Florida Tree Snail Biological Status Review Report

March 31, 2011

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
620 South Meridian Street
Tallahassee, Florida 32399-1600

Biological Status Review Report
for the
Florida Tree Snail
(*Liguus fasciatus*)
March 31, 2011

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 November 8, 2010 that had not undergone a status review in the past decade. Public information on the status of the Florida tree snail was sought from September 17 to November 1, 2010. The three-member Biological Review Group (BRG) met on November 9, 2010. Group members were Lindsay Nester (FWC lead), Steve Sparks (independent consultant), and Deborah Jansen (National Park Service) (Appendix 1). In accordance with rule 68A-27.0012, Florida Administrative Code (F.A.C.), the BRG was charged with evaluating the biological status of the Florida tree snail using criteria included in definitions in 68A-27.001, F.A.C., 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://myfwc.com/wildlifehabitats/imperiled/listing-action-petitions/ to view the listing process rule and the criteria found in the definitions.

In late 2010, staff developed the initial draft of this report which included BRG findings and a preliminary listing recommendation from staff. The draft was sent out for peer review and the reviewers' input has been incorporated to create this final report. The draft report, peer reviews, and information received from the public are available as supplemental materials at http://myfwc.com/wildlifehabitats/imperiled/biological-status/.

The BRG concluded from the biological assessment that the Florida tree snail does not meet any listing criteria. FWC staff recommends not listing the Florida tree snail as a Threatened species and removing it from the Species of Special Concern list.

This work was supported by a Conserve Wildlife Tag grant from the Wildlife Foundation of Florida. FWC staff gratefully acknowledges the assistance of the biological review group members and peer reviewers.

BIOLOGICAL INFORMATION

Life History References -- Jones 1954, Voss 1976, Tuskes 1981, Deisler-Seno 1994.

Taxonomy – According to current genetic information, the Florida tree snails are all thought to be one species *Liguus fasciatus* with many color varieties (Deisler-Seno 1994, Hillis 1995).

Population Status and Trend -- Tuskes 1981; Deisler-Seno 1994; Addison and Auffenberg 1996; Bennetts et al. 2000a, 2000b.

Geographic Range and Distribution – Deisler-Seno 1994, Emmel and Cotter 1995, Smith 1997, Florida Natural Areas Inventory 2001, Sparks undated.

Quantitative Analyses - We are not aware of a population viability analysis for Florida tree snails.

BIOLOGICAL STATUS ASSESSMENT

Threats – The major threat to the Florida tree snail is habitat loss (Emmel and Cotter 1995). These snails have specific habitat requirements. They prefer smooth-barked trees in tropical hardwood hammocks. They also require leaf litter accumulation at the base of trees for egg disposition. In addition to habitat loss, disturbance can also threaten tree snails. Disturbance can result in changes to the microclimate making that area unsuitable habitat for tree snails (Florida Natural Areas Inventory 2001). Fire ants have been observed killing tree snails and breaching the seal of aestivating snails (Forys et al. 2003, Smith 1997). Unusually cold temperatures pose a risk to snails and eggs by direct freezing and by killing host trees (Emmel and Cotter 1995). Collection of tree snails posed a threat to the survival of rare color forms prior to a ban on collecting. In the early part of the 1900s collectors amassed collections of snails numbering into the thousands (Emmel and Cotter 1995). If collection is allowed in the future, this threat could resurface.

The Florida Keys' populations of tree snails may be subjected to a different array, or a heightened level, of threats than the peninsular populations. A major decline in the Florida tree snail on Key Largo in the 1970s and 1980s was attributed to the use of Dibrom and Baytex mosquito-control pesticides (Emmel and Cotter 1995). Hurricane storm surge poses another threat to the Keys' populations (Emmel and Cotter 1995) that would not be felt by inland mainland populations.

Population Assessment – Findings from the BRG are included in Biological Status Review Information Findings tables. The BRG concluded from the biological assessment that the Florida tree snail does not meet any of listing criteria as described in 68A-27.001, F.A.C.

LISTING RECOMMENDATION

Staff recommends not listing the Florida tree snail as a Threatened species and removing it from the Species of Special Concern list.

SUMMARY OF THE INDEPENDENT REVIEW

Comments were received from three reviewers, David Lysinger (North American Butterfly Association), Dr Deborah Shaw (former Manager of Environmental Affairs for Florida Keys Electric Cooperative), and Kurt Auffenberg (Florida Museum of Natural History). Appropriate editorial changes recommended by the reviewers were made to the report. One of the reviewers concurred with delisting the Florida tree snail, while the two other reviewers disagreed with delisting. One reviewer expressed concern about snails being protected from

utility and road maintenance. Another reviewer was concerned about snails being collected when delisted. Best management practices and other recommended protective measures necessary to protect snails from collection and maintenance activities will be included in the management plan. There were many comments from one reviewer about considering the subspecies of tree snails. At this time, subspecies of Florida tree snails are not being considered for listing. The reviewers that disagreed with delisting did not provide supporting evidence to change the staff recommendation. Peer reviews are available at http://myFWC.com.

LITERATURE CITED

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Biological Status Review Information
Findings

Species/taxon: Florida tree snail (Liguus fasciatus)
Date: 11/09/10
Assessors: Lindsay Nester, Deborah Jansen, Steven Sparks

Generation length: average 4-5 yrs; used 15 years for 3 generations

Criterion/Listing Measure	Data/Information	Data Type*	Sub-Criterion Met?	References
*Data Types - observed (O), estimated (E), inferred (I), suspected (S), or projected (P). Sub-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]	Reduction of 50% is not met.	S	N	Steven Sparks (pers. comm.)
(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]	Reduction of 30% is not met.	S	N	Steven Sparks (pers. comm.)
(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]	Projected reduction not suspected.	S	N	Steven Sparks (pers. comm..)
(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]	Reduction of 30% is not met.	S	N	Steven Sparks (pers. comm.)
[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	EOO estimated 4968 mi2 based on county land areas.	E	Y	FWC staff 2010
(b)2. Area of occupancy < 2,000 km^2 (772 mi^2)	AOO estimated < 100 mi2	E	Y	Steven Sparks (unpub. data), FFWCC Florida Wildlife Legacy Initiative (2005)
AND at least 2 of the following:				

a. Severely fragmented or exist in ≤ 10 locations	Distribution doesn't meet IUCN definition of severely fragmented. Hammocks naturally separated with occasional dispersal. Hammocks and islands may be considered to be locations, and there are hundreds.	E	N	Emmel and Cotter (1995); Smith (1997); Sparks (undated)
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	Extent of tropical hardwood habitat in the Keys is continuing to decline.	P	Y	Steven Sparks (pers. obs.)
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	No extreme fluctuations.	E	N	Addison and Auffenberg (1996); Bennetts et al. (2000a, 2000b); Tuskes (1981)
(C) Population Size and Trend				
Population size estimate to number fewer than 10,000 mature individuals AND EITHER	More than 10,000 mature individuals rangewide.	E	N	Bennetts et al. (2000a, 2000b); Emmel and Cotter (1995); Smith (1997); Sparks (undated); Tuskes (1981)
(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	Not applicable			
(c)2. A continuing decline, observed, projected, or inferred in numbers of mature individuals AND at least one of the following:	Not applicable			
a. Population structure in the form of EITHER				
(i) No subpopulation estimated to contain more than 1000 mature individuals; OR				
(ii) All mature individuals are in one subpopulation				
b. Extreme fluctuations in number of mature individuals				
(D) Population Very Small or Restricted, EITHER				
(d)1. Population estimated to number fewer than 1,000 mature individuals; OR	More than 10,000 mature individuals rangewide.	E	N	Bennetts et al. (2000a, 2000b); Emmel and Cotter (1995); Smith (1997); Sparks (undated); Tuskes (1981)
(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	AOO estimated > 60 mi2; estimated several hundred locations.	E	N	Steven Sparks (unpub. data), FFWCC Florida Wildlife Legacy Initiative (2005)
(E) Quantitative Analyses				
e1. Showing the probability of extinction in the wild is at least 10% within 100 years	No quantitative analysis available.		N	

Initial Finding (Meets at least one of the criteria /sub-criteria OR Does not meet any of the criteria/sub-criteria)	Reason (which criteria/sub-criteria are met)
Did not meet any criteria	
Is species/taxon endemic to Florida? (Y/N)	No
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/sub-criteria OR Does not meet any of the criteria/sub-criteria)	Reason (which criteria/sub-criteria are met)
Did not meet any criteria	

1	Biological Status Review Information Regional Assessment	Species/taxon: Florida tree snail (Liguus fasciatus)
2		Date: 11/9/10
3		Assessors: Lindsay Nester, Deborah Jansen, Steven Sparks
4		
5		
6		
7		
8	Initial finding	Supporting Information
9		
10	2a. Is the species/taxon a non-breeding visitor? (Y/N/DK). If 2a is YES, go to line 18. If 2a is NO or DO NOT KNOW, go to line 11.	No
11	2b. Does the Florida population experience any significant immigration of propagules capable of reproducing in Florida? (Y/N/DK). If 2b is YES, go to line 12. If 2b is NO or DO NOT KNOW, go to line 17.	No
12	2c. Is the immigration expected to decrease? (Y/N/DK). If 2c is YES or DO NOT KNOW, go to line 13. If 2c is NO go to line 16.	
13	2d. Is the Florida population a sink? (Y/N/DK). If 2d is YES, go to line 14. If 2d is NO or DO NOT KNOW, go to line 15.	
14	If 2d is YES - Upgrade from initial finding (more imperiled)	
15	If 2d is NO or DO NOT KNOW - No change from initial finding	
16	If 2c is NO or DO NOT KNOW- Downgrade from initial finding (less imperiled)	
17	If 2b is NO or DO NOT KNOW - No change from initial finding	No change
18	2e. Are the conditions outside Florida deteriorating? (Y/N/DK). If 2e is YES or DO NOT KNOW, go to line 24. If 2e is NO go to line 19.	
19	2f. Are the conditions within Florida deteriorating? (Y/N/DK). If 2f is YES or DO NOT KNOW, go to line 23. If 2f is NO, go to line 20.	
20	2g. Can the breeding population rescue the Florida population should it decline? (Y/N/DK). If 2g is YES, go to line 21. If 2g is NO or DO NOT KNOW, go to line 22.	
21	If 2g is YES - Downgrade from initial finding (less imperiled)	
22	If 2g is NO or DO NOT KNOW - No change from initial finding	
23	If 2f is YES or DO NOT KNOW - No change from initial finding	
24	If 2e is YES or DO NOT KNOW - No change from initial finding	
25		
26	Final finding	Does not meet any criteria

APPENDIX 1. Brief biographies of the Florida tree snail Biological Review Group members.

Deborah Jansen received her B.S. in Biology from University of Wisconsin at Eau Claire and her M.S. in Wildlife from University of Wisconsin at Stevens Point. She has been a Wildlife Biologist for the National Park Service at Big Cypress National Preserve (BCNP) since 1988. She was co-investigator on a *Liguus* tree snail project in BCNP, examining the effects of Hurricane Andrew (1992) on host trees and snail survival and movements. That research led to the publication of two research articles and a full-color Florida tree snail brochure.

Lindsay Nester received her B.S. in Wildlife Biology from the State University of New York College of Environmental Science and Forestry and her M.S. in Ecology from the University of Florida. She is currently the Assistant Regional Species Conservation Biologist for the FWC's South Region. Her primary focus has been reptiles and birds, but she has gained invertebrate experience working on the Miami blue butterfly management plan and recovery.

Steve Sparks received his B.A. from Florida Atlantic University in 1978. He has lived in south Florida for over 50 years and been involved with Florida tree snails on an ongoing basis since 1975. He was a snail collector until the early 1980s and then a researcher on several projects in Big Cypress National Preserve (BCNP). In 1995 Mr. Sparks became a co-investigator in Everglades National Park (ENP). He and other project personnel are responsible for the preservation, maintenance, and monitoring of the snails within the more than 250 hammocks where the introductions occurred. He has recorded several thousand field hours with *Liguus* throughout its range, and given many presentations on the snails to schools and conservation organizations over the years.

APPENDIX 2. Summary of letters and emails received during the solicitation of information from the public period of September 17 through November 1, 2010.

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