Supplemental Information for the Sanibel Island Rice Rat

Biological Status Review Report

The following pages contain peer reviews received from selected peer reviewers, comments received during the public comment period, and the draft report that was reviewed before the final report was completed

March 31, 2011

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Peer review #1 from Dr. Jack Stout

From: Jack Stout
To: Imperiled
Subject: review
Date: Tuesday, January 11, 2011 11:24:23 AM
Attachments: Sanibel Island rice rat Final Draft BSR 11-18-10.docx

I have complete confidence in the validity of this review.

Jack Stout

Biological Status Review
for the
Sanibel Island rice rat
(*Oryzomys palustris sanibeli*)

EXECUTIVE SUMMARY

The Florida Fish and Wildlife Conservation Commission (FWC) directed staff to evaluate all species listed as Threatened or Species of Special Concern as of September 1, 2010. Public information on the status of the Sanibel Island rice rat was sought from September 17 to November 1, 2010. The members of the biological review group (BRG) met on November 3-4, 2010. Group members were Melissa Tucker (FWC lead), Jack Stout, and Amanda Bryant. In accordance with rule 68A-27.0012 Florida Administrative Code (F.A.C.), the BRG was charged with evaluating the biological status of the Sanibel Island rice rat using criteria included in definitions in 68A-27.001(3) and following the protocols in the *Guidelines for Application of the IUCN Red List Criteria at Regional Levels (Version 3.0)* and *Guidelines for Using the IUCN Red List Categories and Criteria (Version 8.1)*. Please visit http://www.myfwc.com/WILDLIFEHABITATS/imperiledSpp_listingprocess.htmto view the listing process rule and the criteria found in the definitions.

The Sanibel Island rice rat Biological Review Group concluded from the biological assessment that the Sanibel Island rice rat met criteria for listing. No information about the status of the Sanibel Island rice rat was received from the public. Based on the literature review and the biological review findings, staff recommend retaining the species on the FWC list of threatened species.

This work was supported by a Conserve Wildlife Tag grant from the Wildlife Foundation of Florida.

BIOLOGICAL INFORMATION

Taxonomic Classification – The Sanibel Island rice rat (*Oryzomys palustris sanibeli*) is a subspecies of the marsh rice rat found on Sanibel Island in Florida. Morphological analyses suggested that the Sanibel Island rice rat (*Oryzomys palustris sanibeli*) is not a separate subspecies, but instead should be subsumed within *O. p. natator* (Humphrey and Setzer 1989). Recent molecular analyses, however, have confirmed the subspecific status of *O. p. sanibeli* (Indorf 2010).

Life History – The Sanibel Island rice rat is relatively small with a length of 263mm and a weight of 71g. Its pelage is argus brown or amber brown.

Comment [S1]: I would express this as an average weight.

There is virtually nothing known about the life history, behavior, and biology of the Sanibel Island rice rat so this information is summarized using information on the species, *Oryzomys palustris*, taken from Wolfe (1982).

Oryzomys palustris is semi-aquatic and can be found in coastal marshes, hydric hammocks, swamps, and freshwater marshes and meadows.

Breeding can occur throughout the year although there may be an intrinsic bimodal seasonal cycle that is affected by population and environmental variables. Gestation lasts between 21 and 28 days. Average litter size is around four or five . Neonates weigh between three and four grams. Weaning occurs sometime between day 11 and 20. Sexual maturity is reached at 50 to 60 days of age. Longevity of *Oryzomys* sp. is generally less than one year (Nowak 1999).

Rice rats have nests the size of grapefruits that are woven from grasses and sedges. They are usually located at the bases of shrubs, at the end of shallow burrows, placed on high ground under debris, or woven into thick stands of emergent grasses well above water level.

Rice rats eat a wide variety of foods including insects, crabs, snails, fishes, clams, birds, fungi, vegetation, and seeds.

Rice rats are preyed upon by owls, hawks, snakes, mustelids, foxes, and raccoons.

Densities of rice rats are known to range from 0.1 to 3.3 individuals per hectare in a sedge-shrub community on coastal dunes, to 50 individuals per hectare in the Florida Everglades. Whitaker and Hamilton (1998) indicate "not usually above 10/ha". Kruchek (2004) found densities along the Texas coast were not seasonally dependent, but varied by habitat. Estimates for wetland densities were 10.5 individuals/hectare and upland densities were 3.1 individuals/hectare. Upland sites were dominated by juveniles, and may have functioned as ecological sinks. Bloch and Rose (2005) found densities to be seasonally dependent at two different salt marsh sites, with densities at site one ranging from three individuals/ha in the spring to 15 individuals/ha in the winter. At site two densities were greatest in the fall (87 individuals/ha) and lowest in the winter (8 individuals/ha).

Comment [S2]: Maybe ha throughout?

Home range sizes of 0.25 and 0.37 ha have been calculated for males and 0.23 and 0.33 ha for females.

Geographic Range and Distribution – The Sanibel Island rice rat is endemic to Sanibel Island, Florida.

Population Status and Trend – No population estimates have been done for the Sanibel Island rice rat (SIRR). Genetic analysis by Indorf (2010) did not find evidence of recent population expansion; nucleotide and haplotype diversity was low, which may indicate a small or isolated population. The SIRR population probably declined as Sanibel Island was settled by humans. The human population now seems to have stabilized at approximately 6000 people, however, so assuming there is little additional development on the island, the Sanibel Island rice rat is unlikely to experience rapid loss of habitat in the future. A continued decline in quality of habitat is still likely as urbanization precludes maintaining burn regimes in wetland systems.

According to Florida's Wildlife Legacy Initiative (FWC 2005), *O. p. sanibeli* can be found in salt marsh (which is in poor condition and declining), mangrove swamp (which is in poor condition and declining), and disturbed/transitional habitat (the condition of which is unknown). Cox and Kautz (2000) characterize the habitat as "heavily fragmented" and within "heavily urbanized areas". Using data from Endries et al (2009) and Zwick and Carr (2006), a 5% decline in habitat is estimated to occur by 2020.

Quantitative Analyses – A population viability analysis carried out on the Sanibel Island rice rat found that the probability of extinction in the next 100 years was 84% if only managed habitat was taken into consideration and 70% if all potential habitat was used in analyses (Root and Barnes 2006). There was also an 86% probability of a 90% decline in abundance. The model included stable habitat conditions with no catastrophic change (hurricanes). The model, however, was quite sensitive to small changes in the demographic parameters, with changes in juvenile survival and subadult fecundity as main factors affecting survival (Root and Barnes 2006).

BIOLOGICAL STATUS ASSESSMENT

Threats – Threats to the Sanibel Island rice rat are habitat loss, habitat degradation, habitat fragmentation, predation by free-ranging cats and competition with black rats (*Rattus rattus*). Habitat loss has been reduced by wetland protection regulations, and preservation of land in conservation areas, primarily at the J.N. "Ding" Darling National Wildlife Refuge and properties owned by the Sanibel Captiva Conservation Foundation. Degradation and fragmentation may be ongoing problems, and no estimate is given of the threat of free-ranging cats or competition with other exotics. Sea level rise and climate change impacts will become an increasing threat.

Statewide Population Assessment – Findings from the Biological Review Group are included in a Biological Status Review information table.

LISTING RECOMMENDATION – The Sanibel Island rice rat (*Oryzomis palustris sanibeli*) meets the criteria for State-designated Threatened species as described in 68A-27.001(3) F.A.C. Staff recommend listing the Sanibel Island rice rat as a Threatened species.

SUMMARY OF THE INDEPENDENT REVIEW – this will be completed after the peer review.

Peer review #2 from Dr. Jane Indorf

From: Jane Indorf
To: Imperiled
Subject: Re: FW: Sanibel Island rice rat Draft BSR Report
Date: Tuesday, February 01, 2011 8:49:13 AM
Attachments: Sanibel Island Rice Rat Biological Status Review – Independent Review.docx

Dear Dr. Haubold,

Please find attached my review of the Sanibel Island rice rat Biological Status Review. Let me know if more information is needed. I look forward to hearing about the decision.

Thanks,

Jane

Sanibel Island Rice Rat Biological Status Review – Independent Review
Jane Indorf Ph.D.
Department of Biology
University of Miami
January 25, 2011

The biological information contained within this review is accurate. More study is needed to better understand this species' natural history. This need for further study should be emphasized within the Biological Status Review. Whether or not there is gene flow between the Sanibel Island rice rat (SIRR) and mainland rice rats is a significant determination of this subspecies' distinctiveness and future survival. With gene flow, the SIRR may be less genetically differentiated than if there is no gene flow and is more likely to persist into the future. The absence of gene flow with mainland populations would make this subspecies become increasingly more genetically differentiated and extremely vulnerable to extinction.

The Biological Status Review would be strengthened by being more specific about the amount of genetic differentiation between the SIRR and the mainland marsh rice rat to emphasize the genetic distinctness that supports subspecies classification. By stating the amount of genetic differentiation between the Sanibel Island subspecies and other subspecies compared to the genetic differentiation among mainland subspecies, the distinctness of the SIRR will be illustrated.

Under the "Taxonomic Classification" section, the reference originally describing the SIRR should be mentioned (Hamilton. 1955. Two new rice rats (Genus *Oryzomys*) from Florida. Proceedings of the Biological Society of Washington 68:83 – 86). The SIRR was first described as being smaller in size and having a different color pelage compared to other subspecies.

In describing the SIRR's habitat under the "Life History" section, I suggest adding "mangrove", unless this is assumed to fall under coastal marshes. On Sanibel Island, mangrove is a crucial habitat for the SIRR. This information is stated under the "Population Status and Trends" section, but I think it is necessary to mention it under "Life History" to emphasize the importance of this habitat type for the SIRR. This can be cited through references for the silver rice rat, as well as my personal observation of rice rats utilizing mangrove habitat on Little Pine Island. Because there is a lot of mangrove habitat on Sanibel Island, this habitat type is important when considering land to protect for this subspecies.

The SIRR meets all the criteria for remaining on Florida's List of Threatened Species: reduced population size, small geographic range including a restricted area of occupancy, decline in habitat quality, and small population size.

Peer review #3 from Dr. Robert McCleery

From: McCleery,Robert Alan
To: Imperiled
Subject: Review of Sanibel Island Rice Rat BSR
Date: Thursday, January 20, 2011 7:58:52 AM

The classification of the Sanibel Island rice rat as threatened is predicated on the idea that it is a sub-species. If the Sanibel Island is not a unique subspecies than it has a large and healthy population in the everglades and surrounding areas. This BSR sates "Recent molecular analyses, however, have confirmed the subspecific status of *O. p. sanibeli* (Indorf 2010)". Unfortunately, this is not entirely true and should not be stated with such certainty. This statement was based on a dissertation which found only very moderate differentiation between Sanibel and Everglades populations with an FST = 0.078. I would argue it is a huge step to classify the Sanibel Island rice rat as a unique subspecies. Doing so seems overly ambitious and I think it would face serious questioning if sent out for peer-review. The additional argument made in this dissertation is that that rice rats are isolated on an island. This seemingly ignores the biology of this species. It is a notoriously strong swimmer and good disperser. Islands often do little to isolated them. Especially islands like Sanibel that are only several km from the mainland. Nonetheless, if you accept that this critter is worthy of designation as a population, clade, management unit, or subspecies, I believe that the criteria used to classify the Sanibel rice rat as threatened were logical and defensible. If I were given the same task I would have reached the same conclusion based on the available data.

Robert A. McCleery, Ph.D.
Assistant Professor
Department of Wildlife Ecology & Conservation
Institute of Food & Agricultural Sciences
University of Florida
314 Newins-Ziegler Hall
PO Box 110430
Gainesville, FL 32611-0430

Peer review #4 from Tara Wertz

From: Tara_Wertz@fws.gov
To: Imperiled
Subject: BSR
Date: Friday, February 11, 2011 3:55:23 PM
Attachments: Sanibel Rice Rat Bio Review Feb 2011 - Wertz.doc

Here is my review. Hope this is what you were looking for. Tara (See attached file: Sanibel Rice Rat Bio Review Feb 2011 - Wertz.doc)

Tara Wertz
J.N. Ding Darling National Wildlife Refuge
1 Wildlife Drive
Sanibel, FL 33957

Sanibel Rice Rat (*Oryzomys palustris sanibeli*)
Biological Status Review
Tara Wertz – US Fish and Wildlife Service, J.N. "Ding" Darling National Wildlife Refuge

I concur with the findings of the Biological Review Group to list the Sanibel Island rice rat as a threatened species. Limited data is available about this subspecies, but the Group adequately incorporated relevant data that is published.
The only addition I would like to see added is the habitat changes that may be occurring due to lack of fire in the marsh grass habitats, specifically in the Legion Curve and Botanical Site units on the Island. The threat of upland species encroachment into the wet swales of these units may be exacerbated by absence of fire. The difficulty of using prescribed fire is due to the close proximity of highly urbanized developments which have a significant influence on when burns can occur and the possible smoke effects on tourists during the burns. I believe this is a notable concern when discussing the effects of habitat changes to the rat populations in these units.
I would also add that trapping data is available thru summary reports at the Refuge and could be cited as "data on file at JNDDNWR, Sanibel". It is more accurate than "personal communication".

Peer review #5 from Dr. Elizabeth Forys

From: Elizabeth Forys
To: Imperiled
Subject: review of the rice rat BSR
Date: Tuesday, January 18, 2011 11:55:43 AM
Attachments: rice rat BSR review.docx

Attached is my review. Please let me know if you have any questions.

Beth Forys
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Beth Forys
Professor of Environmental Science & Biology
Eckerd College
4200 54th Ave. South
St. Petersburg, FL 33711

Memo

To: Elsa M. Haubold, Ph.D.

From: Beth Forys

Date: 3/31/2011

Re: Review of the: Biological Status Review for the Sanibel Island rice rat (*Oryzomys palustris sanibeli*)

I have read the BSR for the Sanibel Island rice rat and all of the relevant literature on the SharePoint Drive. I support the conclusion of the BSR and I commend the panel on their use of the little data and literature that exist.

Below I will address some specific issues:

1. *The completeness and accuracy of the biological information and data analyses in the BSR.*

   I concur with the panel that there is almost no information on the Sanibel Island rice rat and I hope that this BSR will eventually result in the development of a monitoring strategy.

   While I have not trapped rice rats on Sanibel, I have seen the habitat and I have trapped rice rats elsewhere in Florida. I agree that the population estimate is most likely under 1,000 as there is no reason to indicate rice rats in this area and habitat would be at the upper end of rice rat densities. Certainly the population is under 10,000.

   The PVA done by Root and Barnes (2006) does not seem to be particularly well done. With the little data available, I'm not sure it would be appropriate to do a PVA. However, the results of the PVA make sense and it seems like the rice rat should qualify for threatened by meeting multiple criteria. One category 4 or 5 hurricane seems like it could cause extinction. Sea level rise seems like it will also be a major factor and then it is also very likely that non-native predators could have a major impact as well.

2. *The reasonableness and justifiability of assumptions, interpretations of the data, and conclusions*

   All of the assumptions and interpretations seem very accurate.

Copy of the Sanibel Island rice rat BSR draft report that was sent out for peer review

Biological Status Review for the Sanibel Island rice rat (*Oryzomys palustris sanibeli*)

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rat is unlikely to experience rapid loss of habitat in the future. A continued decline in quality of habitat is still likely as urbanization precludes maintaining burn regimes in wetland systems.

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SUMMARY OF THE INDEPENDENT REVIEW – this will be completed after the peer review.

LITERATURE CITED

Bloch, C.P. and R.K. Rose. 2005. Population dynamics of *Oryzomys palustris* and *Microtus pennsylvanicus* in Virginia tidal marshes. Northeastern Naturalist 12(3):295-306.

Bryant, Amanda. Personal communication on trapping result at Sanibel Captiva Conservation Foundation and J. N. 'Ding' Darling National Wildlife Refuge.

Cox, J.A. and R.S. Kautz. 2000. Habitat conservation needs of rare and imperiled wildlife in Florida. Office of Environmental Services, Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida.

Endries, M., B. Stys, G. Mohr, G. Kratimenos, S. Langley, K. Root, and R. Kautz. 2009. Wildife Habitat Conservation Needs in Florida. Fish and Wildlife Research Institute Technical Report TR-15. x + 178 p.

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Indorf, J.L. 2010. Phylogeography of the marsh rice rat (*Oryzomys palustris*) in wetlands of the southeastern United States. Unpublished Ph.D. dissertation. University of Miami. 208pp.

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Nowak, R. M. 1999. Walker's Mammals of the World. Sixth Edition. Volume II. The Johns Hopkins University Press. Baltimore, Maryland, USA.

Root, K.V. and J. Barnes. 2006. Risk assessment for a focal set of rare and imperiled wildlife in Florida – Final Report. FWC Contract No. 03111. Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida

Whitaker, J.O. and W.J. Hamilton, Jr. 1998. Mammals of the Eastern United States. Cornell University Press. Ithaca, New York, USA. 583pp.

Wolfe, J.L. 1982. *Oryzomys palustris*. Mammalian Species 176:1-5.

Zwick, P.D. and M.H. Carr. 2006. Florida 2060: A population distribution scenario for the State of Florida. A research project prepared for 1000 Friends of Florida. Geoplan Center at the University of Florida, Gainesville, Florida, USA. 25pp.

Biological Status Review Information
Findings

Species/taxon:	Sanibel Island Rice Rat
Date:	11/04/10
Assessors:	Melissa Tucker, FWC; Jack Stout, UCF; Amanda Bryant SCCF
Generation length:	< 1 year (use 10 yr assessment period)

Criterion/Listing Measure	Data/Information	Data Type*	Criterion Met?	References
*Data Types - observed (O), estimated (E), inferred (I), suspected (S), or projected (P). Criterion met - yes (Y) or no (N).				
(A) Population Size Reduction, ANY of				
(a)1. An observed, estimated, inferred or suspected population size reduction of at least 50% over the last 10 years or 3 generations, whichever is longer, where the causes of the reduction are clearly reversible and understood and ceased[1]	No range-wide surveys for population reduction; habitat has likely improved through removal of exotic plants over the 10 yr period, although threats from fragmentation have not ceased.	S	N	
(a)2. An observed, estimated, inferred or suspected population size reduction of at least 30% over the last 10 years or 3 generations, whichever is longer, where the reduction or its causes may not have ceased or may not be understood or may not be reversible[1]	No range-wide surveys for reduction; habitat has likely improved through removal of exotic plants over the 10 yr period.	S	N	
(a)3. A population size reduction of at least 30% projected or suspected to be met within the next 10 years or 3 generations, whichever is longer (up to a maximum of 100 years) [1]	No range-wide surveys for reduction; habitat has likely improved through removal of exotic plants over the 10 yr period.	S	N	
(a)4. An observed, estimated, inferred, projected or suspected population size reduction of at least 30% over any 10 year or 3 generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased or may not be understood or may not be reversible.[1]	No range-wide surveys for reduction; habitat has likely improved through removal of exotic plants over the 10 yr period.	S	N	
[1] based on (and specifying) any of the following: (a) direct observation; (b) an index of abundance appropriate to the taxon; (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat; (d) actual or potential levels of exploitation; (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.				
(B) Geographic Range, EITHER				
(b)1. Extent of occurrence < 20,000 km^2 (7,722 mi^2) OR	Sanibel Island is approximately 33mi^2	O, E	Y	

(b)2. Area of occupancy $< 2{,}000\ km^2$ ($772\ mi^2$)	Potential habitat has been mapped by Endries et al as $0.97\ mi^2$, and by Cox and Kautz as $0.26 mi^2$. See notes (#1) on area of occupancy.	E	Y	Endries et al. (2009); Cox and Kautz (2000)
AND at least 2 of the following:				
a. Severely fragmented or exist in ≤ 10 locations	Sanibel Island is considered one location, because a single event such as a hurricane could impact all rice rats. SIRR use "heavily fragmented" habitat that occurs within a matrix considered to be "heavily urbanized" by Cox and Kautz based on mapping data.	O,I	Y	Cox and Kautz (2000)
b. Continuing decline, observed, inferred or projected in any of the following: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent, and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals	May be a continuing decline in (ii) AOO and (iii) quality of habitat. Still some concerns that while habitat in conservation areas is managed, that management may not be maintaining habitat suitabililty, but don't have data to state with certainty.	I,S	N?	Inferred from trapping records on SCCF; A. Bryant (SCCF) personal communication.
c. Extreme fluctuations in any of the following: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals	Trapping at Ding Darling NWR and SCCF properties since 2005 have resulted in captures on DDNWR, but no captures on SCCF lands, which may indicate fluctuations in ii.) area of occupancy. Not enough data to assess with certainty. See notes (#2) for more details.		N	Inferred from trapping records on SCCF; A. Bryant (SCCF) personal communication.
(C) Population Size and Trend				
Population size estimate to number fewer than 10,000 mature individuals AND EITHER	No published population estimate is available. Using density estimates from published literature and area of occupancy, maximum number of individuals is less than 10,000. See notes (#3) for full explanation.	E	Y	Endries et al. (2009); Cox and Kautz (2000); inferred from trapping records on DDNWR and SCCF; Block and Rose (2005); Kruchek (2004)

(c)1. An estimated continuing decline of at least 10% in 10 years or 3 generations, whichever is longer (up to a maximum of 100 years in the future) OR	No data on population decline; projections for future decline are roughly 5%, although this is likely an overestimate based on differences in the pixel size of GIS data layers.	I	N	Endries et al (2009); Zwick and Carr (2006)
(c)2. A continuing decline, observed, projected, or inferred in numbers of mature individuals AND at least one of the following:	A continuing decline in individuals is inferred from the projected decline in habitat - see (c)1 for details.	I	Y	Endries et al (2009); Zwick and Carr (2006)
a. Population structure in the form of EITHER	No known subpopulations exist.	S	N	
(i) No subpopulation estimated to contain more than 1000 mature individuals; OR				
(ii) All mature individuals are in one subpopulation	SIRR exists in a single population	E	Y	Indorf (2010) supports range and taxonomy
b. Extreme fluctuations in number of mature individuals	No data on fluctations in mature individuals. Trapping data suggests potential fluctuations.	S	N	A. Bryant personal communication
(D) Population Very Small or Restricted, EITHER				
(d)1. Population estimated to number fewer than 1,000 mature individuals; OR	No published population estimate is available. Using density estimates from published literature and area of occupancy, maximum number of individuals is less than 10,000. If upper level of density estimates are used, population is greater than 1000. See notes (#3) for full explanation.	E, I	N?	Endries et al (2009); Cox and Kautz (2000); Block and Rose (2005); Krucheck (2004),;Whitaker and Hamilton (1998); Wolfe (1982)
(d)2. Population with a very restricted area of occupancy (typically less than 20 km^2 [8 mi^2]) or number of locations (typically 5 or fewer) such that it is prone to the effects of human activities or stochastic events within a short time period in an uncertain future	Area of occupancy estimated to be between .26 and .97 sq miles. Coastal island susceptible to hurricanes, and considered a single location.	E, I	Y	Cox and Kautz (2000); Endries et al (2009)
(E) Quantitative Analyses				
e1. Showing the probability of extinction in the wild is at least 10% within 100 years	Root and Barnes estimate a 70% chance of extinction in the next 100 years.	P	Y	Root and Barnes (2006)

Initial Finding (Meets at least one of the criteria OR Does not meet any of the criteria)	Reason (which criteria are met)
Meets 3 criteria	C (c)2aii, D2, E

Is species/taxon endemic to Florida? (Y/N)	Y
If Yes, your initial finding is your final finding. Copy the initial finding and reason to the final finding space below. If No, complete the regional assessment sheet and copy the final finding from that sheet to the space below.	
Final Finding (Meets at least one of the criteria OR Does not meet any of the criteria)	Reason (which criteria are met)
Meets 3 criteria	C (c)2aii, D2, E

Additional notes -

1. Area of occupancy: Endries et al 2009 estimate 250 ha (0.97 mi2) and included transitional habitats and drier upland areas in addition to wetlands. Upland sites may be sinks, and more likely occupied by juveniles (Krucheck 2004). Cox and Kautz (2000) estimated 68.29 ha (.26 mi2) and included freshwater and saltwater wetland habitats.

2. Trapping protocols are consistent across sites, and trapping sessions run concurrently. The reasons for absence of SIRR on SCCF during trapping over last 4 years is not understood, but may be tied to changes in coverage - specifically an increase by woody vegetation. Maintining burn regimes are limited by the urban matrix and limited staffing at SCCF.

3. Population densities for rice rats in coastal habitats have been estimated from .1 to 87 rice rats per hectare (Wolfe 1982, Whitaker and Hamilton 1998, Kruchek 2004, Block and Rose 2005). Block and Rose caution against using density estimates, since methods for calculating differs between studies; however the review group used a conservative density of 3 rice rats /hectare (as reported by Wolfe 1982, Kruchek 2004, and Block and Rose 2005). At this density, and using the larger AOO from Endries et al 2009, populations were less than 10,000 individuals, and less than 1000 individuals. If higher reported densities are used (10/ha) with the higher Endries AOO, then the population is estimated to be greatern than 1000 individuals.

Abbreviations:

SCCF – Sanibel Captiva Conservation Foundation

DDNWR – Ding Darling National Wildlife Refuge

SIRR – Sanibel Island rice rat

Appendix 1. Biological Review Group Members Biographies

Melissa Tucker has a M. S. in Ecology from the University of Georgia. She has worked as the Mammal Taxa Coordinator in FWC's Species Conservation Planning Section since 2007. Ms. Tucker has worked over 5 years on wildlife conservation issues, including planning and implementing conservation actions for mammals statewide, with an emphasis on small mammal species.

Jack Stout has a Ph.D. from Washington State University. He is currently a Professor Emeritus at the University of Central Florida. Dr. Stout has worked over 30 years on the ecology and conservation of wildlife habitats and species in Florida, including Florida mice and beach mice.

Amanda Bryant has a B.S in Environmental & Conservation Biology from Philadelphia University. She is currently a biologist at Sanibel Captiva Conservation Foundation. Amanda's interests and work have focused mainly on threatened, endangered, and at-risk wildlife populations. She's worked predominately with small mammals including black-tailed prairie dogs, black-footed ferrets, and swift fox. Currently, she coordinates the sea turtle program, as well as assisting with other wildlife research and monitoring projects.

Appendix 2. Summary of letters and emails received during the solicitation of information from the public.

No information about this species was received during the public information request period

Appendix 3. Information and comments received from the independent reviewers.