Supplemental Information for the Blackmouth Shiner

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. Mary Freeman

To: Imperiled
Cc: Hoehn, Ted; Mary Freeman
Subject: review of BSR reports
Date: Monday, January 31, 2011 10:53:24 AM
Attachments: Blackmouth Shiner Final Draft BSR 12-8-2010_freeman.doc
ATT00001.htm
Bluenose Shiner Final Draft BSR 12-9-10_freeman.docx
ATT00002.htm

Dr. Haubold,

Per your request, I have reviewed the draft Biological Status Reviews for the Blackmouth Shiner and the Bluenose shiner, in the context of the FWC rules for listing species as "Threatened". My assessments for the reviews of each of these two species are detailed below. I am also returning the review documents with comments added as "track changes", to indicate a few instances where I believe clarification of intended meanings may be warranted.

I appreciate this opportunity to comment.

Best regards,

Mary Freeman, PhD
U.S. Geological Survey
Patuxent Wildlife Research Center
University of Georgia
Athens, GA 30602

Review comments: Blackmouth Shiner Final Draft BSR 12-8-2010

The Biological Status Review recommends that the blackmouth shiner, Notropis melanostomus, be listed as a State-designated Threatened species in Florida, citing criteria “B2ac”. Based on the evidence presented, the blackmouth shiner clearly meets criterion B2a (<2000 km2 and <10 locations occupied), where “locations” are counted as number of 12-digit hydrologic unit (HUC12) subwatersheds occupied, which is 5 or 6 in FL. Including all streams within the occupied subwatersheds (HUC12s) and assigning an estimated width of 0.4 km (likely an over-estimate of actual habitat area available to the species), occupied area is much less than 2000 km2. The Biological Review Group cites unpublished data from Bortone (1993) and Bass (2004) as evidence of “extreme fluctuations” in numbers of mature individuals (criterion B2c). High population variability is common in short-lived species, including most species of *Notropis*, and contributes to higher risk of local extirpation. Local extirpation of species that occupy a limited number of sites increases the probability of species extinction. Based on the evidence presented, which does not to my knowledge contradict any other information available for *Notropis melanostomus*, the recommendation of listing as a state-designated Threatened species appears valid and justified.

Biological Status Review
for the
Blackmouth shiner
Notropis melanostomus

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 blackmouth shiner (*Notropis melanostomus*) was sought from September 17 to November 1, 2010. The members of the blackmouth shiner biological review group (BRG) met on November 18, 2010. Group members were Noel Burkhead (USGS), William Tate (USFWS), and Theodore Hoehn (FWC Lead). In accordance with rule 68A-27.0012 Florida Administrative Code (F.A.C.), the blackmouth shiner BRG was charged with evaluating the biological status of the blackmouth shiner 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.htm to view the listing process rule and the criteria found in the definitions.

The BRG found that the blackmouth shiner met criterion B2ac. FWC staff recommends that the blackmouth shiner be listed as a state-designated Threatened species.

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

BIOLOGICAL INFORMATION

Taxonomic Classification – This biological status report is for the blackmouth shiner, *Notropis melanostomus*, in Florida Bortone (1989).

Life History References – Bass and Hoehn (Manuscript), Bass et al., (2004), Bortone (1989), Bortone (1993), Gilbert (1992), O'Connell et al., (2005), Suttkus and Bailey (1990)

Geographic Range and Distribution – The blackmouth shiner has been collected in isolated locales of the Blackwater River (and its tributary: Pond Creek), the Yellow, and Shoal Rivers in Florida; Bay Minnette Creek in Alabama; and the Lower Black Creek, Chickasawhay, and Pascagoula Rivers in Mississippi (Bass et al., 2004; Bortone 1993; O'Connell et al., 1998; O'Connell et al., 2005; Suttkus and Bailey, 1990). The Imperiled Fishes Survey Project collected the blackmouth shiner in 21 locations in only two major Florida river drainages (Bass et al., 2004).

Population Status and Trend – The Florida population of these rare fishes is unknown, as sites are discontinuous and isolated. Several new sites were discovered during the Imperiled Fishes Survey Project (Bass et al., 2004). In Florida, the population trend appears to be stable currently, but in-state site losses will probably occur. Bortone (1993) estimated that typical

Comment [mcf1]: "fishes" usually refers to more than one species. I'm not sure what this sentence conveys. That is, what is unknown about the "Florida population" – spatial extent, temporal trends in abundance, number of sites occupied?

schools ranged from 50 - 4,800 individuals with the average school of ~666 for the 23 populations that were observed during his study.

Quantitative Analyses – There are no quantitative analyses for blackmouth shiners.

BIOLOGICAL STATUS ASSESSMENT

Threats – The blackmouth shiner is highly vulnerable due to its short life span and the ephemeral nature of its habitat. In Florida encroachment of urbanization is a concern for some populations. The restricted number of locales (six locations) where the blackmouth shiner has been collected make the species vulnerable to local extinction (Bass et al., 2004). Many of the sub-watersheds that contained blackmouth shiners have had some impairment of water quality designated use criteria (Hoehn 1998). The Florida Department of Environmental Protection impaired waters data from 1998-2007 indicate that several of the sub-watersheds have elevated nutrients. The Pond Creek drainage and Shoal River drainage are being impacted by the rapid urbanization of Northwest Florida. Some of the Florida range is in publically-held conservation lands, but most of the range is in developable areas.

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 blackmouth shiners. While some of the sub-watersheds are contained in existing conservation lands, those in the Yellow River, Shoal River and Blackwater River basins are expected to increase in development pressures over the next 10-50 years (Zwick & Carr, 2006). Changes from light to moderate agriculture to residential development may result in increased nutrients, 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 "offline surface water supply reservoirs" beyond 2025. Preliminary work has identified several sites in Okaloosa County (NWFWMD, 2008). There have also been discussions over the past 15 years to construct a dam on the Yellow River near Crestview, Florida. The construction of the dam would eliminate many of the areas that the blackmouth shiner has occurred in the past.

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

LISTING RECOMMENDATION – Staff recommends listing the blackmouth shiner as a Threatened species because the species met criteria for listing as described in 68A-27.001(3) F.A.C.

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

Comment [mcf2]: The IUCN uses the term population to mean "total number of individuals of a taxon". If the term "Florida population" (1st sentence of this paragraph) means "total number of individuals of this species in FL" (which would answer my query about what that sentence intends), then I strongly suggest not using the word "population" here.

Comment [mcf3]: Given this statement, it's not clear to me what the statement "In Florida, the population trend appears to be stable" (previous paragraph) is based on.

LITERATURE CITED

Bass, G. and T. Hoehn (2010, unpublished manuscript). Florida Imperiled Fish Species, Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida. 356 p.

Bass, G., T. Hoehn, J. Couch, K. McDonald. 2004. Florida Imperiled Fish Species Investigations. Florida Fish and Wildlife Conservation Commission, Tallahassee. 59 p.

Bortone, S. A. 1989 *Notropis melanostomus*, a new species of cyprinid fish from the Blackwater-Yellow River drainage of northwest Florida. Copeia 1989(3):737-741.

Bortone, S. A.1993. Life history, habitat assessment, and systematics of blackmouth shiner (Notropis sp.) Blackwater River drainage, Fla. Game and Fish Commission, Non-game Wildlife Program, Final Report. Tallahassee, Florida. 40 p.

Gilbert, C. R. 1992. Blackmouth Shiner, *Notropis melanostomus*. Pages 58-62 in, Gilbert, C. R. (ed.). Rare and endangered biota of Florida. Volume II. Fishes. University Press of Florida, Gainesville, Florida.

Hoehn, T. 1998. Rare and imperiled fish species of Florida: a watershed perspective. Florida Game and Fresh Water Fish Commission, Tallahassee, Florida. 60 p.

Northwest Florida Water Management District. 2008. 2008 Water Supply Assessment Update. Water Resources Assessment 08-02. Havana, Fl. 138 p.

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O'Connell, M. T., A. M. Uzee O'Connell, and J. D. William. 2005. Assessment of rarity of the blackmouth shiner *Notropis melanostomus* (Cyprinidae) based upon museum and recent survey data. Southeastern Naturalist 4(2):247-260.

Suttkus, R. D. and R. M. Bailey. 1990. Characters, relationships, distribution, and biology of *Notropis melanostomus*, a recently named cyprinid fish from southeastern United States. Occasional Papers of the Museum of Zoology, The University of Michigan 722:1–15.

Zwick, P. D. and M. H. Carr. 2006. Florida 2060, a population distribution scenario for the State of Florida. Prepared for the 1000 Friends of Florida by the Geoplan Center, University of Florida, Gainesville, Florida. 29 p.

Peer review #2 from Dr. Brett Albanese

From: Brett Albanese
To: Imperiled
Subject: Re: Blackmouth shiner Draft BSR Report
Date: Tuesday, December 21, 2010 11:22:38 AM

I concur with the decision to list the blackmouth shiner as a threatened species in Florida. Small range, habitat specialization, and short life span make this species vulnerable to extirpation.

The members of the BRB used HUC 12 watersheds to define the number of occupied locations in evaluating the IUCN criteria. I believe that this is appropriate, as the number of sample locations (n=21 as reported in the range description) is likely to include several sites within the same population. Although it is possible for demographic exchange between HUC 12s, these watershed are likely to each face their own set of threats and exhibit similar population dynamics. Thus, I think the number of occupied watersheds is an appropriate criterion for estimating the extinction risk.

Please let me know if you have any questions,

Brett Albanese, Ph.D.
Georgia Department of Natural Resources
Nongame Conservation Section
Wildlife Resources Conservation Center
2065 U.S. Highway 278 SE
Social Circle, GA 30025-4743

Peer review #3 from Dr. Gray Bass

From: Gray Bass [mailto:graybass43@live.com]
Sent: Monday, January 31, 2011 11:27 AM
To: Hoehn, Ted
Subject: Bluenose, Saltmarsh and Blackmouth reviews

Well, Ted, I ought'a be whipped with a three-day-old-dead eel. But, here, belatedly, are the reiviews for the Bluenose shiner, Saltmarsh topminnow, and Blackmouth shiner. (The Lake Eustis pupfish review has been sent to both Bill Johnson and yourself.) Actually, the review documents were attached to the original e-mails. However, the documents themselves were off-screen on my computer. The bureaucratic stuff took up all the normal attachment space. After you mentioned they were there, I found I could get to them by "scrolling right". At any rate, I used the versions you sent recently, except for the L. E. pupfish file.

Be good,

Gray

January 2010
Blackmouth shiner review (by Gray Bass)
To: Ted Hoehn (FWC)
Ted:

(1) I agree with your conclusions and recommendations regarding the Blackmouth shiner. It should be a Threatened species.

(2) Comments: This is an easy species to collect, and we should now have a good idea of its distribution within Florida. However, it is now known from locations outside Florida of which we were not aware in past years. Throughout its entire range it may not be as imperiled as it is in Florida.

Sincerely,

Gray

Peer review #4 from Dr. Bernard Kuhajda

From: Bernard Kuhajda
To: Imperiled
Subject: Review of Biological Staus Reviews for FWC
Date: Wednesday, February 02, 2011 3:49:17 PM
Attachments: Review of BSR Saltmarsh Topminnow F. jenkinsi.doc
Review of BSR Blackmouth Shiner N. melanostomus.doc
Review of BSR Bluenose Shiner P. welaka.doc

Attached please find reviews of Biological Staus Reviews for FWC for three species, Fundulus jenkinsi, Notroois melanostomus, and Pteronotropis welaka. Let me know if you have any questions.
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Bernard Kuhajda
Collections Manager
Department of Biological Sciences
Box 870345
University of Alabama
Tuscaloosa, AL 35487-0345

This is an independent review by Bernard Kuhajda of the draft Biological Status Review for the Blackmouth Shiner (*Notyropis melanostomus*) by Noel Burkhead, William Tate, and Theodore Hoehn. This review is at the request of the Florida Fish and Wildlife Conservation Commission.

The biological review group (BRG) for the Blackmouth Shiner concluded the species met criteria B2ac and Florida Fish and Wildlife Conservation Commission staff recommended that the species be listed as a state-designated Threatened species.

The appropriate literature has been cited and the threats to the species have been addressed. I agree with the BRG that the species meets criteria B2ac (if there in fact 10 or less locations, see below) and should be considered as a state-designated Threatened species.

The BRG needs to do a better job of explaining what they consider the number of locations for the Blackmouth Shiner (6) compared to the number of locations given in the Geographic Range and Distribution section (21). I assume the BRG considered several localities as one location, but this is not clear from the text or the map. The BRG needs to show all collection sites on the map and also indicate areas that are considered a “single” location to be used in listing criteria.

Copy of the Blackmouth shiner BSR draft report that was sent out for peer review

Biological Status Review for the Blackmouth shiner *Notropis melanostomus*

EXECUTIVE SUMMARY

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LITERATURE CITED

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Biological Status Review Information
Findings

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

Generation length: 10 years used in analysis (1-2 years life expectancy)

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 true population values		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 true population values		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 true population values		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 true population values		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 using all known occurrences, HUC12 (watersheds) and NHD (GIS stream dataset) stream length with assumption of 2.5 mile width (192 km^2)	E	Y	Bortone (1993), Gilbert (1992), Bass et al., (2004)
AND at least 2 of the following:				
a. Severely fragmented or exist in ≤ 10 locations	Locations based upon the HUC12s (watersheds) and observed collections- estimate 5- 6 locations	O	Y	Bortone (1989), Bortone (1993), Gilbert (1992), Bass et al., (2004)
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			N	
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	extreme fluctuations in number of mature individuals	O/I	Y	Bortone. (1989), Bortone (1993), Gilbert (1992), Bass et al., (2004)
(C) Population Size and Trend				
Population size estimate to number fewer than 10,000 mature individuals AND EITHER	too much variability in populations/schools to provide good estimate (even with Bortone 1993 estimates, standard deviation is high and exceeds 10,000)	E	N	Bortone (1993)
(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	too much variability in populations/schools to provide good estimate (even with Bortone (1993) estimates, standard deviation is high and exceeds 10,000)	E	N	Bortone (1993)
(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	while concern over possible development in core population area (Pond Creek/Milton), the species has persisted through both natural and development activities - estimate 6 locations	I/O	N	
(E) Quantitative Analyses				
(E)1. Showing the probability of extinction in the wild is at least 10% within 100 years			N	

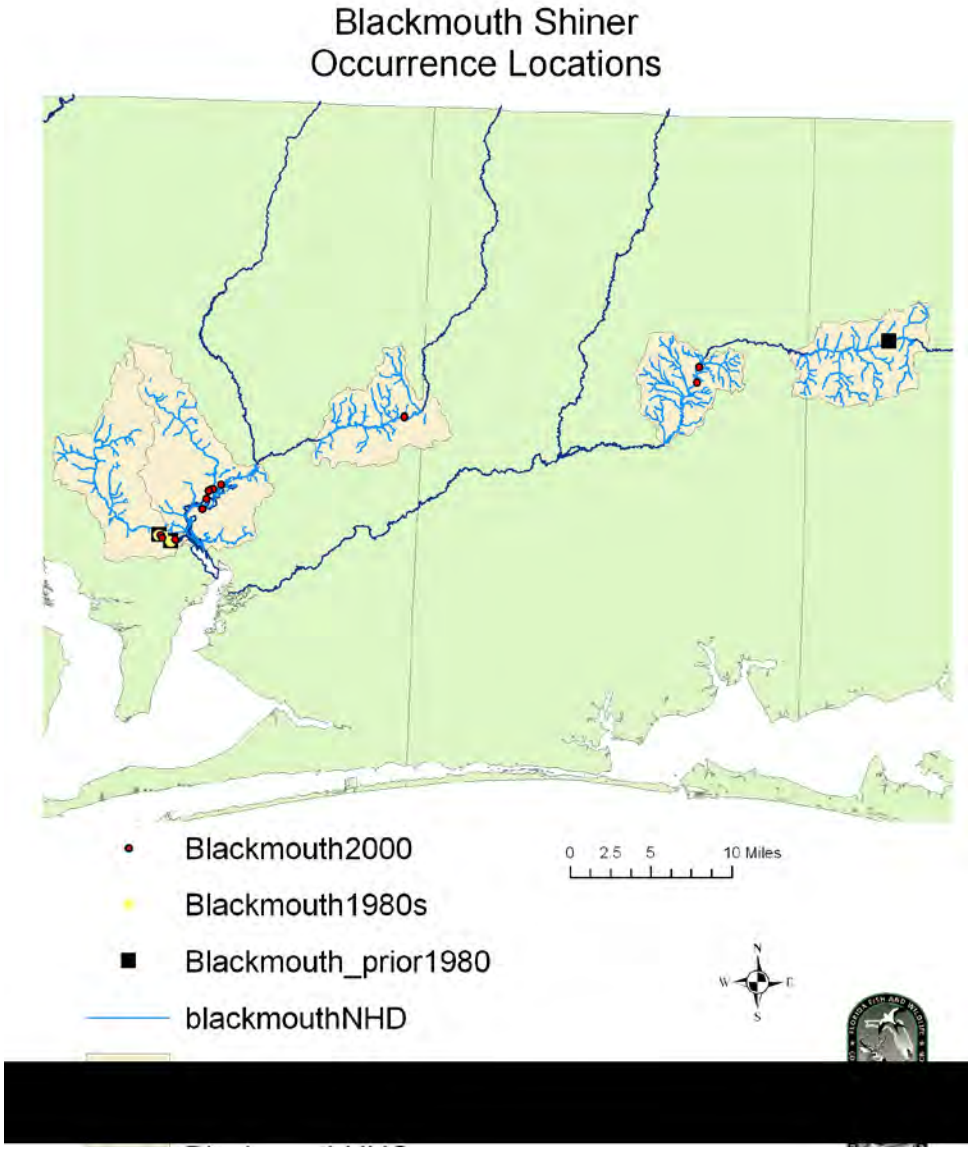
Initial Finding (Meets at least one of the criteria OR Does not meet any of the criteria)	Reason (which criteria are met)
Meets at least one of the criteria	meets B2ac
Is species/taxon endemic to Florida? (Y/N)	N
If Yes, your initial finding is your final finding. Copy the initial finding and reason 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)
Meets at least one of the criteria	meets B2ac

1	Species/taxon:	blackmouth shiner
2	Biological Status Review Information Regional Assessment	Date: 11/18/10
3		Assessors: Burkhead, Tate, Hoehn
4		
5		
6		
7		
8	Initial finding	Y
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 discussed the listing criteria and determined that there was insufficient information to determine exact population size reduction (Criterion A), population size and trends (Criterion C), and there had been no specific population viability analysis developed (Criterion E). The group discussed the geographic range (Criterion B) and its sub-criteria under this category. The BRG agreed that the location information met Criterion B2 based on a combination of the National Hydrographic Dataset (NHD) [GIS dataset of stream lines and waterbodies] and Hydrologic Unit Code (HUC)12s [watersheds] where species have been collected since 2000 with an estimated area of occupancy of 147.26 stream km² or 59.99 stream mi². The BRG found that Criterion B2a was met due to the limited extent of collections and known locations. Criterion B2c was found to have been met since the species appeared to have a highly variable population as documented in Bortone (1993), Bass et al., (2004), and recent FWC data. The BRG discussed Criterion D and while it appeared that D2 was met, the BRG felt that it was likely that there would be increased development in core population area, the species has persisted through both natural and development activities in the area around Milton. However, a re-assessment of this criterion may need to be made within 5-10 years. The BRG concluded from the biological assessment that the blackmouth shiner met the criteria for listing.

The Biological Review Group (BRG) discussed the Bortone estimates of abundance (Criterion C and D). Given the extreme variance in school populations, we did not believe that we could use the estimates of 666 individuals with a standard deviation of 1,033 per school. We discussed the area of occupancy (Criterion B) based upon NHD and HUC12 where species have been collected, ~480 stream km (298.26 stream miles) of ALL streams in HUC12s. If you exclude the HUC 12 on the Shoal River that has a historic record but no collections since 1980's, then 368.15 stream km (239.94 stream miles) of ALL streams that are in HUC12s. We agreed to use an assumption of a 0.4 km or .25 mile stream width. Then, for ALL streams in HUC12s that have collections, there are 192 stream km² or 74.57 stream mi². If you exclude the streams in the HUC 12 on the Shoal River, then there are 147.26 stream km² or 59.99 stream mi². We discussed that the species preferred habitat was backwaters and that the area of occupancy was an overestimate of occurrence. We did discuss that the mainstem of the Blackwater River might have additional schools if habitat was available. However, the over-estimate of stream length likely captured this area of the Blackwater River. We agreed that based upon the five HUC12s and NHD that Criterion B2a was met. If we included the contiguous HUC12 on the Blackwater River, then there are 6 locations. We also discussed that the species appeared to have a highly variable population as documented in Bortone (1993), Bass et al., (2004), and other FWC data (Criterion B2c). We discussed that the main threats would likely be from development in the Milton Area. We remain concerned that if changes occurred, there could be changes in the population. However, if our timeframe is over the next 10 years, we did not believe that these threats would eliminate the core population around Milton (Criterion D2). We concluded that the blackmouth shiner met Criterion B2ac.


Blackmouth Shiner
Occurrence Locations
Blackmouth2000
Blackmouth1980s
Blackmouth_prior1980
blackmouthNHD
0 2.5 5 10 Miles
N
W
E
S

APPENDIX 1. **Biographies of the members of the Blackmouth Shiner Biological Review Group.**

Noel Burkhead (USGS)

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.

Ted Hoehn (FWC/HCSS, Lead-shiners, saltmarsh topminnow)

Ted 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.

Bill Tate (USFWS)

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 additional public information was received during the public solicitation period.

APPENDIX 3. Information and comments received from independent reviewers.

To be added after the peer review.