Alligator Snapping Turtle 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
Alligator Snapping Turtle
(*Macrochelys temminckii*)
March 31, 2011

EXECUTIVE SUMMARY

The Florida Fish and Wildlife Conservation Commission (FWC) directed staff to evaluate 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 alligator snapping turtle was sought from September 17 through November 1, 2010. The 5-member biological review group (BRG) met on November 9-10, 2010. Group members were Bill Turner (FWC lead), Chris Lechowicz (Sanibel-Captiva Conservation Foundation), Peter Meylan (Eckerd College), Paul Moler (independent consultant) and Travis Thomas (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 alligator snapping turtle using criteria included in definitions in 68A-27.001, F.A.C., 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/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 alligator snapping turtle met criterion B2ab(iii); citing severe fragmentation of the population as part of the criterion. This is described in the guidelines for listing as "*a taxon can be considered to be severely fragmented if most (>50%) of its total area of occupancy is in habitat patches that are (1) smaller than would be required to support a viable population, and (2) separated from other habitat patches by a large distance.*" After the review was conducted, staff further evaluated the concept of "severely fragmented" and believes that it does not apply to the alligator snapping turtle. When conducting the Regional Assessment, the BRG discussed that should there be a catastrophic event in Florida that eliminated populations of alligator snapping turtles, there could be a rescue effect from turtles outside Florida. In these situations, the listing guidelines consider downgrading the initial listing finding to a less imperiled status. Taking into consideration both of these factors, staff recommends not listing the alligator snapping turtle as Threatened and to remove it from the Species of Special Concern list.

This work was supported by a Conserve Wildlife Tag grant from the Wildlife Foundation of Florida. FWC staff gratefully acknowledges the assistance of the biological review group

members and peer reviewers. Staff thanks Dr. Dale Jackson for serving as a data compiler on the species and drafting the Biological Information section of this report.

BIOLOGICAL INFORMATION

Taxonomic Classification – The alligator snapping turtle (*Macrochelys temminckii*) (Harlan 1835) is universally recognized as a full species with no close living relatives (Ewert et al. 2006).

Life History and Habitat Requirements – Life history and habitat of the alligator snapping turtle have been summarized by Ewert et al. (2006), Pritchard (2006), and Ernst and Lovich (2009). In Florida, the species is restricted to rivers and associated permanent freshwater habitats. The latter include floodplain swamp forests characterized by tannic or turbid waters, bald cypress and tupelo, and numerous channels and deep holes (Ewert and Jackson 1994). The only lakes supporting the species are either impounded sections of large rivers (Lake Seminole: Apalachicola, Lake Talquin: Ochlockonee) or natural lakes with at least occasional connection to a river (e.g., Lake Iamonia, Leon County). Alligator snapping turtles also make use of surprisingly small streams, such as the seepage streams on Eglin Air Force Base. A few adults have been taken from brackish water habitats (e.g., Ochlockonee Bay, Franklin County), with some individuals even supporting barnacles, but movements into salt water are extremely rare (Ewert et al. 2006, Pritchard 2006). The alligator snapping turtle is by far the largest North American freshwater turtle. Although both sexes achieve large body size, the oft-pictured behemoths (up to 250 lbs, 29 inch carapace length [CL]) are all males, which grow considerably larger than females (maximum ca. 62 lbs, 22 inches CL) (Ewert et al. 2006, Pritchard 2006). Both sexes require at least 15, and probably 20 years to mature (Sloan et al. 1996, Tucker and Sloan 1997, Reed et al. 2002). Lifespan in the wild is unknown, but captives have lived in excess of 75 years (Snider and Bowler, 1992). Based on these data, a conservative estimate of average age of parents (generation time) is 30-40 years. Reed et al. (2002) estimated generation time at 49 years. All studies (e.g., Allen and Neill 1950, Dobie 1971, Ewert and Jackson 1994) indicate that females produce but one clutch per year, and some may occasionally skip years (Dobie 1971). The nesting season is correspondingly short, extending from late April to mid-May in Panhandle Florida (Ewert 1976, Ewert and Jackson 1994). Nests are constructed in sandy soils when available, normally within 20 m of water but sometimes as far as 200 m. Natural berms 2-3 m high are favored along the lower Apalachicola River, but these have been supplemented and in part replaced by man-made deposits of sandy dredged spoil, which tend to produce more female hatchlings as a consequence of temperature-dependent sex determination (Ewert and Jackson 1994, Ewert et al. 1994). Clutch sizes along the lower Apalachicola River, the best studied site, average ca. 36 eggs (range 17-52). Most eggs there hatch in the second half of August after 100-110 days of incubation, followed within a few weeks by hatchling emergence (Ewert and Jackson 1994). Although little studied in Florida, the diet of the alligator snapping turtle across its range is rather broad and chiefly carnivorous, although plant matter seems also to be important (Ewert et al. 2006). Juveniles feed predominantly upon small fish, but the diet broadens with age and growth. While fish remain important, crustaceans, mollusks (both bivalve and gastropod: Allen and Neill 1950), aquatic salamanders, water birds, mammals, and other turtles all become significant components.

Population Status and Trend – Based on past extent of harvest (Ewert et al. 2006, Pritchard 2006), there is little doubt that the alligator snapping turtle once was extremely numerous and accounted for substantial biomass throughout many Southeastern riverine systems, including those in Florida. Although rigorous data documenting the century or more of human take do not exist, there is equally little doubt that extensive harvest, both commercial and personal, depleted populations in many rivers. Typically, after periods of heavy effort, declining yields forced harvesters to move on to other sites (Pritchard 2006). This is not unexpected given the long generation time of alligator snapping turtles and the normally low rates of recruitment of virtually all turtles. Beginning in 1973, enactment of a series of protective rules by FWC (then the Florida Game and Fresh Water Fish Commission [GFC]) reduced the species' rate of decline in Florida, although harvest (legal and illegal) still occurred. FWC rule changes in 2009 prohibited take of all snapping turtles and ended legal harvest. Whether the statewide population has stabilized or begun to increase is undetermined, although some Florida rivers support healthy populations (Ewert et al. 2006).

Geographic Range and Distribution – The alligator snapping turtle occupies Gulf Coast drainages from Florida to Texas and northward to Illinois; in Florida, the species inhabits most, if not all, of the larger drainages in the Panhandle and Big Bend regions, from the Escambia River to the Suwannee River (Ewert et al. 2006, Pritchard 2006).

Quantitative Analyses – The principal attempt at modeling population demography of the alligator snapping turtle and evaluating population effects of changes in life history parameters is that of Reed et al. (2002). They concluded that an annual survival rate of 98% for adult females was necessary for population stability, that any lesser rate would lead to long-term population decline and eventual extirpation, and that even successful efforts to increase egg and juvenile survival would be unlikely to compensate for continued loss of adult females. While the model may have underestimated the rates of nest and/or juvenile survival in the wild, which might lead to an overestimate of necessary female survival rate (Ewert et al. 2006), the conclusion that long-term population viability requires very high rates of female survival is sound.

BIOLOGICAL STATUS ASSESSMENT

Threats – Not surprisingly given its size and catchability, the alligator snapping turtle has a long history of both commercial and personal harvest for meat throughout its range, including in Florida (Dobie 1971, Sloan and Lovich 1995, Reed et al. 2002, Ewert et al. 2006, Pritchard 2006). There is little doubt that this suppressed populations locally and regionally. Beginning in the 1970s, rules enacted by the GFC to limit take likely slowed the rate of mortality in Florida, though both legal and illegal harvest still occurred. Legal take of alligator snapping turtles was prohibited by rule changes enacted by FWC in 2009. However, it may be years or decades before the negative impacts of long-term harvest are fully reversed. Even in the absence of legal harvest, there remains a problem of bycatch mortality on lines set for fish, especially catfish. These include both trot lines (long lines of submerged baited hooks) and bush lines (single hooks suspended from tree branches) (Ewert et al. 2006, Pritchard 2006). The latter may be more widely used in rivers and hence likely present a greater problem for the alligator snapping turtle. Because rivers tend to be relatively stable and persistent systems compared to most Florida habitats, outright habitat destruction is not a major threat to this turtle. Nonetheless, various human-generated insults to the integrity of lotic systems, including their floodplains, can and do affect Florida's riverine turtles (Jackson 2005). Chemical pollution (from industries such as pulp mills, and waste products from cities and agricultural activities, including those in Alabama and Georgia) always poses a potential threat to all riverine fauna, though even a major spill along one Panhandle river would not endanger the species' statewide population (Ewert et al. 2006). Other than the industrially degraded Fenholloway River in Taylor County, which once may have supported the alligator snapping turtle but presumably no longer does (Jackson 1999), the Escambia River in western Florida is probably the most polluted (from pulp mill effluent) yet still retains the species (Moler 1996, Jackson 2005). Siltation from road crossings, borrow pits, or other situations probably can reduce the suitability of smaller streams, such as the clear seepage streams on Eglin Air Force Base, that the species utilizes. Although both major impoundments (by dams designed to provide electricity, flood protection, and recreation) within the alligator snapping turtle's Florida range (Lake Talquin: Ochlockonee River, Lake Seminole: Apalachicola River) still support the species, long-term impacts of microhabitat changes and shoreline development are unstudied but potentially negative (Ewert et al. 2006). A third impoundment has been proposed for the Yellow River but would require substantial review by regulatory agencies to be considered further. As for all turtles, predation, particularly by raccoons, accounts for the loss of a majority of alligator snapping turtle eggs (about 2/3 along the lower Apalachicola River). Additional potential predators include wild hogs and imported fire ants. Nest flooding following very heavy regional rains also destroys entire clutches in some years (Ewert and Jackson 1994).

Population Assessment – Findings from the BRG are included in the Biological Status Review Information Findings tables. The BRG concluded from the biological assessment that the alligator snapping turtle met criterion B2ab(iii); citing severe fragmentation of the population (B2a) as part of the criterion. When conducting the Regional Assessment, the BRG discussed that, should there be a catastrophic event in Florida that eliminated populations of alligator snapping turtles, there could be a rescue effect from turtles outside Florida. In these situations, the listing guidelines consider downgrading the initial listing finding to a less imperiled status.

After a careful review of the information with regards to sub-criterion B2ab, staff believes that the BRG misinterpreted guidance on fragmentation which led to a misapplication of the B2a sub-criterion. Staff believes the alligator snapping turtle is not severely fragmented under the definition used in the biological status review process.

The BRG and staff both referred to the Version 8.1 of the IUCN Guidelines for Using the IUCN Red List Categories and Criteria for guidance on fragmentation. Under the section entitled "4.8 Severely fragmented (Criterion B)," fragmentation is defined as "a situation in which increased extinction risks to the taxon result from the fact that most of its individuals are found in small relatively isolated subpopulations." Further guidance is given that, "a taxon can be considered to be severely fragmented if most (>50%) of its total area of occupancy is in habitat patches that are (1) smaller than would be required to support a viable population, and (2) separated from other habitat patches by a large distance." It is implied that the distance is large relative to the species' ability to cover the distance. The BRG considered alligator snapping turtles "severely fragmented" because alligator snapping turtles are not known to frequently move between the rivers where their populations occur, which considers the second part of the guidance. While this may be valid, the first part of the fragmentation guidance is not supported by current data. There is no indication that more than 50% of the alligator snapping turtles are in habitat patches smaller than would be required to support viable populations. If non-viable alligator snapping turtle populations were in habitat patches so far apart that the snappers could not move from one to another, then alligator snapping turtles would indeed be at risk of extinction. This is not the case. Within most rivers there seem to be viable populations of alligator snapping turtles. For this reason, staff does not consider alligator snapping turtle populations severely fragmented and believe the B2a sub-criterion is not met.

LISTING RECOMMENDATION

Staff recommends not listing the alligator snapping turtle as a Threatened species and to remove it from the Species of Special Concern list.

SUMMARY OF THE INDEPENDENT REVIEW

John Jensen (Georgia Department of Natural Resources), Kenneth P. Way (Florida State University) and Joseph Apodaca (Florida State University) reviewed this document. Although all three peer reviewers supported the findings of the BRG, one did not support the staff recommendation to not list the alligator snapping turtle as threatened. This reviewer expressed that the alligator snapping turtle populations in Florida were fragmented and doubted that alligator snapping turtles from outside of Florida could repopulate some Florida river systems.

One reviewer also pointed out that the Suwannee River clade of alligator snapping turtles is genetically distinctive from the other alligator snapping turtles in Florida and as such may warrant protection. This issue was discussed in the BRG. Although the Suwannee River clade is morphologically and genetically distinctive from other populations of alligator snapping turtles, the taxonomic status of this clade is uncertain. Until the taxonomy of the Suwannee River clade is determined, the turtles in this clade will be given the same considerations as other alligator snapping turtles in Florida. The reviewer recommended that the population receive further study.

A reviewer stated that there has been heavy harvest pressure on alligator snapping turtles, although the species has been protected by FWC rules since the 1970s. He also stated the species is easily harvested at high rates. This does not seem to be the case. Although alligator snapping turtles are caught on trot lines, they are not caught at a high rate compared to other turtles probably due to their low density in the habitat. Because of FWC rules, alligator snapping turtle harvest has not been commercialized in Florida.

Full text of the peer reviews is available at myFWC.com.

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Biological Status Review Information
Findings

Species/taxon: Alligator Snapping Turtle
Date: 11/10/10
Assessors: Chris Lechowicz, Peter Meylan, Paul Moler, Bill Turner and Travis Thomas
Generation length: 30-40 years (ca. 35 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]	Has been harvest throughout the past 90 years however due to historic harvest pressures and existing sampling data it is unlikely that there has been a 50% decline.	I	N	Ewert et al. 2006, Pritchard 2006
(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]	We suspect that there has not been a 30% decline although there was historic and continuing harvest.	S	N	Ewert et al. 2006, Pritchard 2006
(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]	Projections for sea level rise during the next 90 years may increase the salinity of the waterways which could result in habitat loss and reduction of the population, but group is uncertain that the reduction would be at least 30%.	S	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]	We suspect that there has not been a 30% decline although there was historic and continuing harvest and potential for additional decline due to projected sea level rise.	S	N	Ewert et al. 2006, Pritchard 2006
[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	46,000 km^2	E	N	D. Jackson GIS polygon
(b)2. Area of occupancy < 2,000 km^2 (772 mi^2)	440 km^2	E	Y	D. Jackson GIS polygons
AND at least 2 of the following:				

a. Severely fragmented or exist in ≤ 10 locations	Occupies 12 river drainages in FL - the group thought that the population is severely fragmented because the rivers isolated by drainage basin and reduced terrestrial mobility across drainage basins, but individual river basin populations are viable	I	Y	Ewert et al. 2006, FL Natural Areas Inventory (FNAI)
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 sea level rise during the next 90 years may increase the salinity of the waterways which could result in habitat loss and a corresponding decline. Future water quality decline and increased human demand for the water could also result in decline of the population.	I/S	Y	
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 unlikely in long-lived species; rivers relatively stable.	S	N	
(C) Population Size and Trend				
Population size estimate to number fewer than 10,000 mature individuals AND EITHER	The alligator snapping turtle has a very restricted area of occupancy, 12 drainages. Travis Thomas (BSR group member) estimates 6 turtles per km from his research. Using this values multiplied by length of the rivers gives an estimate of 3000 turtles for the Suwannee and Santa Fe Rivers (where Thomas is conducting research). Group suspects there are over 10,000 alligator snapping turtles in Florida	S	N	Moler 1996, Ewert et al. 2006 offer catch-per-unit-effort data, but no population numbers.
(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	Defer to Cc2.			
(c)2. A continuing decline, observed, projected, or inferred in numbers of mature individuals AND at least one of the following:	With strong enforcement of 2009 FWC rules prohibiting take, population likely to grow.	P	N	
a. Population structure in the form of EITHER (i) No subpopulation estimated to contain more than 1000 mature individuals; OR	No suitable quantitative population size data but likely >1000 in Apalachicola and Suwannee drainages.	S	N	Ewert et al. 2006
(ii) All mature individuals are in one subpopulation	No; occurs in at least 11 independent drainages.	I	N	Ewert et al. 2006, FL Natural Areas Inventory (FNAI)
b. Extreme fluctuations in number of mature individuals	No; extreme fluctuations unlikely in long-lived species; rivers provide relatively stable habitat.	S	N	Jackson 2005, Ewert et al. 2006
(D) Population Very Small or Restricted, EITHER				
(d)1. Population estimated to number fewer than 1,000 mature individuals; OR	Few quantitative data available, but Moler's trapping survey and Ewert/Jackson nesting study on Apalachicola River suggest >1000.	S	N	Moler 1996, Ewert et al. 2006, FL Natural Areas Inventory (FNAI)

(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	Both estimated area of occupancy (440 km2) and number of inhabited rivers (1@; each river is at least one location) exceed this.	S	N	Ewert et al. 2006, FL Natural Areas Inventory (FNAI), D. Jackson GIS polygons
(E) Quantitative Analyses				
e1. Showing the probability of extinction in the wild is at least 10% within 100 years	Uncertain; Reed et al. (2002) model assumptions questionable, but suggests possible with even moderate take.	P	N	Reed et al. 2002

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 one criterion	B2ab(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/sub-criteria OR Does not meet any of the criteria/sub-criteria)	Reason (which criteria/sub-criteria are met)
meets one criterion	B2ab(iii)

1	Species/taxon:	Alligator Snapping Turtle
2	Biological Status Review Information Regional Assessment Date:	11/10/10
3	Assessors:	Chris Lechowicz, Peter Meylan, Paul Moler,
4		Bill Turner and Travis Thomas
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.	Y
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.	N
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)	Downgrade
17	If 2b is NO or DO NOT KNOW - No change from initial finding	
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	

Additional notes. Calculation of generation time presented at the BSR group meeting

Generation length is defined as the average age of parents of the current cohort, which is greater than the age at first breeding and less than the age of the oldest breeding individual. We estimate generation length for the alligator snapping turtle as follows. Dobie (1971) estimated both sexes mature in LA in 11-13 years (no data for FL) but noted a two-thirds decline in growth rate by ages 16-35; this suggests slightly later maturation, probably closer to 15-20. Lifespan in the wild is unknown (Ewert et al. 2006), but individuals may live >75 years in captivity (Snider and Bowler, 1992). We therefore conservatively estimate average age of parents at 30-40 years and recognize that this is more likely to be an underestimate than overestimate. Reed et al. (2002) estimated a generation length of 49 years.

APPENDIX 1. Brief biographies of the Alligator snapping turtle Biological Review Group members.

Chris Lechowicz is the Interim Director of the Wildlife Habitat Management Program and staff herpetologist at the Sanibel-Captiva Conservation Foundation where he has worked since 2002. He has a B.S. in Zoology and Computer Science from Southern Illinois University at Carbondale and will complete his M.S. in Environmental Science from Florida Gulf Coast University in 2010. Chris's focus is on riverine turtles with a specialty on the Genus *Graptemys.* Chris is a member of the IUCN/SCC Tortoise and Freshwater Turtle Specialists Group as well as a board member of the Florida Turtle Conservation Trust.

Dr. Peter A. Meylan received his Ph.D. from the University of Florida. He is a Professor of Biology at Eckerd College in Saint Petersburg, FL. His research interests include the evolutionary history, ecology, and conservation biology of amphibians and reptiles, especially turtles. Current research includes 2 sea turtle projects: an investigation of the ecology and migrations of sea turtles of Bocas del Toro Province, Panama (funded by the Wildlife Conservation Society) and the Bermuda Turtle Project, which is a cooperative project with the Bermuda Aquarium and the Caribbean Conservation Corporation (as well as continuing to work with Florida freshwater turtles with the Eckerd Herpetology Club on the Rainbow River). He has many scientific articles on turtles and is the editor of a book on the biology and conservation of Florida turtles.

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 more than 90 publications on amphibians and reptiles.

Travis Thomas received a Bachelor's Degree in 2008 from the University of Florida in Natural Resources Conservation. He is currently pursuing a Masters Degree in Wildlife Ecology and Conversation under the supervision of Dr. Perran Ross. His primary research focuses on the ecology and management of fauna in riparian systems. He was hired by FWC in 2008, and he has worked on numerous projects concerning reptile and amphibian ecology. He worked for 3 years in the Herpetology Dept. under Dr. Kenneth Krysko at the Florida Museum of Natural History. He has spent time as a volunteer on numerous projects in Kenya, Africa, under the supervision of Leigh Ecclestone and the Kenyan Wildlife Service. He has published several notes on the ecology and distribution of reptiles and is currently a co-author on a study of the ecology of M. temminckii in O'Leno State Park as well as the primary author on a study of the morphology of M. temminckii.

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

A comment was received via email from Jeff Preacher, who is a recreational catfish fisherman in the Milton, FL area. He has captured alligator snapping turtles while fishing on the Blackwater, Yellow and Escambia Rivers using trot lines and bush hooks. He stated that alligator snapping turtles seemed as abundant now as 30 years ago. He claimed from observation of captive and wild turtles that alligator snapping turtles grow more quickly than most suppose. He felt that large ones 90+ lbs in weight were only in their 20s. His data are based on aging turtles with the annular rings on their scutes (scales on their dorsal shells). He felt that alligator snapping turtles were able to endure "man's encroachment" into their habitat because they often remained unseen. He stated that the main threat to alligator snapping turtles is commercialization and that the current turtle rules (no take of alligator snapping turtles) are too restrictive. He felt that the alligator snapping turtles could be harvested with a permit and stated that he would gladly participate in such a permitting system.