Southern Tessellated Darter 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
Southern Tessellated Darter

(*Etheostoma olmstedi maculaticeps*)

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 Southern tessellated darter was sought from September 17 to November 1, 2010. The members of the Biological Review Group (BRG) met on November 18, 2010. Group members were John R. Knight (FWC lead), William Tate (U. S. Fish and Wildlife Service), and Howard Jelks (U. S. Geological Survey) (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 Southern tessellated darter 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 Southern tessellated darter BRG found that the southern tessellated darter, *Etheostoma olmstedi maculaticeps* met at least one listing criterion. Staff recommends listing the southern tessellated darter as a Threatened species.

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. Staff would also like to thank Dr. Joseph Mitchell who served as a data compiler on the species and drafted much of this report.

BIOLOGICAL INFORMATION

Taxonomic Classification- This biological status report is for the southern tessellated darter (*Etheostoma olmstedi maculaticeps* Cole 1967).

Life History References – Rohde et al. (2009), Marcy et al. (2005), Kuehne and Barbour (1983), Lee and McAllister (1980), Gilbert (1978, 1992), Page (1983), Layzer and Reed (1978), Tsai (1972).

Geographic Range and Distribution - This moderately sized darter occurs in Atlantic slope streams from Ontario, Canada, southward to Florida. The subspecies *E. o. maculaticeps* occurs from the Cape Fear drainage (North Carolina), south to the St. Johns River, Florida (Cole 1967, Rohde et al. 2009). In Florida, Gilbert (1978, 1992) reported tessellated darters from three locations in Marion and Putnam counties. He noted that this fish could be found with regularity only at the Orange Creek site. Four additional individuals were caught at this site during the Rodman Reservoir study in 1993-1994 (http://www.rodmanreservoir.com/Time_Line/studies.htm#vol18, accessed 9 Nov. 2010). Bass et al. (2004) reported tessellated darters were collected from Eaton Creek in 2000, although none were collected from that location when resampled in 2003. The St. Johns population of southern tessellated darter is fragmented from the next closest population to the north (the Atlamaha River, Georgia), being absent from the St. Marys and Satilla drainages (Gilbert 1992).

Population Status and Trend – Southern tessellated darters inhabit small-to-medium sized streams with sand, mud, silt, or gravel substrates (Gilbert 1978, 1992). Bass et al. (2004) collected the species at only two locations during a statewide monitoring project (Orange Creek and the mainstem Oklawaha River). No population data are available and current population sizes are unknown.

Generation Length – Southern tessellated darters reach sexual maturity at age one, and the maximum age observed is four years (Rohde et al. 2009, Layzer and Reed 1978). Therefore the estimated generation time is 2.5 years. Since the estimated time for 3 generations is less than 10 years (the default minimum for IUCN assessment), a 10-year timeframe was used for this assessment.

Quantitative Analyses – There have been no population viability analyses (PVA) or other quantitative models conducted that include in their results a probability of extinction.

BIOLOGICAL STATUS ASSESSMENT

Threats – The small geographic range and specific habitat occupied by this species in Florida suggest that it may be vulnerable to anthropogenic sources of pollution and habitat alteration. Specifically, non-point source input of fine sediment into the Ocklawaha Watershed, could adversely affect tessellated darters by smothering available spawning habitat (a crevice spawning species) or suffocating existing nests. The status of the three known locations for this fish in Florida is unknown. Hybridization could become a threat if other *Etheostoma* species are introduced. Raesly et al. (1990) reported hybrids between *Etheostoma olmstedi* and an introduced species in Pennsylvania. Bass et al. (2004) indicated that the construction of impoundments (such as Rodman Reservoir) destroyed much of the original habitat inhabited by tessellated darters. The Orange Creek watershed appears to be the only location where tessellated darter populations are stable. Efforts are needed to protect this watershed from antropogenic disturbances that could result in possible extirapation of the species from Florida.

Population Assessment – Findings from the Southern Tessellated Darter BRG are included in the Biological Status Review Information Findings tables. The BRG found that the southern tessellated darter met at least one listing criterion as described in 68A-27.001, F.A.C.

LISTING RECOMMENDATION

Based on the findings of the southern tessellated darter BRG and in subsequent consultation with other FWC fish experts, staff recommends that the southern tessellated darter, *Etheostoma olmstedi maculaticeps,* be listed as a Threatened species.

SUMMARY OF THE INDEPENDENT REVIEW

Comments were received from 4 reviewers; Dr. Lawrence Page (University of Florida), Dr. Brett Albanese (Georgia Department of Natural Resources), Dr. Steven Herrington (The Nature Conservancy), and Dr. Catherine Phillips (U.S. Fish and Wildlife Service). Appropriate editorial changes recommended by the reviewers were made to the report. No changes were recommended that would affect the findings or staff recommendations. Three of the four reviewers concurred with staff recommendations. One reviewer did not believe that the species was threatened in Florida, and recommended that the species should be listed as a Species of Concern. This reviewer did not provide a detailed explanation as to why, therefore no change was made to the BSR. Suggestions for additional materials needed within the BSR were incorporated into the document. Peer reviews are available at http://www.myFWC.com.

LITERATURE CITED

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Biological Status Review Information
Findings

Species/taxon: *Etheostoma olmstedi maculaticeps*
Date: 11/19/10
Assessors: Jelks, Tate, and Knight

Generation length: 10 years

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]	Data not available		No	
(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]	Data not available		No	
(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]	Data not available		No	
(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]	Data not available		No	
[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	Based on 2.59 sq km grid and known recent locations (32 grids). EOO was calculated as 95.6 sq km	E	Y	Bass et al. 2004, FWC GIS data
(b)2. Area of occupancy < 2,000 km^2 (772 mi^2)	Based on 2.59 sq km grid and known recent locations (32 grids). AOO was calculated as 95.6 sq km	E	Y	Bass et al. 2004, FWC GIS data
AND at least 2 of the following:				
a. Severely fragmented or exist in ≤ 10 locations	1 location record in past 10 years, 6 historical locations	E	Y	Bass et al. (2004), FWC GIS data

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	historic range decline (from 6 to 1 location), loss of quality habitat (e.g., Rodman Reservoir). Reservoir construction completed in 1968. Collections of *E. olmstedi* pre-date impoundment	I	Y (iii, iv)	Bass et al. (2004)
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 available data		No	
(C) Population Size and Trend				
Population size estimate to number fewer than 10,000 mature individuals AND EITHER	16 specimens collected in past 10 years	S	Y	Bass et al. (2004), FWC GIS data
(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 available data		No	
(c)2. A continuing decline, observed, projected, or inferred in numbers of mature individuals AND at least one of the following:	no available data		No	
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	no available data		No	
(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	1 location record in past 10 years, 6 historical locations	E	Y	Bass et al. (2004), FWC GIS data
(E) Quantitative Analyses				
e1. Showing the probability of extinction in the wild is at least 10% within 100 years	No available data		No	

Initial Finding (Meets at least one of the criteria OR Does not meet any of the criteria)	Reason (which criteria/sub-criteria are met)
Y	B1+2ab(iii,iv); D2
Is species/taxon endemic to Florida? (Y/N)	Yes, next closest drainage is Altamaha (functionally endemic), no probability of exchange
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/sub-criteria are met)
Y	B1+2ab(iii,iv); D2

1	Biological Status Review Information Regional Assessment Species/taxon:	*Etheostoma olmstedi maculaticeps*
2	Date:	11/19/10
3	Assessors:	Jelks, Tate, and Knight
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.	N
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.	N
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	No change

APPENDIX 1. Brief biographies of the Southern tessellated darter Biological Review Group members.

Bill Tate is the US Fish and Wildlife Service biologist responsible for assisting Eglin Air Force Base's Jackson Guard unit in protecting the endangered Okaloosa darter . Through their efforts and his guidance this darter species has been managed successfully enough for the last decade that it qualified for down-listing from federally endangered to threatened this year. His expertise extends to all North Florida darters and many other benthic (therefore cryptic) freshwater species.

Howard Jelks received his undergraduate education at FSU, then went to UF for his master's degree. Howard has diverse experience from wetland plants, aquatic invertebrates, fish, and wading birds. He has studied these organisms from the estuaries of Apalachicola Bay, freshwater marshes of the Everglades, and streams of the Piedmont and Coastal Plain. Although he specializes in fishes, he classifies himself as a general naturalist/ecologist. How the dynamic environment structures biotic communities is his broad interest. Imperiled freshwater fishes are his speciality, but nonindigenous and marine taxa are also studied. For the past 16 years, he has been a leader of Okaloosa darter monitoring and recovery planning at Eglin Air Force Base in northwest Florida. He has developed skills in sampling design, database development, geographical information system and statistical analyses. He is an active member of the American Fisheries Society Endangered Species Committee and directs their website at http://fl.biology.usgs.gov/afs/index.html

John R. Knight II received his B.S. in Fisheries from the University of Georgia in 2000. After graduation, he accepted a position with the University of Georgia, Institute of Ecology and Georgia Museum of Natural History, where he primarily worked on research of Federally Endangered and Threatened fish species. He accepted a graduate research assistantship at Auburn University and completed his master's research in 2005. Later that year he accepted a position with FWC's Fish and Wildlife Research Institute (FWRI). For the past five and a half years, he has worked primary on developing monitoring strategies/techniques to effectively characterize fish communities from streams and rivers in Florida. Additional duties while working for FWRI include; biological comments on the effects of development on state and federally listed species, provided consultation for scientific permit applications, assisted USFWS with sampling for federally listed fish and mussel species, and worked on numerous interagency technical committees and partnerships within the state of Florida.

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.