Black Creek Crayfish Biological Status Review Report

March 31, 2011

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

Biological Status Review
for the
Black Creek Crayfish
(*Procambarus pictus*)
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 Black Creek crayfish (*Procambarus pictus*) 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 David Cook (FWC lead), Paul Moler (independent consultant), and Richard Franz (University of Florida/Florida Museum of Natural History, Emeritus) (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 Black Creek crayfish 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 Black Creek crayfish met at least one listing criterion. Based on the BRG findings, literature review and information received from the public and independent reviewers, staff recommends that the Black Creek crayfish 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

Life History References Franz and Franz 1979, Brody 1990, Franz 1994.

Taxonomic Classification The current scientific name for the Black Creek crayfish is *Procambarus* (*Ortmannicus*) *pictus* Hobbs, with no recognized subspecies. Hobbs 1942, 1958.

Population Status and Trend Franz and Franz 1979, Brody 1990, Franz and Franz 1990, Franz 1994, Franz et al. 2008.

Geographic Range and Distribution This species is endemic to Florida and is known from headwater streams in Clay, Duval, Putnam, and St. Johns counties. Burgess and Franz 1978, Franz and Franz 1979, Franz 1994, Franz et al. 2008, P. Moler pers. comm.

Quantitative Analyses We are not aware of a population viability analysis that has been done for the Black Creek crayfish.

BIOLOGICAL STATUS ASSESSMENT

Threats – This species is restricted to higher-quality headwater streams (Franz and Franz 1979). Potential threats include pollution, change in water temperature, siltation, damming, and other changes in water and habitat quality (Franz and Franz 1979, Brody 1990, Franz and Franz 1990, Florida Natural Areas Inventory 2001). Populations on public lands (Camp Blanding and Jennings State Forest) may receive some protection, but those localities on private lands may be threatened with expanding urbanization, mining, and silviculture (Brody 1990, Franz and Franz 1990, Florida Natural Areas Inventory 2001). Franz et al. (2008) reported specimens with a fungal disease, but the potential impact of this is unknown.

Population Assessment – The BRG concluded that the Black Creek crayfish met listing Criterion B (Geographic Range), based on the species' small extent of occurrence and area of occupancy, its distribution among 10-12 threat-prone "locations," and observed and projected continuing decline in area of occupancy and quality of habitat. Determining the number of locations depends on how finely one divides the Black Creek drainage, which has several tributaries that may or may not constitute separate locations. Because the number of locations is close to the "$\leq$ 10 locations" specified in this criterion, the BRG is exercising precautionary principles by considering that this criterion is met. This assessment is specifically written as B1+2a,b(ii,iii). Specific findings from the BRG, including justification and pertinent references, are included in the Biological Status Review Information Findings tables, following.

LISTING RECOMMENDATION

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

SUMMARY OF INDEPENDENT REVIEW

Comments were received from two reviewers: Dr. Keith Crandall (Brigham Young University) and Dr. Dale Jackson (Florida Natural Areas Inventory). Appropriate editorial changes recommended by the reviewers were made to the report. Both reviewers concurred with the staff recommendation to include the Black Creek crayfish as a Threatened species. Peer reviews are available at MyFWC.com.

LITERATURE CITED

Brody, R.W. 1990. Status of habitat and populations of *Procambarus pictus* in the North Fork of Black Creek, Clay County, Florida. St. Johns River Water Management District, Palatka, Florida.

Burgess, G.H. and R. Franz. 1978. Zoogeography of the aquatic fauna of the St. Johns River system with comments on adjacent peninsular faunas. The American Midland Naturalist 100: 160-170.

Florida Natural Areas Inventory. 2001. Black Creek crayfish, *Procambarus pictus*. Field guide to the rare animals of Florida. Florida Natural Areas Inventory, Tallahassee, Florida.

Franz, R. 1994. Rare: Black Creek crayfish. Pp. 211-214 in Deyrup, M. and R. Franz (eds.). Rare and endangered biota of Florida. Volume IV. Invertebrates. University Press of Florida.

Franz, R. and L.M. Franz. 1979. Distribution, habitat preference and status of populations of the Black Creek crayfish, *Procambarus* (*Ortmannicus*) *pictus* (Decapoda: Cambaridae). Florida Scientist 42: 13-17.

Franz, R. and S.E. Franz. 1990. A review of the Florida crayfish fauna, with comments on nomenclature, distribution, and conservation. Florida Scientist 53: 286-296.

Franz, R., H. Smith, and A. Hallman. 2008. Survey for Black Creek crayfish (*Procambarus pictus*) at Jennings State Forest and Camp Blanding Joint Training Center, Clay and Duval counties, Florida. Florida Fish and Wildlife Conservation Commission final report, June 2008.

FWC staff. 2010. Created from http://en.wikipedia.org/wiki/List_of_counties_in_Florida and http://dlis.dos.state.fl.us/library/flcollection/landWater.cfm

Hobbs, H.H., Jr. 1942. The crayfishes of Florida. University of Florida Biological Science Series 3: 179 pp + 24 plates.

Hobbs, H.H., Jr. 1958. The evolutionary history of the *pictus* group of the crayfish genus *Procambarus*. Quarterly Journal of the Florida Academy of Sciences 21: 71-91.

Biological Status Review Information
Findings

Species/taxon: Black Creek crayfish *Procambarus pictus*
Date: 11/18/10
Assessors: David Cook, Paul Moler, Richard Franz

Generation length: Estimated 16 months; default time frame 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]	No data for 50% decline		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 data for 30% decline		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 data for 30% decline		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 data for 30% decline		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	Maximum EOO estimated < 1700 mi^2	E	Y	Franz and Franz 1979, Franz and Franz 1990, Franz 1994, P. Moler pers comm, FWC staff 2010
(b)2. Area of occupancy < 2,000 km^2 (772 mi^2)	Unknown, but restricted to streams, so estimated < 772 mi^2	E	Y	Franz and Franz 1979, Franz and Franz 1990, Franz 1994, P. Moler pers comm
AND at least 2 of the following:				

a. Severely fragmented or exist in ≤ 10 locations	Estimated 10-12 locations (4-6 in Black Creek drainages, plus Peters Creek, Governors Creek, Rice/Etoniah Creek, Durbin Creek, Julington Creek, Holly Oaks Creek); BRG is exercising precautionary principles by considering that this criterion is met	I	Y	Franz et al. 2008, P. Moler pers comm.
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	Projected continuing development of Clay County and portions of Duval County is expected to result in decline in area of occupancy (ii) and quality of habitat (iii)	O, P	Y	Brody 1990, Franz and Franz 1990, Florida Natural Areas Inventory 2001
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 documented			
(C) Population Size and Trend				
Population size estimate to number fewer than 10,000 mature individuals AND EITHER	Total population estimated > 10,000	E	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	Total population estimated > 10,000	E	N	
(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 has not been calculated and might be < 20 km^2; however, the number of locations is estimated to be 10-12 and it is unlikely that most or all could be extirpated by proposed threats over the specified 1-2 generations (2-3 years), so there are no conclusive data to confirm that the criterion is met	I	N	
(E) Quantitative Analyses				
e1. Showing the probability of extinction in the wild is at least 10% within 100 years	No extinction probability model done		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)
Meets at least one of the criteria	B1+2a,b(ii,iii)
Is species/taxon endemic to Florida? (Y/N)	Y
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)	Reason (which criteria/sub-criteria are met)
Meets at least one of the criteria	B1+2a,b(ii,iii)

Appendix 1. Brief biographies of the Black Creek crayfish Biological Review Group members.

David Cook received his B.S. in Biology from Brown University and his M.S. in Zoology from the University of Florida. He has worked for 24 years as a nongame biologist with GFC/FWC, with primary emphasis on reptiles, amphibians, and invertebrates. He currently serves as the Invertebrate Taxa Coordinator in the FWC's Species Conservation Planning Section, and has drafted management plans on the flatwoods salamander, Panama City crayfish, and Miami blue butterfly.

Richard Franz received his M.S. at the University of Montana. He is an Emeritus, Associate Scientist in Ecosystem Conservation with the Florida Museum of Natural History and an Emeritus, Affiliate Associate Scientist in Wildlife Ecology and Conservation at the University of Florida. He has been studying the ecology and systematics of Florida crayfish for more than forty years. He has conducted field studies and surveys on both the Black Creek and Santa Fe cave crayfish, and published scientific papers on both of these species.

Paul Moler received his B.A. in Biology from Emory University and his M.S. in Zoology from the University of Florida. He worked for 29 years as a research biologist with GFC/FWC, with primary emphasis on reptiles and amphibians. He retired in 2006. Over the last 10 years, he has increasingly focused on research and conservation of Florida's freshwater crayfish and is currently completing a Commission funded genetic assessment of the cave crayfishes of Florida.

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.

Two items were submitted by the public. One, from Mr. Allan Hallman, FWC biologist on Camp Blanding, was the suggestion submitted on September 13, 2010 to review a Black Creek crayfish survey report from 2008 on which he was a coauthor. Mr. Hallman later submitted a copy of the report, which was included and cited (Franz et al. 2008) in the BSR assessment.

The other item was a Google Earth data point for the Black Creek crayfish submitted on October 11, 2010 by Mr. Richard Cantrell of Entrix, Inc. This information was provided to the BRG for its review.