater marsh, herbaceous species are nearly absent. Transition zones

are areas of higher elevation between freshwater marsh and mangrove swamps; these areas can be especially important to marsh rice rats. Buttonwood is the dominant woody species within the transition zones, followed by white indigoberry (*Randia aculeta*), cabbage palm (*Sabal palmetto*), and Florida swamp privet (*Forestiera segretata*). Mangrove swamp areas on Sanibel Island are dominated by woody species such as red mangrove (*Rhizopora mangle*), black mangrove (*Avicennia germinans*), and white mangrove (*Laguncularia racemosa*). The herbaceous layer within the mangrove forest is sparse and consists mainly of saltwort (*Batis martima*) and perennial glasswort (*Sarcocornia ambigua*).

Threats

Threats to SIRR identified in the Biological Status Review Report for the Sanibel Island Rice Rat (BSR) were habitat loss, habitat degradation, habitat fragmentation, predation from native and non-native species, and competition with black rats (FWC 2011). Impacts of the specific threats identified below may be exacerbated by the already constricted range and limited number of locations occupied by the species.

Habitat loss on Sanibel Island has been reduced by wetland protection regulations and preservation of land in conservation areas, primarily at the J.N. "Ding" Darling National Wildlife Refuge (DDNWR) and properties owned by the Sanibel-Captiva Conservation Foundation (SCCF). In total, 2/3 of Sanibel Island is owned and managed as conservation lands by USFWS, SCCF, and the City of Sanibel. Habitat degradation and fragmentation outside of conservation lands are ongoing potential problems. Much of potential SIRR habitat has been degraded through unchecked succession. Without appropriate managemet, the quality of suitable habitats for SIRR can decrease to such an extent that it becomes a barrier to SIRR movement, resulting in fragmentation of suitable habitat patches. The increased urbanization of Sanibel Island complicates the use of prescribed fire as a management tool, even on conservation lands. In absence of fire, shrubs will invade areas of freshwater marsh, causing those habitats to become less suitable for the SIRR, subsequently compounding the issues of habitat loss and fragmentation.

No estimates are available on threats to the SIRR from competition from or predation by non-native species. The City of Sanibel works to prevent the establishment of feral cat colonies on the island, however, free-ranging pets may have an impact on SIRR populations. Invasive cane toads (*Rhinella marina*) are present on Sanibel Island, which have toxic skin secretions that could be problematic if they are preyed on by SIRR, but no such impact to the SIRR has been documented. Predatory, non-native Nile monitors (*Varanus niloticus*) and spiny-tailed iguanas (*Ctenosaura* spp.) occur on the adjacent mainland, but currently are not known to be present on Sanibel Island. Monitoring for the possible establishment of these and other non-native species on Sanibel Island remains a priority.

Threats associated with sea level rise (SLR) will increase as interior freshwater marshes become inundated with seawater. The National Wildlife Refuge system analyzed potential impacts from SLR at DDNWR. Results indicated that DDNWR was vulnerable to SLR in all modeled scenarios (USFWS 2011). Under each scenario, inland freshwater marsh was expected to be severly impacted.

Marsh rice rats can be negatively impacted by the presence of various pollutants including polychlorinated biphenyls and crude oil through direct absorption, bioaccumulation, or habitat destruction (Smith et al. 2002, Bergeon-Burns et al. 2014). Additionally, exposure to insecticides such as Naled, a popular insecticide used for mosquito control, can potentially harm SIRR (United States Environmental Protection Agency [EPA] 2006). Studies have determined that when used for mosquito applications, Naled exceeds the level of concern for mammals and is moderately toxic on an acute basis (EPA 2006). Naled is also considered highly toxic to aquatic organisms, which could reduce prey availability for SIRR.

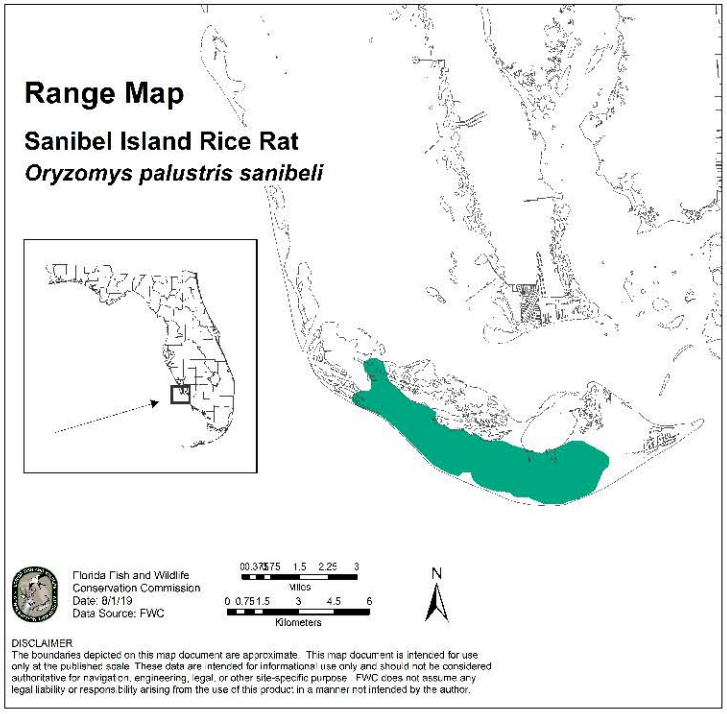
Potential to Significantly Impair Essential Behavioral Patterns

Sanibel Island rice rats primarily rely on emergent marsh communities containing high proportions of herbaceous vegetation such as cordgrass. Actions that degrade water quality, change hydrology, or result in loss or fragmentation of wetland communities used by SIRR can cause significant impairment of essential

behavioral patterns. Actions that change the timing, quantity, or quality of water in wetland areas should be expected to result in significant impairment of essential behavioral patterns. Fire is typically used to maintain marsh communities dominated by herbaceous wetland species required for SIRR habitat. Therefore, actions that alter the size or natural hydrology of marsh wetlands or restrict the ability of fire to maintain an herbaceous-species dominated wetland will reduce habitat quality and may impair essential behaviors. Establishment of predators such as free-ranging cats or Nile monitors may impair essential behavioral patterns. Actions that result in pollutants toxic to mammals entering wetlands potentially used by SIRR may result in significant impairment of essential behavioral patterns.

Distribution and Survey Methodology

The range map (right) represents the principle geographic range of the Sanibel Island rice rat, including intervening areas of unoccupied habitat. This map is for informational purposes only and not for regulatory purposes. A large portion of this species' habitat occurs on the DDNWR and land acquired for conservation by the City of Sanibel and the SCCF.



Counties: Lee

Recommended Survey Methodology

Surveys are not required but can be used to determine if SIRR are present in a given area. If survey methodologies for SIRR follow the recommendations below and no rice rats are detected, then no further action is needed. Both camera-based surveys and live-trapping may be used to detect the presence of SIRR. To minimize the possibility of influence from dispersing animals, both camera-based and live-trapping surveys should be conducted within 60 days before any site clearing, demolition, construction, or other ground disturbing activity.

- A floating bucket camera trap design is effective in detecting SIRR and other small mammals inhabiting marsh communities (McCleery et al. 2014). This design allows for the camera to adjust for changing water levels. Other camera trap methods, such as stand-alone cameras, are not recommended because they have not been shown to be effective in a marsh environment.
- Camera traps should be staked or anchored in place to allow for vertical movement and should be baited with black oil sunflower seeds or a bird seed mixture.
- At least 1 camera trap should be installed per hectare (2.47 ac) throughout any possible SIRR habitat within the area of interest; cameras should be separated by at least 85 m (280 ft) but no more than 100 m (328 ft) (McCleery et al. 2019).
- All camera traps should be active on the site of interest for at least 4 consecutive nights (McCleery et al. 2019).
- Live trapping may be conducted; an FWC scientific collecting permit is needed for any live-trapping effort.

- Appropriately sized live traps, similar in style to Sherman live traps, should be used when live-trapping for SIRR. Traps should be arranged in a 5x5 trapping grid with a trap spacing of 50 ft (15 m) between trap stations and 1 trap set at each station (McCleery et al. 2019).
- In areas of less than 1 ha, 50% of the area should be trapped. Traps should be set with a spacing of 50 ft (15 m) between trap stations with 1 trap set at each station.
- One trapping grid should be used for areas 1-4 ha in size. For areas >4 ha, at least 1 trapping grid per 4 ha should be used, with trapping grids separated by 100 m (330 ft).
- Traps must be securely attached to a floating platform and anchored in place to allow for vertical movements caused by fluctuating water levels.
- Traps can be baited with black oil sunflower seeds or a bird seed mixture.
- Baits that may attract fire ants (*Solenopsis* spp.), such as peanut butter, should not be used.
- Trapping grids should be active for no less than 4 consecutive nights (McCleery et al. 2019).
- All traps must be checked daily within 1 hour of sunrise, then closed. Traps should be reopened within 1 hour of sunset. All traps need to be closed and removed at the end of trapping.

Recommended Conservation Practices

Recommendation conservation practices are general measures that could benefit the species but are not required. No FWC permit is required for these activities.

- Conduct appropriate habitat management techniques to maintain and restore fresh water marsh habitat to optimal habitat quality, including the use of prescribed fire when possible. Focus both on occupied habitat and unoccupied habitat.
- Restore freshwater marsh habitat in transition areas and in areas that will enhance connectivity between isolated patches of suitable SIRR habitat. Remove or reduce encroaching woody vegetation such as buttonwood and wax myrtle to maintain a dense layer of herbaceous vegetation.
- Implement appropriate management methods to remove or reduce coverage of invasive, non-native plant species within and around areas of freshwater marsh habitat.
- Manage transitional communities to retain herbaceous ground cover to enhance suitability for SIRR during periods of water inundation or when other resources are scarce.
- Landscape margins of developed areas near freshwater marshes using native marsh grasses and other herbaceous ground cover vegetation to promote habitat connectivity.
- Maintain or restore hydrology to improve hydroperiod in freshwater marsh areas and increase connectivity between isolated areas of freshwater marsh habitat.
- Appropriately manage non-native, invasive animal species that may prey on SIRR.
- Implement management practices and management zones along water bodies to protect habitats and water quality.
- Consider including designs for wildlife underpasses in engineering for bridge replacements, drainage culverts, and weir installations that allow for unobstructed passage of Sanibel Island rice rats and other wildlife between wetland habitats.

Measures to Avoid Take

Avoidance Measures that Eliminate the Need for FWC Take Permitting

This section describes all measures that would avoid the need for an applicant to apply for an FWC take permit

- Avoid converting or negatively impacting freshwater marshes, transition zones, and mangrove swamp communities on Sanibel Island within the range of the SIRR (see Range Map).

- Avoid killing or injuring SIRR when they are observed, especially on roadways such as Tarpon Bay Road and Rabbit Road.
- Avoid modifying natural hydrology in SIRR habitat on Sanibel Island. This includes diverting runoff to, constructing berms around, or otherwise modifying the freshwater marshes, transition zones, and mangrove swamps within the range of the SIRR.

Examples of Activities Not Expected to Cause Take

This is not an exhaustive list of exempt actions. Please contact FWC if you are concerned that you could potentially cause take.

- Activities that occur in upland areas beyond the locally approved development setback distances from freshwater marsh and outside of nearby transitional areas.
- Activities that restore natural hydrology in habitat that is otherwise suitable for SIRR.
- Prescribed burning and use of other planned natural resource management techniques to manage vegetation for the benefit of the natural communities.

Florida Forestry Wildlife BMPs and Florida Agricultural Wildlife BMPs

- These best management practices do not include the Sanibel Island rice rat and thus do not apply.

Other Authorizations for Take

- As described in Rule 68A-27.007(2)(c), F.A.C., land management activities (e.g., wetland restoration, prescribed fire, mechanical removal of invasive species, and herbicide application) that benefit wildlife and are not inconsistent with FWC Management Plans are authorized and do not require a permit authorizing incidental take.
- Vegetation removal or trimming in the linear right of way for power restoration. This applies only in cases where there is an immediate danger to the public's health and/or safety (including imminent or existing power outages that threaten public safety, or in direct response to an official declaration of a state of emergency by the Governor of Florida or a local government entity), and only to non-routine removal or trimming of vegetation within the linear right of way, in accordance with a vegetation management plan that meets applicable federal and state standards. If conducted under these circumstances, no FWC take permit is required.
- Emergency actions necessary for human health and safety, such as water management activities for flood control.

Coordination with Other State and Federal Agencies

The FWC participates in other state and federal regulatory programs as a review agency. During review, FWC identifies and recommends measures to address fish and wildlife resources to be incorporated into other agencies' regulatory processes. The FWC provides recommendations for addressing potential impacts to state listed species in permits issued by other agencies. If permits issued by other agencies adequately address all the requirements for issuing a state-Threatened species take permit, the FWC will consider these regulatory processes to fulfill the requirements of Chapter 68A-27, F.A.C., with no additional application process. This may be accomplished by issuing a concurrent take permit from the FWC, by a memorandum of understanding with the cooperating agency, or by a programmatic permit issued to another agency. These permits would be issued based on the understanding that implementation of project commitments will satisfy the requirements of Rule 68A-27.005 and Rule 68A-27.007, F.A.C.

Review of Land and Water Conversion projects with State-Listed Species Conditions for Avoidance, Minimization and Mitigation of Take

- The FWC, in coordination with other state agencies, provides comments to federal agencies on actions such as initiated projects or permits under review by a federal agency.

- FWC staff works with landowners, local jurisdictions, and state agencies such as the Department of Economic Opportunity on large-scale land use decisions, including long-term planning projects like sector plans, projects in Areas of Critical State Concern, and large-scale comprehensive plan amendments.
- FWC staff coordinates with state agencies such as the Department of Environmental Protection (DEP) and the five Water Management Districts on the Environmental Resource Permitting (ERP) program, which regulates activities such as dredging and filling in wetlands, flood protection, stormwater management, site grading, building dams and reservoirs, waste facilities, power plant development, power and natural gas transmission projects, oil and natural gas drilling projects, port facility expansion projects, some navigational dredging projects, some docking facilities, and single-family developments such as for homes, boat ramps, and artificial reefs.
- During the ERP process, FWC staff will provide guidance on avoidance, minimization, and mitigation measures for SIRR.
- FWC staff will also work with DEP, water management districts, and the applicants during the ERP process to determine if ERP mitigation will satisfy the applicant's responsibilities under Chapter 68A-27, F.A.C., and associated enforcement policies (see FWC Incidental take Permitting Process below).
- Conservation benefit as defined in Chapter 68A-27, F.A.C., can be accomplished through avoidance, minimization, and mitigation measures outlined in the ERP permit. The existing ERP requirements for wetland mitigation include replacement of functional loss from impacts to wetlands. The mitigation includes provisions for perpetual conservation and management. Mitigation achieved through the ERP process could be considered a conservation benefit when mitigation sites are within the range of the SIRR and they include suitable wetlands where natural hydrology is maintained.

FWC Permitting: Incidental Take

As defined in Rule 68A-27.001, F.A.C., "incidental take" is take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Activities that result in impacts to SIRR can require an Incidental Take Permit from the FWC (see above for actions that do not require a permit). Permits may be issued when there is a scientific or conservation benefit to the species and only upon demonstration by the applicant that that the permitted activity will not have a negative impact on the survival potential of the species. Scientific benefit, conservation benefit, and negative impacts are evaluated by considering the factors listed in Rule 68A-27.007(2)(b), F.A.C. These conditions are usually accomplished through a combination of avoiding take when practicable, minimizing take that will occur, and mitigating for the permitted take. This section describes the minimization measures and mitigation options available as part of the Incidental Take Permit process for take of this species. This list is not an exhaustive list of options.

Minimization Measure Options

The options below are intended to address the evaluation factors required for consideration when issuing an incidental take permit. These options can lessen the impact of activities, and ultimately may reduce what is needed to achieve a conservation or scientific benefit (see below).

Seasonal, Temporal, and Buffer Measures

- Minimize disturbance to potentially occupied habitats surrounding project areas with a minimal buffer distance of 10 m (30 ft) (Birkenholz 1963) outside the specific footprint of planned development activities (i.e., outside the project work zone) that will impact SIRR habitat, or upland areas adjacent to potential SIRR habitat, within the expected SIRR range.
- Restore any impacts to natural habitat within buffer areas adjacent to project work zones and, whenever possible, within project work zones.
- Seasonal minimization measures are not currently provided as population fluctuations and

changes in habitat use of the SIRR are poorly known.

Design Modification

- Minimize the amount of suitable habitat (i.e., freshwater marsh, transitional zones, mangrove forest) converted to other land uses.
- Leave a buffer of 30 m (100 ft) (Birkenholz 1963) around freshwater marsh, transitional, or mangrove swamp communities within the expected SIRR range on Sanibel Island.
- Design projects to minimize changes in hydrology of wetlands within SIRR range.
- Design projects that will not affect prescribed fire regimes, or the ability to use fire, to manage freshwater marshes or other SIRR habitat.
- Minimize development of areas that serve to connect areas of suitable SIRR habitat and provide structural designs to maintain hydrologic connectivity among basins.
- Use native grasses and other herbaceous groundcover vegetation for planting developed areas whenever possible, especially near freshwater marshes.

Method Modification

- When impacting areas near potential SIRR habitat, take steps to identify areas potentially occupied by SIRR. If SIRR are present, follow recommended design modifications, including the consideration of directional drilling for the installation of cables and pipes underneath potentially occupied habitat.
- Follow sedimentation and erosion control best management practices in construction areas to minimize impacts to water quality (e.g., turbidity) adjacent to suitable wetland habitats.
- Avoid or minimize the release of heavy metals and other chemicals that may bioaccumulate, as well as other chemicals and pollutants, especially into surface water runoff that can drain into potentially suitable wetland habitats.
- On sites where SIRR are observed or SIRR nests occur, inform people onsite about SIRR and the importance of avoiding disruption to their behavior.

Mitigation Options

Mitigation is scalable depending on the impact, with mitigation options for take causing significant impacts or disruption of essential behavioral patterns. Multiple options for mitigation may exist that could be appropriate to counterbalance impacts to essential behavioral patterns resulting from a given project or action. From those options, the most appropriate combination of actions can be selected. The DEP's ERP process forms the basis of mitigation for loss or degradation of suitable SIRR habitat. Following the ERP process, the FWC will review the resulting wetland mitigation to assess whether it meets the seven factors outlined in Rule 68A-27.007, F.A.C., and meets the definition of scientific or conservation benefit for the SIRR. In many cases, wetland mitigation through the ERP process will satisfy the applicant's responsibilities under Rule 68A-27, F.A.C., and associated rule enforcement policies. However, under certain circumstances, the FWC may require additional measures to achieve scientific or conservation benefit specific for take of SIRR. Potential options for mitigation are described below. This list is not an exhaustive list of options.

Scientific Benefit

This section describes research and monitoring activities that provide scientific benefit, per Rule 68A-27.007, F.A.C. Conducting or funding these activities can be the sole form of mitigation for a project.

- Continued research to determine habitat characteristics that influence seasonal and annual SIRR occupancy.
- Research to better determine SIRR use of transitional zones and mangrove swamps. There is limited information on the extent to which those habitats are used by SIRR or on seasonal use of those habitats.
- Research to better understand SIRR movements and demographic characteristics within their

expected range, both annually and seasonally.

- Research to determine factors that that enhance the ability of SIRR to move between patches of suitable habitat separated (fragmented) by roads or other structures and habitat characteristics that may improve connectivity, such as specific vegetation structure and composition.
- Research to determine how to modify habitat management practices (i.e., prescribed fire, mechanical removal, etc.) to improve SIRR occupancy and population size.

Habitat

This acquisition option includes wetland mitigation through the ERP program. FWC will review the ERP mitigation to evaluate whether it meets the definition of conservation benefit for SIRR.

- In some cases (e.g., wetland restoration within SIRR range), ERP mitigation can satisfy the applicants' responsibilities under Rule 68A-27, F.A.C., and associated rule enforcement policies, and no additional FWC permit would be necessary.
- Preference is given to the acquisition of sites that are adjacent to, or increase connectivity of, existing conservation lands within the SIRR range (see map).
- Suitable mitigation sites may include marsh communities, transitional zones, and mangrove swamps connected to similar habitat on conservation lands.
- Restoration of natural hydrology within the range of SIRR may be a mitigation option.
- Restoration of disturbed ground cover with native species following project completion may be a mitigation option.
- Applicants proposing the habitat mitigation option should follow recommended habitat management procedures to maintain or enhance habitat quality for SIRR.

Funding

- No funding option has been identified at this time. A funding option may be appropriate in circumstances where ERP mitigation does not satisfy the FWC's definition of conservation benefit for SIRR. Funds can be used to support activities identified in the Species Action Plan for the SIRR (SAP) or in the information and habitat options within the permitting guidelines.

Information

- Design research projects consistent with actions in the Species Action Plan for the SIRR, and in coordination with FWC.
- Conduct surveys on undisturbed sites in potential habitat to determine presence.
- Provide photo and location data for all specimens captured, collected, or observed during surveys.
- The information option may be appropriate in circumstances where ERP mitigation does not satisfy the FWC's definition of conservation benefit for the Sanibel Island rice rat.

Programmatic Options

- No programmatic option available.

Multispecies Options

- The ERP process can act as a multi-species option for the Sanibel Island rice rat and other species that use shallow freshwater marshes, swamp forests, coastal marshes, and mangroves. In many circumstances, mitigation provided through the ERP process may be sufficient to cover take of SIRR and other state-Threatened wetland dependent species.
- Activities that restore vegetation or natural hydrology of freshwater marshes, or other habitats potentially occupied by SIRR would be expected to also benefit other birds, mammals, reptiles, and amphibians dependent upon those habitats.

FWC Permitting: Intentional Take

Intentional take is not incidental to otherwise lawful activities. Per Chapter 68A-27, F.A.C., intentional take is prohibited and requires a permit. For State-Threatened species, intentional take permits may only be considered for scientific or conservation purposes (defined as activities that further the conservation or survival of the species taken). Permits are issued for State-Threatened species following guidance in Rule 68A-27.007(2)(a), F.A.C.

Risks to Property or People

Intentional Take for Human Safety

- There are no known circumstances for which the SIRR may be taken for human safety.

Aversive Conditioning

- No approved aversive conditioning techniques have been identified at this time.

Permits Issued for Harassment

- Not applicable for the Sanibel Island rice rat.

Scientific Collecting and Educational Use Permits

Scientific collecting permits may be issued for the SIRR using guidance found in Rule 68A-27.007(2)(a), F.A.C. Activities requiring a permit include any research that involves capturing, handling, or marking wildlife; conducting biological sampling; or other research that may cause take, including live trapping following the Recommended Survey Methodology.

Considerations for Issuing a Scientific Collecting Permit:

1) Is the purpose adequate to justify removing the species (if the project requires this)?
    - Permits will be issued if the identified project is consistent with the goal of the SAP (i.e., improvement in status that leads to removal from Florida's Endangered and Threatened Species List) or addresses an identified data gap important for the conservation of thespecies.
2) Is there a direct or indirect effect of issuing the permit on the wild population?
3) Will the permit conflict with programs intended to enhance survival of species?
4) Will purpose of permit reduce likelihood of extinction?
    - Projects consistent with the goal of the SAP or that fill identified data gaps in species life history or management may reduce the likelihood of extinction. Applications should clearly explain how the proposed research will provide a scientific or conservation purpose for the species.
5) Have the opinions or views of other scientists or other persons or organizations having expertise concerning the species been sought?
6) Are applicant expertise, facilities, and other resources adequate?
    - Applicants must have prior documented experience with this or similar species; applicants should have met all conditions of previously issued permits; and applicants should have a letter of reference that supports their ability to handle the species.

Relevant to All Scientific Collecting for the Sanibel Island rice rat

- Walking, visual encounter, camera-based, and opportunistic surveys that do not involve touching the animals or altering the microhabitat do not require a permit.
- Any activity that requires trapping or handling requires a permit (including the taking hair or tissue samples for taxonomic analyses).

- A permit may be issued to display a taxidermied specimen for educational or scientific purposes as specified in 68A-12.004, F.A.C. if the specimen was obtained originally via a rehabilitation facility or was encountered dead.
- Applications must include a proposal that clearly states the objectives and scope of work of the project, including a justification of how the project will result in a scientific or conservation purpose for the species. The proposal also must include a thorough description of the project's methods, time frame, and final disposition of all individuals. Permit amendment and renewal applications must be "stand alone" (i.e., include all relevant information on objectives and methods).
- Permits may be issued for captive possession (removal from the wild) if the individual is deemed non-releasable.
- Capturing and handling protocols, and a justification of trapping methods, must be included in the permit application and should identify measures to lessen stress for captured SIRR.
- Methodologies for any collection of tissues, such as blood, should be clearly spelled out, including measures taken to reduce stress/injury to the animals.
- Disposition involving captive possession for any period of time must include a full explanation of whether the facility has the appropriate resources for accomplishing the objectives and for maintaining the animals in a safe and humane manner.
- Any mortality should be reported immediately to the FWC at the contact information below. The FWC will provide guidance on proper deposition of specimens.
- Active nest sites should be reported as soon as possible to the FWC at the contact information below.
- A final report should be provided to the FWC in the format specified in the permit conditions.

Additional information

Information on the economic impacts assessment of the Species Conservation Measures and Permitting Guidelines for the Sanibel Island rice rat can be found at http://myfwc.com/wildlifehabitats/imperiled/management-plans/

Contact

For more species specific information or related permitting questions, contact the FWC at (850) 921-5990 or WildlifePermits@myfwc.com. For regional information, visit http://myfwc.com/contact/.

Literature Cited

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Appendices

Appendix A. Comparison of Rat Species with Ranges Overlapping the Sanibel Island Rice Rat

Species	Sanibel Island rice rat *Oryzomys palustris sanbeli*	Hispid cotton rat *Sigmodon hispidus*	Black rat (non-native) *Rattus rattus*
			
Length	226-305mm	224-365mm	325-445mm
Weight	40-80g	100-225g	115-350g
Tail	Nearly equal in length to body	Shorter in length than body	At least as long as body, thick
Fur	Distinctly bi-color, white underneath, medium-brown to reddish above	Coarse, blend of gray, brown, and black	Variable by individual, ranging from black to gray to brown
Head	Triangular	Rounded	Triangular
Ears	Small, furred	Small, furred	Large, bare
Foot	Pale coloring	Dark coloring	Pale coloring

Photograph credits, left to right: Sanibel Island rice rat by Wes Boone; hispid cotton rat by Wes Boone; black rat by CSIRO.