Bluenose Shiner 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
Bluenose shiner
(*Pteronotropis welaka*)
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 bluenose shiner (*Pteronotropis welaka*) was sought from September 17 to November 1, 2010. A Biological Review Group (BRG) met on November 18, 2010. Group members were Noel Burkhead (US Geological Survey -USGS), William Tate (US Fish and Wildlife Service), and Theodore Hoehn (FWC) (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 bluenose shiner 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 bluenose shiner met a listing criterion. FWC staff recommends that the bluenose shiner be listed 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.

BIOLOGICAL INFORMATION

Taxonomic Classification – This biological status report is for the bluenose shiner, *Pteronotropis welaka*, in Florida. Evermann and Kendall (1898).

Life History References – Albanse et al. (2007), Bass & Hoehn (Manuscript), Bass et.al. (2004), Fletcher (1993), Gilbert (1992), Johnson and Knight (1999), Osprey Data International, Inc. (2001).

Geographic Range and Distribution – The bluenose shiner, *Pteronotropis welaka*, is found in southern Coastal Plain streams from Florida to Louisiana. It is very fragmented in occurrence throughout its range (Albanse et al., 2007). In Florida there are two disjunct distributions, the St. Johns River basin and the western panhandle (Figure 1), with no known occurrences between the St. Johns and the Apalachicola rivers (Gilbert, 1992). The first specimens were collected from the St. Johns River, near Welaka, in 1897 by William C. Kendall (Bass and Hoehn, 2010).

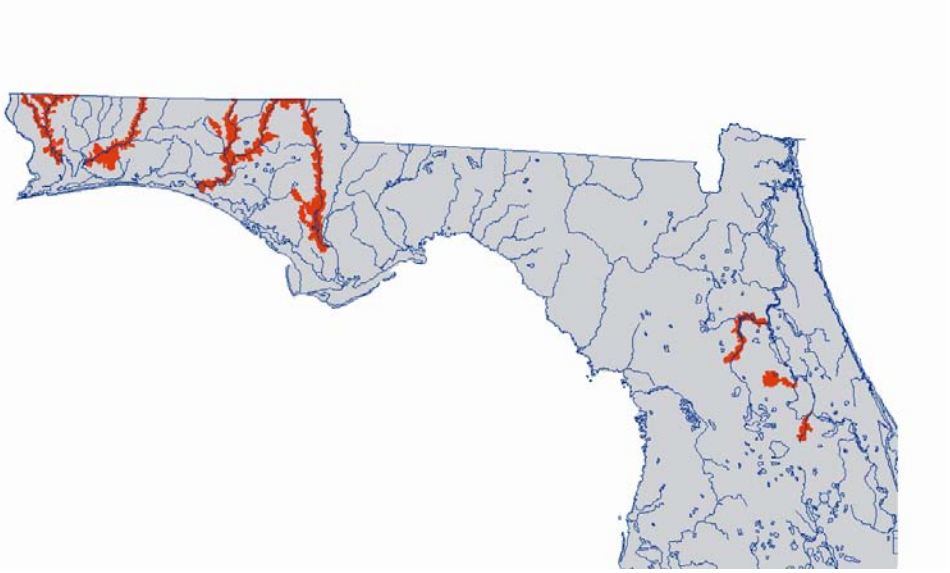

Figure 1. Distribution and Range for the bluenose shiner, *Pteronotropis welaka* (source: Bass and Hoehn, 2010).

Population Status and Trend – The bluenose shiner has undergone a precipitous decline in the St. Johns River Drainage since the 1970s. None were found there in the 2004 statewide Imperiled Species Survey Project (Bass et al., 2004), and none were collected in a recent intensive survey of Alexander Springs using multiple sampling techniques (Steve Walsh, USGS, personal communication). Bluenose shiners were collected from 21 sites in northwestern Florida in the Imperiled Species Survey Project (Bass et al., 2004). Drainages harboring bluenose shiners included the Escambia, Choctawhatchee, and Yellow rivers. Bluenose shiners were not found during this survey effort at some sites that were known to previously contain them.

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

BIOLOGICAL STATUS ASSESSMENT

Threats - The disjunct population centers and the isolated areas where the bluenose shiner have been collected make the species vulnerable to local extinction (Albanse et al., 2007). Many of the sub-watersheds inhabited by bluenose shiners do not meet water quality standards as determined by the Florida Department of Environmental Protection (DEP) (Hoehn, 1998). The DEP impaired waters data from 1998-2007 indicate that several of the sub-watersheds have elevated nutrients.

The "Florida 2060" research project prepared for 1000 Friends of Florida presents a scenario of development in many of the watersheds and sub-watersheds that contain bluenose shiners (Zwick and Carr, 2006). While some of the sub-watersheds are in conservation lands, those in the Wekiva River, Yellow River, Shoal River and Escambia River basins are expected to increase in development pressures over the next 10-50 years (Zwick and Carr, 2006). Changes from light to moderate agriculture to residential development may result in increased nutrients and turbidity, changes to other water quality parameters, habitat loss, and increased consumptive use of water (Hoehn, 1998).

The panhandle sub-watersheds face an increasing threat due to the possible development of water supply reservoirs beyond 2025. Preliminary work has identified several sites for these reservoirs in Okaloosa County (NWFWMD, 2008). There have also been discussions over the past 15 years of constructing a dam on the Yellow River near Crestview, Florida.

The non-native island apple snail (*Pomacea insularum*) is a biological threat that has the potential to affect native aquatic vegetation associated with the bluenose shiner. Grazing of native aquatic vegetation by the island apple snail may lead to replacement by non-native aquatic plant species which may not be used by the bluenose shiner. The island apple snail has been documented by FWC staff and the U.S. Geological Survey to be moving toward the western panhandle (http://nas.er.usgs.gov/queries/CollectionInfo.aspx?SpeciesID=2599&State=FL). However, it has not yet been reported west of the Apalachicola River drainage.

Population Assessment – Findings from the BRG are included in Biological Status Review Information Findings tables.

LISTING RECOMMENDATION

Staff recommends that the bluenose shiner be listed as a Threatened species because the species meets criteria for listing as described in 68A-27.001, F.A.C.

SUMMARY OF THE INDEPENDENT REVIEW

Comments were received from 4 reviewers, Dr. Mary Freeman (USGS-Patuxent Wildlife Research Center), Dr. Brett Albanese (Georgia Department of Natural Resources), Dr. Bernard Kuhadja (University of Alabama), and Mr. Gray Bass (FWC-retired). One reviewer commented that bluenose shiners may be more numerous in numbers and sites occupied than believed. No data, however, were provided that would change the BRG's findings. Another reviewer requested that all collection sites be provided on the map, along with the individual locations (HUCs) that were considered by the BRG. The scale of the map, does not allow presentation of these details; the 13 combined HUC's identified by the BRG, however, are generally the individual river systems of the species' known occurrence. Another reviewer identified the island apple snail as a potential threat, and reference to this threat was added to the report. Appropriate editorial changes recommended by the reviewers were made to the report as well. All reviewers concurred with the staff recommendation that the species be listed as State Threatened. Peer reviews are available at MyFWC.com.

LITERATURE CITED

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Biological Status Review Information
Findings

Species/taxon: bluenose shiner
Date: 11/18/10
Assessors: Burkhead, Tate, Hoehn

Generation length: 10 year (1-2 years life expectancy)

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		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]	data not available		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]	data not available		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]	data not available		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				
(B)2. Area of occupancy < 2,000 km^2 (772 mi^2)	Based upon NHD (GIS-stream dataset) and HUC12 (watersheds) where species have been collected since 1980, ~2300 stream km (1423 stream miles) of **ALL** streams in HUC12s (excludes lower Choctawhatchee River). If you use a 0.4 km or .25 mile stream width assumption, then 920 stream km^2 or 355.75 stream mi^2. Not all of area is habitat for the species.	S	Y	Osprey 2001, Bass et al. 2004, Gilbert 1992, FWC Data
AND at least 2 of the following:				
a. Severely fragmented or exist in ≤ 10 locations	occurs in 24 HUC12 units (13 HUC12 "combined units")	O	N	Osprey 2001, Bass et al. 2004, Gilbert 1992, FWC 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	variation in number of specimens collected over the past 25 years, change in extent of occurrence - St. Johns pop. has not been seen in 15 years	O	Y	Osprey 2001, Bass et al 2004, Gilbert 1992
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	number of mature individuals may be associated with climate (high water periods)	O	Y	FWC data unpublished (John Knight)
(C) Population Size and Trend				
Population size estimate to number fewer than 10,000 mature individuals AND EITHER	no data to substantiate estimates	S	N	
(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				
(C)2. A continuing decline, observed, projected, or inferred in numbers of mature individuals AND at least one of the following:				
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 data to substantiate estimates	O	N	Osprey 2001, Bass et al 2004, Gilbert 1992, FWC Data
(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	greater area of occupancy and greater than 5 locations (occurs in 24 HUC12 units (13 HUC12 "combined units")	O	N	Osprey 2001, Bass et al 2004, Gilbert 1992, FWC Data
(E) Quantitative Analyses				
(E)1. Showing the probability of extinction in the wild is at least 10% within 100 years			N	

Initial Finding (Meets at least one of the criteria OR Does not meet any of the criteria)	Reason (which criteria/sub-criteria are met)
Yes	B2 b & c
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 OR Does not meet any of the criteria)	Reason (which criteria/sub-criteria are met)
Yes	B2 b & c

1	Species/taxon:	bluenose shiner
2	Biological Status Review Information Regional Assessment Date:	11/18/10
3	Assessors:	Burkhead, Tate, Hoehn
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.	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 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
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

Additional information –

The BRG found there was insufficient information to determine if there has been or will be a population size reduction (Criterion A) or if Criterion C (Population Size and Trend) was met, and there had been no specific population viability analysis developed (Criterion E). The BRG agreed Criterion B.2. was met with an estimated area of occupancy of 920 stream km^2 or 355.75 stream mi^2, based on a combination of the National Hydrographic Dataset (NHD) (GIS dataset of stream lines and waterbodies) and Hydrologic Unit Code (HUC)12 (watersheds), where the species has been collected since 1980. There are 24 HUC12 units where the species has been collected. Combining contiguous units results in 13 HUC12 units or locations, which exceeds Criterion B.2.a. The BRG concluded Criterion B.2.b. was met as a result of a change in extent of occurrence based on the variation in number of specimens collected over the past 25 years and the fact that the St. Johns population has not been observed in 15 years. The BRG believed that Criterion B.2.c. was met because the number of mature individuals may be associated with climate (high water periods) based upon collection records.

The BRG discussed that the St. Johns population may be unique, but has not been observed in many years. Additional sampling needs to be conducted in the St. Johns River. We also discussed the sampling that has occurred in the past 30 years and the trends that have been observed in both number of specimens and locations (Criterion B.2.b. and c.). We discussed that the "locations" (Criterion B.2.) were probably the individual HUC12 units since the fish do not move extended distances. There are 24 HUC12 units where the species has been collected. However, combining contiguous HUC12 units results in 13 "units" or locations (Criterion B.2.a.). John Knight indicated that he had collected hundreds on Holmes Creek this spring (2010) after a good high water period (Criterion B.2.c.). We also discussed that the St. Johns population had shown a long decline over the past 30 years. We discussed that the area of occupancy was going to be an over estimate since the species will not occupy all the streams that are included in the "clip" of the NHD stream segments. Further, the species would not occupy the entire estimated stream length due to specific habitat requirements.

APPENDIX 1. **Brief biographies of the members of the Bluenose shiner Biological Review Group.**

Noel Burkhead has a B.S. from Roanoke College and an M.S. in zoology from the University of Tennessee. He is the Endangered Species Committee Chairman for the American Fisheries Society and has served decades as a Research Fishery Biologist for the US Fish and Wildlife Service and more recently for the US Geological Survey. Noel has an extensive publication record and is presently describing four new species of darters endemic to Georgia and Tennessee. His recent work has focused on assessing distribution and relative abundance of imperiled and endangered fishes in southern watersheds as a means of estimating extinction rates and determining their causes for many imperiled southern fishes. His expertise has resulted in his work with the International Union for the Conservation of Nature and Natural Resources, World Wildlife Fund, NatureServe, Center for Biological Diversity, and the Nature Conservancy.

Theodore Hoehn is a current employee of the Fish and Wildlife Conservation Commission with long experience in mapping the distribution of Florida fishes. He initiated the Florida's Aquatic Species and Habitat Conservation Planning (Aquatic GAP) Project. His distribution maps were derived from collections by the Commission, other agencies, and academic institutions throughout the country. His freshwater fish distribution data are the most comprehensive in the state. He has also long been involved with ecological and environmental issues, especially those related to the state's major river, the Apalachicola. Ted received his Masters in Biology (Marine emphasis) from Florida State University in 1983.

William (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.

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

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