Eastern Chipmunk Biological Status Review Report

DRAFT May 22, 2015

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

Biological Status Review
for the
Eastern chipmunk
(*Tamias striatus*)
May 22, 2015

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. Public information on the status of the eastern chipmunk was sought initially from September 17 to November 1, 2010. A group of 3 biologists with expertise in the biology of mammals in Florida was convened on November 3-4, 2010. Group members were Jeff Gore (FWC lead), Bob McCleery (University of Florida), and Jack Stout (Emeritus, University of Central Florida) (Appendix 1).

In accordance with rule 68A-27.0012 Florida Administrative Code (F.A.C.), the Biological Review Group was charged with evaluating the biological status of the eastern chipmunk 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://myfwc.com/wildlifehabitats/imperiled/listing-action-petitions/ to view the listing process rule and the criteria found in the definitions. The 2011Biological Status Review is available at http://myfwc.com/media/2273280/Eastern-Chipmunk-BSR.pdf.

The Biological Review Group concluded from the biological assessment that the eastern chipmunk did not meet any of the listing criteria. However, independent reviewers expressed concerns that the primary data available for making this evaluation were not recent and not available for the time window in which the assessment should be conducted for this species (the past 10 years). Therefore, FWC retained the species on the FWC list of Species of Special Concern and directed a study to collect more recent data on the eastern chipmunk in Florida.

That study was conducted by FWC from 2012-2014, and in May of 2015, the Biological Review Group evaluated data from the new study. They conducted a biological assessment based on the new data and again concluded that the eastern chipmunk did not meet any of the listing criteria. Therefore, staff recommends that the eastern chipmunk should not be listed as Threatened or Endangered and should no longer be listed as a Species of Special Concern.

FWC staff gratefully acknowledges the assistance of the biological review group members and peer reviewers.

BIOLOGICAL INFORMATION

Taxonomic Classification – This biological status report is for the eastern chipmunk (*Tamias striatus*) in Florida. Several subspecies of the eastern chipmunk have been named and

the Florida population is typically included within *T. s. pipilans* (Snyder 1982; but see Jones and Suttkus 1979). However, the subspecies are not disjunct and are separated only by clinal gradation (Snyder 1982; Whitaker and Hamilton 1998). Therefore, this report does not consider subspecies in the assessment of the status of the Florida population of the eastern chipmunk.

Life History – The eastern chipmunk is a small ground squirrel that weighs around 80 to 125g and has prominent black and white lateral stripes (Snyder 1982). It inhabits deciduous forests, particularly areas with abundant crevices for refuge and numerous observation posts (Snyder 1982). Habitat in Florida is hardwood or mixed hardwood-pine forests having oaks as the dominant species (Gore 1990). Eastern chipmunks occur unevenly across their range in Florida, and much of the apparently suitable deciduous forest habitat remains unoccupied (Gore 1990, Winchester and Gore 2015).

The eastern chipmunk lives in solitary and dispersed territories (Yahner 1978). Individuals are active during the day, mostly within 15m of the burrow system (Snyder 1982; Yahner 1978). Burrows are separated from each other by an average of 35m and core areas are intensely defended against conspecifics (Yahner 1978).

Density of eastern chipmunk populations varies both temporally and geographically and ranges from 0.3 to 37.6 individuals per hectare (Yerger 1953). Adult female breeding density is probably determined by the availability of food resources while male density seems to be dependent on female density (Galloway and Boonstra 1989). Clear-cutting of forests has no significant effect on eastern chipmunk population densities or age structure, but forest fragmentation may decrease chipmunk survival rates (Mahan and Yahner 1998; Nupp and Swihart 1998). Furthermore, in farmland woodlots, density decreases with increasing area and isolation of habitat (Reunanen and Grubb 2004).

Eastern chipmunk females breed once or twice a year in the spring and/or summer (Snyder 1982). Estrus lasts only a short period of time during which males intensively guard access to females (Yahner 1978). Litter size averages between 4 and 5 individuals and juveniles emerge at 5 to 7 weeks old at which time they are self-reliant (Snyder 1982; Yahner 1978). Most juveniles disperse to a new residence within two weeks of first emergence. Individuals usually become sexually mature after their first winter and average mean life expectancy is 1.3 years (Snyder 1982).

In the northern part of their range, eastern chipmunks spend most of their time from late fall to early spring underground in various degrees of torpor, but in favorable weather they sometimes appear above ground (Snyder 1982). This annual cycle of torpidity seems to be endogenous rather than determined by ambient temperature, and juveniles tend to delay its onset longer than do adults (as reviewed in Snyder 1982). It is unclear whether eastern chipmunks in the southern part of their range undergo this seasonal torpidity. Stevenson (1962) believed eastern chipmunks were inactive in winter in Florida, but Jones and Suttkus (1979) observed or collected individuals throughout the year. Food items (seeds, nuts, and acorns) for overwinter survival are cached in burrow systems (Snyder 1982).

Geographic Range and Distribution –The eastern chipmunk ranges from Lake Manitoba across eastern Canada and southward nearly to the Gulf of Mexico (Snyder 1982). It is listed as a species of Least Concern by the IUCN because it is widespread, abundant, and subject to no major threats (Linzey and Hammerson 2008).

Along the southern edge of its range the eastern chipmunk occurs in a few parishes in Louisiana near the Mississippi River; throughout much of Mississippi, Alabama, and Georgia; and in a small portion of northwest Florida (Snyder 1982). The eastern chipmunk's historical range in Florida is unknown, but its current range is restricted to areas west of the Apalachicola River (Winchester and Gore 2015). The range mapped by Winchester and Gore (2015) covers 2,531 square miles within the northern portions of Escambia, Santa Rosa, Okaloosa, Walton, Holmes and Jackson counties. Results of field surveys determined that chipmunks inhabit 10% (254 mi^2) of areas within their range in Florida and appear to be restricted to deciduous forests near streams and rivers (Winchester and Gore 2015).

Population Status and Trend – Winchester and Gore (2015) found chipmunks over a larger area in northwest Florida than both Stevenson (1962) and Gore (1990) reported earlier. However, the apparent increase was likely due to broader sampling effort rather than a real expansion of the extent of occurrence (Winchester and Gore 2015). Based on comparison of historical and current range estimates, chipmunk populations in Florida are not believed to be declining in number or distribution, (Winchester and Gore 2015).

Assuming the lowest reported density of 0.3 eastern chipmunks/hectare (Yerger 1953) occurs over the estimated 254 mi^2 of occupied habitat within their range (Winchester and Gore 2015), the estimated number of chipmunks in Florida is 19,728 and is not believed to be declining. Because the density of chipmunks in Florida is likely greater than the minimum recorded density, the total population size also is likely greater than the estimated minimum.

Quantitative Analyses – No population viability analysis has been conducted for the eastern chipmunk.

BIOLOGICAL STATUS ASSESSMENT

Threats – The greatest threat to eastern chipmunk populations in Florida is the destruction of habitat through the clearing of deciduous forests (Gore 1990; Winchester and Gore 2015). In Florida, this may be offset by the abandonment of planted pine forests and their succession into deciduous forests (Jones *et al*. 1992). The net effect of these two practices in Florida to chipmunk populations remains unknown (Jones *et al*. 1992).

Population Assessment – Findings from the Biological Review Group are included in a Biological Status Review information table and regional assessment table. The eastern chipmunk Biological Review Group concluded from the biological assessment that the eastern chipmunk (*Tamias striatus*) does not meet any of the listing criteria.

LISTING RECOMMENDATION – FWC staff recommends not listing the eastern chipmunk as a Threatened species and removing it from the Species of Special Concern list as none of the listing criteria were met.

SUMMARY OF THE INDEPENDENT REVIEW

LITERATURE CITED

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Jones, C. and R.R. Suttkus. 1979. The distribution and taxonomy of *Tamias striatus* at the southern limits of its geographic range. Proc. Biol. Soc. Washington 91:828-839.

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Nupp, T.E. and R.K. Swihart. 1998. Effects of forest fragmentation on population attributes of white-footed mice and eastern chipmunks. Journal of Mammalogy 79(4):1234-1243.

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Biological Status Review Information Findings		
	Species/taxon:	Eastern chipmunk (*Tamias striatus*)
	Date:	22 May 2015
	Assessors:	Jeff Gore, Robert McCleery, I. Jack Stout,
	Generation length:	Individuals usually become sexually mature after their first winter and average mean life expectancy is 1.3 years (Snyder 1982). Therefore, generation time is about **1 year**.

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 evidence to suggest Florida populations are declining. Previous BSR in 2010 estimated a higher population size, but the estimate was based upon a liberal estimate of area occupied.		N	Gore 1990; Winchester and Gore 2015
(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 evidence to suggest Florida populations are declining.		N	Gore 1990; Winchester and Gore 2015
(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 evidence to suggest Florida populations are declining.		N	Gore 1990; Winchester and Gore 2015
(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 evidence to suggest Florida populations are declining.		N	Gore 1990; Winchester and Gore 2015
[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	< 7,722 mi^2 (extent of occurrence is 2,531 mi^2, calculated as the	E	Y	Winchester and Gore 2015

	minimum convex polygon around all known chipmunk locations as of 2014)			
(b)2. Area of occupancy < 2,000 km^2 (772 mi^2)	< 772 mi^2 (area of occupancy is 254 mi^2 as of 2014)	E	Y	Winchester and Gore 2015
AND at least 2 of the following:				
a. Severely fragmented or exist in ≤ 10 locations	Some fragmentation, but often connected along streams throughout much of the extent of occurrence	O	N	Winchester and Gore 2015
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	No evidence of a decline. Current extent of occurrence is larger than previous estimate.	O	N	Winchester and Gore 2015
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 evidence of fluctuations in population size or area occupied.	O	N	Gore 1990; Winchester and Gore 2015
(C) Population Size and Trend				
Population size estimate to number fewer than 10,000 mature individuals AND EITHER	Estimate of 19,728 chipmunks in Florida in 2014, based upon lowest reported density of 0.3 chipmunks/hectare over 254 mi^2 of area occupied =	E	N	Yerger 1953; Winchester and Gore 2015
(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	Even if population size is much lower than estimated, there is no evidence of continuing decline. Estimate in 2010 BSR of 36,900 chipmunks was based on a liberal estimate of area occupied.	I	N	Gore 1990; Winchester and Gore 2015
(c)2. A continuing decline, observed, projected, or inferred in numbers of mature individuals AND at least one of the following:	No evidence of a population decline.	I	N	Winchester and Gore 2015
a. Population structure in the form of EITHER	No evidence of subpopulations containing < 1000 mature individuals.	I	N	Winchester and Gore 2015
(i) No subpopulation estimated to contain more than 1000 mature individuals; OR				
(ii) All mature individuals are in one subpopulation	No evidence of mature individuals in one subpopulation.	I	N	Winchester and Gore 2015
b. Extreme fluctuations in number of mature individuals	No evidence of extreme fluctuations.	I	N	Winchester and Gore 2015

(D) Population Very Small or Restricted, EITHER				
(d)1. Population estimated to number fewer than 1,000 mature individuals; OR	Population size is estimated to be >19,000 individuals	E	N	Winchester and Gore 2015
(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 > 8 mi^2 and number of locations > 5.	O	N	Winchester and Gore 2015
(E) Quantitative Analyses				
e1. Showing the probability of extinction in the wild is at least 10% within 100 years	No PVA has been conducted.		N	

Initial Finding (Meets at least one of the criteria OR Does not meet any of the criteria)	Reason (which criteria are met)
Does not meet any of the criteria.	
Is species/taxon endemic to Florida? (Y/N)	N
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)
Does not meet any of the criteria.	

1	Species/taxon:	Eastern chipmunk (Tamias striatus)
2	Date:	22 May 2015
3	Assessors:	Jeff Gore, Bob McCleery, Jack Stout
4		
5		
6		
7		
8	Initial finding	
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.	Possible, but don't know for certain.
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 regional 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 from initial finding.
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	No change from initial finding.

Biological Status Review Information
Regional Assessment

Appendix 1. Brief biographies of the Eastern chipmunk Biological Review Group members.

Jeff Gore has a Ph.D. in Wildlife Biology from the University of Massachusetts. He has worked for FWC since 1986 and since 2004 has been the leader of the Terrestrial Mammal Research Subsection. Dr. Gore has over 25 years of experience working on conservation of wildlife species in Florida, particularly small mammals such as bats and beach mice.

Robert McCleery has a Ph.D. in Wildlife Science from Texas A & M University. He currently serves as an assistant professor in the Department of Wildlife Ecology and Conservation at the University of Florida. Dr. McCleery has over 15 years experience in research and conservation of wildlife and has worked extensively on the ecology of fox squirrels, Key Largo woodrats, Keys marsh rabbits, Florida Key deer and Indiana bats.

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.