

Supplemental Information for the Georgia Blind Salamander 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 John Jensen

From: John Jensen

To: Imperiled

Subject: Georgia Blind Salamander Independent Review

Date: Wednesday, December 29, 2010 11:48:38 AM

To Whom it May Concern:

I have reviewed the BSR for the Georgia Blind Salamander and concur that the species is deserving of listing as Threatened based on the criteria used and the species' data provided. However, I found the following statement misleading on one particular issue: "The species meets this criterion due to its limited area of occupancy, severe fragmentation, and continuing decline due to projected decreases in water quality and increased ground water use to support a growing human population in Florida and Georgia." The term "severe fragmentation" should not apply to populations of this species. There is no evidence presented here to indicate that the phreatic waters in which this species occurs has been or is in danger of being fragmented, and in fact, many of these cave systems likely share the same water source (aquifer) for the pools formed within. Thus, as was indicated in the Alligator Snapping Turtle BSR, a rescue effect could reasonable occur if a catastrophic event happened at one or more cave systems. Criterion B2(a) states "Severly fragmented or exist in < 10 locations." The data/information block addresses only the latter part of this statement, providing no information to suggest the former part of the statement is founded. The end result is the same and thus listing is deserved, but I encourage you not to use the term "severely fragmented" when indicating justifications for their listing.

Sincerely,

John Jensen
Georgia DNR
Nongame Conservation Section
116 Rum Creek Drive
Forsyth, GA 31029, USA

Peer review #2 from Mark Ludlow

From: Ludlow, Mark

To: Imperiled

Cc: Hawthorne, Chris; Kaufmann, Greg

Subject: Gerogia Blind Salamander

Date: Monday, January 24, 2011 11:10:57 AM

As requested, I have reviewed the FWC Biological Status Review paper for the Georgia Blind Salamander.

I agree with the assessment that the species should be classified as Threatened by FWC.

From 1993 to 2003, I served at the Biologist for Florida Caverns State Park in a full-time capacity. As far as I know, this park has the only cave in Florida in state ownership which has this species. During that period of time I visited "Salamander Pond Cave" numerous times and only documented this species present on 5 occasions. Several researchers have visited this cave with me to see and photograph this animal, and we have failed to find it.

Since the region in which the Georgia Blind Salamander occurs is characterized by karst terrain, consider the animal quite vulnerable to the impacts of herbicides, pesticides, septic tanks and petroleum contamination of groundwater. In this porous limestone landscape, contaminants can be "directly injected" via underground conduits into the groundwater without the natural filtration and decontamination functions typically afforded by layers of topsoil and clay above the Floridan aquifer horizon.

For many years, wells in Jackson County have had special filters on them to deal with existing ethyl dibromide contamination of the groundwater from local agriculture.

There are several publications in the literature which document the vulnerability of aquatic cave animals to groundwater pollution. Examples would be:

Streever W.J. 1995 *Brimleyana* 22:61-65

Elliot, W. R. 2005 17th Annual Cave and Karst Management Symposium

Weaver, D. H. 1992. *The Wilderness Underground*. University of Missouri Press.

Due to the very small geographic range of the Georgia Blind Salamander, and its vulnerability to mass mortality which could result from groundwater contamination, I feel the Threatened classification of this species is fully justified.

Please let me know if I can provide any additional information.

Mark Ludlow

Biological Scientist

Torrey State Park

Florida Caverns State Park

Peer review #3 from Richard Franz

From: Richard Franz

To: Imperiled

Subject: Georgia blind salamander

Date: Tuesday, February 01, 2011 8:42:17 PM

For the most part, I agree with all of the information presented in the document. I strongly believe that a Threatened status is appropriate for this species. The part that needs some additional comment relates to the distribution of the salamander and possible speciation that might have occurred over its range from Flint River (SW Georgia), Chipola River and Choctawhatchee River. We know cave species based on what has been observed from the vantage of karst windows into the aquifer, i.e. sinks, caves and spring caves. We do not know or understand barriers to dispersal between karst windows and drainage basins. Hence we do not know how many isolation populations occur within this 772 sq km area depicted as the range of the species. I suspect that the actual distribution is much smaller if one considers that the species may not be universally distributed throughout that projected area.

Peer review #4 from David Lee

From Dave Lee, Jan 2011

The Biological Status Review for the Georgia Blind Salamander is well done and I only have a few comments.

I think the overall range of the species described as less than 772 sq miles, while correct, maybe somewhat misleading. It seems unlikely that an aquifer that could support subterranean aquatic species underlies this entire area. In fact, it likely is a fraction of this total area, and the existing populations may be quite disjunct. Furthermore, there is nothing to suggest that the species is distributed throughout the existing aquifers of the region, or that it would be distributed uniformly within them. Perhaps there is information on the hydrogeology of the region of which I am unaware.

I refer you to a publication of Franz and Lee (1982; cited below). In that paper we suggest that the various cave crayfish of Florida are distributed around, and are dependent on, isolated island like subterranean sites. These sites allow for nutrient flow into the system and support the crayfish in the immediate vicinity of the specific sites. Cave diving confirmed this as the number of individuals declined sharply as one moves further from the nutrient input source. The same is likely true for the salamanders and in the few extensive cave systems I have been in (Jackson Co) this seems to be the case. I bring this up only because I suspect it is important to protect and manage these input sites (sink holes and cave entrances). The nutrient input is from leaves, etc. washing and falling into caves, and guano contributions from roosting bats. The bat colonies in caves inhabited by the salamanders should be protected, monitored, and if necessary managed for a variety of reasons, one of them being the aquatic ecology of the cave. With the current and rapid spread of white-nosed syndrome in cave dwelling bats this could become a major conservation concern for the salamanders. This includes keeping people, including researchers, out of caves as the fungus is easily spread from cave to cave by mud on boots, etc.

Here are three references for which you might not be aware. The first one has no bearing on conservation *per se*, but could influence the timing of surveys. The 2005 article is a popular one but has some ecological information that may be of interest. I have some rough counts of numbers of individuals in various pools in the 1960's (some repeated counts over a 5- 7 year period), if it would help I could re do these surveys.

Lee, D. S. 1969. Possible circadian rhythm in the cave salamander *Haideotriton wallacei* Carr. Bull. Maryland Herpetological Society 5(3):85-88.

Franz, R. L. and D. S. Lee. 1982. Distribution and evolution of Florida's troglobitic crayfishes. Bulletin Florida State Museum 28 (1-4):53-78.

Lee, D. S. 2005. Salamander from Hell. Reptiles 13(12): 30-39.

Peer review #5 from Dr. Bruce Means

From: D. Bruce Means [mailto:means@bio.fsu.edu]
Sent: Tuesday, January 25, 2011 2:30 PM
To: Turner, Bill
Subject: RE: Biol Status Rev of Pine Barrens Treefrog

Dear Bill,

Attached please find my review of the Status Review for the Georgia Blind Salamander (which ought to be called the Florida Blind Salamander!). There was nothing I felt I could add and the committee that put this together covered all the pertinent literature that exists.

Best regards,

--Bruce
D. Bruce Means, Ph. D.
President and Executive Director
Coastal Plains Institute and Land Conservancy
1313 Milton Street, Tallahassee, FL 32303

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22 January 2011

Bill.Turner@MyFWC.com

Biological Status Review of the

Georgia Blind Salamander, *Eurycea wallacei*

Dear Bill,

I have reviewed the Biological Status Review of the Georgia Blind Salamander. The Status Review Group did a good job in extracting the scanty literature on the species and I have no additional comments to make. I also agree with the conclusion to list the species as Threatened, on the basis of declining access points (cave openings to the air) on private properties and threats to the integrity of the waters of the Floridin Aquifer.

Very sincerely yours,

A handwritten signature in black ink, reading "D. Bruce Means". The signature is written in a cursive style with a large, stylized "D" and "M".

**Biological Status Review
for the
Georgia Blind Salamander
(*Eurycea wallacei*)**

EXECUTIVE SUMMARY

The Florida Fish and Wildlife Conservation Commission (FWC) directed staff to evaluate all species listed as Endangered, Threatened or Species of Special Concern as of September 1, 2010. Public information on the status of the Florida population of the Georgia blind salamander was sought from September 17 through November 1, 2010. A five-member biological review group (BRG) met on November 9-10, 2010. Group members were Bill Turner (FWC lead), Ryan Means (Coastal Plains Institute), Kelly Jones (Virginia Tech.), John Himes (FWC), and Paul Moler (independent consultant). Biographies of group members are presented in 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 Georgia blind salamander using criteria included in definitions in 68A-27.001(3) and following 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/imperiledSpp_listingprocess.htm to view the listing process rule and the criteria found in the definitions. The BRG concluded from the biological assessment that the Georgia blind salamander met criteria for listing as Threatened. Based on the BRG findings, literature review, and information received from independent reviewers, staff recommends listing this species as a Threatened species.

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

BIOLOGICAL INFORMATION

We provide a brief biological information section to provide the basics about this species.

Taxonomy – The Georgia blind salamander was originally described as *Haideotriton wallacei*, by Carr (1939). *Haideotriton* was recently placed into synonymy with *Eurycea* in order to render the latter genus monophyletic (Frost et al. 2006).

Geographic Range and Distribution – The Georgia blind salamander occurs in subterranean waters associated with the 1) Dougherty Plain at one site in Decatur County and two sites in Dougherty County, Georgia; 2) Chipola River system at 22 sites in Jackson County and one site in Calhoun County, Florida; and 3) Holmes Creek (Choctawhatchee River) system at five sites in Washington County, Florida (Hammerson 2004; Florida Natural Areas Inventory

unpubl. data). Because it is so difficult to access and sample these habitats, it is probable that this species remains undocumented from additional sites within these areas.

Life History and Habitat Requirements – The Georgia blind salamander is confined to the clear, oligotrophic, cool waters of underground streams and pools in caves and sinkholes, where it typically lives in perpetual darkness and does not voluntarily come to the surface. Substrate is typically limestone, often covered by clay or silt (Means 1992, 2005). Smaller individuals tend to be found in shallower water than are larger individuals (Means 1992). In conjunction with its highly specialized habitat and lifestyle, this species retains its aquatic larval body form throughout life, which includes gills. As typical of aquatic cave vertebrates, eyes are vestigial, and body pigmentation is greatly reduced (Valentine 1964; Brandon 1971). Adults are 51-76 mm in total length (Petranka 1998), but are otherwise similar in appearance to juveniles (Brandon 1971).

Gravid females of the Georgia blind salamander have been found in May and November, suggesting that breeding is not seasonal, but the reproductive biology of this species is otherwise incompletely known (Means 1992). Prey consists of small aquatic invertebrates, especially crustaceans such as ostracods and amphipods (Lee 1969). Although observations are lacking, likely predators include cave crayfishes, eels, bullheads, and chubs (Means 1992). In addition, this species may be parasitized by nematodes in its digestive tract (Lee 1969). Other aspects of this species' life history and behavior are largely unknown due to the difficulty of accessing its habitat and observing wild individuals.

BIOLOGICAL STATUS ASSESSMENT

THREATS

The specialized habitat and life history of the Georgia blind salamander make it vulnerable to water pollution, changes in water levels, and collection by people (in the few sites that are easily accessible). Sources of water pollution include septic tank effluent, fertilizers, pesticides, hazardous wastes, surface runoff from impervious surfaces, waste from cattle ranches and dairy farms, and siltation and erosion caused by divers and recreationalists in caves, springs, sinkholes, and in the vicinity of blind salamander sites (Brandt and Jackson 2003). Decreases in water levels occur from pumping groundwater from wells (e.g., for providing water for irrigation or drinking), whereas increases in water levels occur from stream impoundment (Means 1992). Nonetheless, sightings of salamanders in caves flooded for decades by Merritt's Mill Pond (Marianna, Jackson Co.) still occur. The potential for most known sites to be affected by one or more of these threats is relatively high, particularly given that most are on private lands that receive limited management or protection (Morris 2006).

STATEWIDE POPULATION ASSESSMENT

Data on the Georgia blind salamander were evaluated relative to each of the five criteria for state listing under Rule 68A-27.001(3), F.A.C. There are two steps in assessing the status of a regional population: (1) use FWC criteria for a preliminary categorization and (2) investigate whether conspecific populations outside the region may affect the risk of extinction within the region.

LISTING RECOMMENDATION

The Georgia Blind Salamander is currently listed by the FWC as a species of special concern. This status review finds that the Georgia blind salamander meets criterion B (Geographic Range). The species meets this criterion due to its limited area of occupancy, severe fragmentation, and continuing decline due to projected decreases in water quality and increased ground water use to support a growing human population in Florida and Georgia. Staff recommend that the Georgia blind salamander be listed as a Threatened species because the species met a criterion for listing as described in 68A-27.001(3), F. A.C.

DRAFT

SUMMARY OF THE INDEPENDENT REVIEW

DRAFT

LITERATURE CITED

- Brandon, R. A. 1971. North American troglobitic salamanders: some aspects of modification in cave habitats, with special reference to *Gyrinophilus palleucus*. Nat. Speleol. Soc. Bull. 33:1-21.
- Brandt, K., and D. R. Jackson. 2003. Protecting the habitat of the Florida cave salamander in Jackson County's spring caves. Final Report to Florida Dept. Environmental Protection, Research Grant Agreement. Tallahassee, FL, 18 pp.
- Carr, A., Jr. 1939. *Haideotriton wallacei*, a new subterranean salamander from Georgia. Occasional Papers of the Boston Society of Natural History 8: 333-336.
- Cox, J. A., and R. S. Kautz. 2000. Habitat conservation needs of rare and imperiled wildlife in Florida. Florida Fish and Wildlife Conservation Commission, Tallahassee. Dubois, A. 2005. Amphibia Mundi. 1.1. An ergotaxonomy of recent amphibians. Alytes 23:1-24.
- Frost, D. R., T. Grant, J. Faivovich, R. H. Bain, A. Haas, C. F. B. Haddad, R. O. De Sa, A. Channing, M. Wilkinson, S. C. Donnellan, C. J. Raxworthy, J. A. Campbell, B. L. Blotto, P. Moler, R. C. Drewes, R. A. Nussbaum, J. D. Lynch, D. M. Green, and W. C. Wheeler. 2006. The amphibian tree of life. Bull. Amer. Mus. Nat. Hist., No. 297:1-370.
- Hammerson, G. 2004. *Eurycea wallacei*. In: IUCN 2010. IUCN Red List of Threatened Species. Version 2010.3. <www.iucnredlist.org>. Downloaded on 19 October 2010.
- Lee, D. S. 1969. A food study of the salamander *Haideotriton wallacei* Carr. Herpetologica 25:175-177.
- Means, D. B. 1992. Georgia Blind Salamander, *Haideotriton wallacei* Carr. Pages 49-53 in P. E. Moler, editor: Rare and endangered biota of Florida. Volume III. Amphibians and reptiles. University Press of Florida, Gainesville, FL.
- Means, D. B. 2005. *Haideotriton wallacei* Carr, 1939, Georgia Blind Salamander. Pages 779-780 in M. Lannoo, editor: Amphibian declines. University of California Press, Berkeley, CA.
- Morris, T. L. 2006. A biological inventory of aquifer caves in Florida with special emphasis on troglobitic crustaceans and salamanders. Final Report to Florida Dept. Environmental Regulation, Research Grant Agreement S0057, Tallahassee, FL, 47 pp.
- Petranka, J. W. 1998. Salamanders of the United States and Canada. Smithsonian Inst. Press, Washington, D.C., 587pp.
- Valentine, B. D. 1964. The external morphology of the plethodontid salamander, *Haideotriton*. J. Ohio Herpetol. Soc. 4:99-102.

Biological Status Review Information Findings

Species/taxon: Georgia Blind Salamander

Date: 11/10/2010

Assessors: John Himes, Kelly Jones, Ryan Means

Paul Moler, Bill Turner

Generation length: Unknown, used 10 years for three generations

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 declines indicated	S	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 declines indicated	S	N	No declines indicated
(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	Declining water quality and an increase in the nutrients in the Floridan aquifer system as well as increased drawdown threaten blind salamander populations, but there is no quantifiable salamander decline.	I	N	R Means pers. commun.
(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	Declining water quality and an increase in the nutrients in the Floridan aquifer system as well as increased draw down threaten blind salamander populations, but there is no quantifiable salamander decline.	I	N	R Means pers. commun.
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	Does not exceed 2151 mi ² (total area of 3 counties = a maximum estimate of range)	E	Y	

(b)2. Area of occupancy < 2,000 km ² (772 mi ²)	Area of occupancy is unknown but is probably less than 772 mi ² based on estimated cave habitat of all three areas where the salamanders occur in FL.	I	Y	Used estimated habitat from GIS. Data layer was 2003 FWC landcover data. Beth Stys pers. commun. 2010.
AND at least 2 of the following:				
a. Severely fragmented or exist in ≤ 10 locations	Known to occur in 22 caves in Jackson County, FL, but several are probably connected and would be threatened by the same events, so we estimate that there are 10 or fewer locations.	I	Y	Cox and Kautz 2000
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	Projections for decline are based on water quality trends and increased need for water to support population growth (iii)	S	Y (iii)	R. Means pers. commun.
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	Not indicated in literature	I	N	
(C) Population Size and Trend				
Population size estimated to number fewer than 10,000 mature individuals AND EITHER	Impossible to estimate -no basis to make determination			
(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 declines indicated	I	N	
(c)2. A continuing decline, observed, projected, or inferred in numbers of mature individuals AND at least one of the following:	No declines indicated	I	N	
a. Population structure in the form of EITHER	No data - because of anecdotal information it seems likely that there are more than 1000 individuals at least one subpopulation.	S	N	
(i) No subpopulation estimated to contain more than 1000 mature individuals; OR				
(ii) All mature individuals are in one subpopulation		I	N	
b. Extreme fluctuations in number of mature individuals	No data	S	N	
(D) Population Very Small or Restricted, EITHER				

(d)1. Population estimated to number fewer than 1,000 mature individuals; OR	No data but unlikely	S	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	We estimated using an area of 2 mi ² around the mouths of the caves, but due to the complexity (many have numerous branches) of the caves, total area is probably greater than 8 mi ² ; Group agreed that there are < 10 locations based on connectivity, but probably not < 5 locations	I	N	using GIS data Beth Stys pers. commun. 2010
(E) Quantitative Analyses				
e1. Showing the probability of extinction in the wild is at least 10% within 100 years	No PVA available			
Initial Finding (Meets at least one of the criteria OR Does not meet any of the criteria)	Reason (which criteria are met)			
Meets one criterion	B1+2ab(iii)			
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)	Meets one criterion			

Regional Assessment

1	<p align="center">Biological Status Review Information</p> <p align="center">Regional Assessment</p>	Species/taxon:	Georgia blind salamander
2		Date:	11/10/10
3		Assessors:	John Himes, Kelly Jones, Ryan Means
4			Paul Moler, Bill Turner
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.		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 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

APPENDIX 1. Biological Status Review Group Biographies

Dr. John H. Himes received his Ph.D. from the University of Southern Mississippi, M.S. from Louisiana State Medical Center, and B.S. from the University of Mississippi. He is currently a regional biologist for FWC. He has published many papers on southeastern herpetofauna.

Kelly Jones received his M.S. in Biology from Ball State University. He is currently the project manager for the Virginia Tech team working with red-cockaded Woodpeckers, Florida bog frogs, reticulated flatwoods salamanders, and gopher tortoises on Eglin Air Force Base. He has short notes in press on distribution and natural history of native and exotic herpetofaunal species in the Florida panhandle.

Ryan C. Means received both his M.S. in Wildlife Ecology and Conservation (2001) and his B.S. degree in Zoology (1996) from the University of Florida. He is a wildlife ecologist with the Coastal Plains Institute in Tallahassee, FL. His research interests focus on ecology and conservation of ephemeral wetlands and associated amphibian fauna in the southeastern Coastal Plain. Ryan has many other interests, including wilderness exploration, archaeology, paleontology, and anything related to being in the outdoors.

Paul E. Moler received his M.S. in Zoology from the University of Florida in 1970 and his B.A. in Biology from Emory University in 1967. He retired in 2006 after working for 29 years as a herpetologist with FWC, including serving as administrator of the Reptile and Amphibian Subsection of the Wildlife Research Section. He has conducted research on the systematics, ecology, reproduction, genetics, and conservation biology of a variety of herpetofaunal species in Florida, with primary emphasis on the biology and management of endangered and threatened species. He served as Chair for the Florida Committee on Rare and Endangered Plants and Animals in 1992–94, Chair of the Committee on Amphibians and Reptiles since 1986, and editor of the 1992 volume on amphibians and reptiles. Paul has >90 publications on amphibians and reptiles.

William M. Turner received his B.S. from Erskine College and M.S. in Biology from the University of South Alabama. From 2003 to 2007, he was the Herpetological Coordinator for the Wyoming Game and Fish Department. In Wyoming, he conducted statewide surveys for amphibians and reptiles, focusing on emerging amphibian diseases and the impacts of resources development on native reptiles. Since 2007, he has been the Herp Taxa Coordinator for FWC in the Division of Habitat and Species Conservation. He has conducted research on native amphibians and reptiles in Florida, Alabama, and Wyoming that has resulted in several published papers and reports.

APPENDIX 2. Summary of public comments that were received 17 September–3 November 2010 regarding the proposed reclassification of the Georgia blind salamander.

No comments were received.

DRAFT

APPENDIX 3. Information and comments received from independent reviewers.

Will be added after review.

DRAFT