Herpetological Conservation and Biology 7(3):349−357.
Submitted: 21 February 2012; Accepted: 29 October 2012; Published 31 December 2012.

BOAT STRIKES: A THREAT TO THE SUWANNEE COOTER (*PSEUDEMYS CONCINNA SUWANNIENSIS*)

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***Abstract.*—Boat strikes are a significant threat to wildlife. Mortality can occur as a result of blunt-force trauma or from propeller injuries, whereas survivors may suffer scars, limb loss, compromised fitness, and decreased survivorship. Among turtles, boat strikes affect most marine and estuarine species, as well as a diversity of freshwater genera that includes emydids, kinosternids, and trionychids. We documented this threat to the Suwannee Cooter (*Pseudemys concinna suwanniensis*), a geographically restricted turtle of conservation concern that inhabits Florida rivers along the northeastern Gulf of Mexico. We compared three samples of Cooters representing 593 Florida individuals. Boats struck at least 10% of 164 individuals recovered in 2004 from a Levy County site where carcasses were dumped following illegal harvest. In contrast, only four (2.2%) of 180 museum specimens collected from 1928–2003 from throughout the Florida range of the river cooter (*P. concinna*) bore scars indicating encounters with boats, with the earliest from 1952. We compared these two samples of dead turtles to a sample of 249 predominantly live adult females studied previously (1988–1993) within the relatively protected waters of a state park in Wakulla County; 10 (4.0%) bore boat-related scars, probably from encounters with tour boats. We recommend increasing protected, boat-free zones, restricting boat speeds, use of propeller guards and electric motors, and increased education and law enforcement to address this threat.**

Key Words.—anthropogenic threats; conservation; freshwater turtles; injuries; riverine turtle protection

INTRODUCTION

Boat strikes have been documented as a significant threat to many populations of marine and freshwater animals. The impact on marine mammals is particularly well documented (Wells and Scott 1997; Laist et al. 2001; Lightsey et al. 2006; Calleson and Frohlich 2007). Marine turtles are also strongly impacted (Lutcavage et al. 1997; Meylan and Redlow 2006; Stewart and Johnson 2006); boat-related injuries accounted for 13.7% of 19,388 strandings recovered by the Florida Sea Turtle Stranding and Salvage Network from 1980–2002 (Meylan and Redlow 2006). The Florida Fish and Wildlife Conservation Commission (FFWCC 2002) noted boat-related injuries to 79 of 458 (17.2%) dead Leatherback Sea Turtles (*Dermochelys coriacea*; scientific name usage follows that used by the Turtle Taxonomy Working Group [2011] and Meylan [Ed.] [2006]) documented from 1992 to 2002. Mortality can occur as a result of blunt-force trauma from boat impact or from injuries caused by propellers. Animals that survive such insults may experience scars, loss of limbs, compromised fitness, and decreased survivorship.

Numerous studies have documented the threat from boat strikes to the Diamondback Terrapin (*Malaclemys terrapin*), a small estuarine emydid endemic to the Atlantic and Gulf coasts of the United States. Cecala et al. (2009) reported that injuries can reduce body condition in male terrapins and affect survivorship of both sexes. Baldwin et al. (2005) observed propeller damage in ca. 10% of *Malaclemys* along the Texas coast, whereas Roosenburg (1991) reported frequencies of 19.7% and 2.2% for adult female and male terrapins, respectively, in Maryland. Gibbons et al. (2001) likewise noted a higher incidence (1.5:1) of such injuries among female terrapins in South Carolina. The degree of this threat may be increasing in New Jersey, where incidence of injuries from boat motors in nesting female terrapins rose from 1–2% in the early 1970s to 12–17% in the 1990s (Burger and Garber 1995).

Other emydids, kinosternids, and trionychids are also impacted by boat strikes. Bulté et al. (2010) noted a 2–9 times higher incidence of boat-related injuries to female Northern Map Turtles (*Graptemys geographica*) than males or juvenile females in

FIGURE 1. Example of recent boat-related damage on a live male *Pseudemys concinna suwanniensis* at Rainbow Run, Marion County, Florida (initial capture: carapace length [notch to notch] 247 mm on 26 April 2008; recaptured with injuries on 19 September 2009; individual not evaluated in this study). (Photographed by George L. Heinrich).

FIGURE 2. Example of healed boat-related injury on a live female *Pseudemys concinna suwanniensis* at Rainbow Run, Marion County, Florida (captured on 8 July 2006; individual not evaluated in this study). (Photographed by Benjamin K. Atkinson).

FIGURE 3. Example of boat-related mortality of female *Pseudemys concinna suwanniensis* at Wacissa River, Jefferson County, Florida (found on 13 April 2000; maximum carapace length 357 mm, measured with main broken piece held in proper position; individual not evaluated in this study). (Photographed by Matthew J. Aresco).

Ontario, Canada. Bancroft and co-workers (1983) listed injuries from boat propellers as a cause of mortality for the two dominant emydids, the Florida Cooter (*Pseudemys floridana*) and Florida Red-bellied Cooter (*P. nelsoni*), in Lake Conway (Orange County, Florida). They reported that 46% of *P. floridana* deaths of determined cause originated from boat propeller injuries and that 21% of 819 living individuals examined had boat propeller scars. This threat even impacted the diminutive (< 10 cm carapace length; CL), bottom-dwelling Common Musk Turtle (*Sternotherus odoratus*); three of 12 deaths of determined cause resulted from boat propeller strikes, and 77 (2.3%) of 3,273 live individuals showed damage from boats (Bancroft et al. 1983). Those authors suspected that boat propellers were a major source of mortality for their study population. It is probable that most struck individuals died and were never recovered.

Galois and Ouellet (2007a, b) identified boat propellers as a threat to Eastern Spiny Softshell Turtles (*Apalone s. spinifera*) in the northern Lake Champlain basin of Quebec and Vermont. The authors reported five turtles with boat-related injuries, including one adult female found in June 1995 with a fresh laceration on the carapace; the same individual was found dead in August 1999 with new lacerations and fractures.

In this paper, we present evidence of the impacts of boat strikes on the Suwannee Cooter (*Pseudemys concinna suwanniensis*) in Florida, USA. Principally riverine, this herbivorous turtle occurs in Florida river systems draining into the northeastern Gulf of Mexico, from the Ochlockonee River in the Florida panhandle, southward in the western portion of the peninsula to the Alafia River at Tampa Bay (Jackson 2006); river cooters in the rest of the Florida panhandle west of the Ochlockonee River are assigned to *P. c. concinna*. This subspecies is the largest emydid turtle in North America and exhibits pronounced sexual dimorphism, with adult females reaching a maximum CL nearly 11 cm longer and body mass 6.6 kg heavier than adult males (Jackson and Walker 1997; Jackson 2006). The FFWCC currently lists *P. c. suwanniensis* as a Species of Special

Concern, with no take allowed. Proposed delisting mandates that a formal management plan be prepared by the agency (FFWCC. 2011. Threatened species management system - listing recommendations and criteria. Available from http://myfwc.com/wildlifehabitats/imperiled/biological-status/listingrecommendations/ [Accessed on 14 October 2011]); such a plan requires identification of threats and actions to ameliorate those threats. Principal threats of concern thus far identified in the current draft plan are take for human consumption (illegal under Florida Administrative Code 68A-25.002), predation, loss or degradation of nesting sites, and riverine habitat degradation (Meylan et al. 1992; Jackson and Walker 1997; Jackson 2006; Heinrich et al. 2010). We document boat strikes as an additional threat.

MATERIALS AND METHODS

We examined shells of *Pseudemys concinna* from three discrete samples representing 593 individuals, all from Florida. Two of the samples were comprised of museum specimens taken from rivers that were generally open to boating. The third was a sample of nesting females caught within the boundaries of a state park where boat traffic is limited mostly to slow-moving tour boats. In addition to recording maximum carapace length (CL) and plastron length (PL) to the nearest mm and sex of each individual when possible, we evaluated turtles for evidence of encounters with boats (because this species rarely wanders on land, automobile-related injuries are almost non-existent). Shell injuries caused by boats exhibit diagnostic damage (Figs. 1–3) indicative of encounters with hulls and/or propellers. Scars from blunt-force trauma involve injuries from fixed features (e.g., hulls, keels, and motors). Such injuries can be identified by a depression from the impact or a region of damaged scutes and/or underlying bone. Healed wounds from propeller blade damage typically leave scars represented by elongated and sometimes multiple parallel gouges. Healed injuries can exhibit remodeled bone, and scutes may display lighter or abnormal pigmentation. We discounted specimens with injuries possibly originating from other causes, such as tooth punctures and chips from encounters with American Alligators (*Alligator mississippiensis*) or road abrasion that were likely caused by automobile strikes (rare) during nesting forays. We used digital photography to record boat-related injuries to turtles in the museum samples.

The impetus for our study was a sample of 164 butchered *P. c. suwanniensis*, the remains of which are housed in the Chelonian Research Institute (CRI; Oviedo, Florida; Appendix 1: PCHP specimen numbers) and the University of North Florida teaching collection (one uncatalogued carapace). These specimens were collected from a rural dumpsite discovered in 2004 near Cedar Key, Levy County (Heinrich et al. 2010). The turtles were taken illegally for human consumption from unknown rivers in west-central Florida within several years prior to recovery. We subsequently examined a statewide sample of 180 Florida specimens of *P. concinna* (both subspecies to increase sample size and because it was difficult to ascertain the subspecies of some specimens with incomplete or unclear labels) in the Florida Museum of Natural History (University of Florida, UF; Appendix 1: UF specimen numbers). Specimen collection spanned 75 years (1928–2003) and represented rivers from throughout the Florida panhandle as well as the northwestern quarter of the peninsula. We recorded locality data (county and river) of all specimens exhibiting boat-related injuries from this sample.

We supplemented the two museum samples with data from the nesting female *P. c. suwanniensis* population studied from 1988–1993 by Jackson and Walker (1997) at Wakulla Springs State Park on the Wakulla River, Wakulla County. The study site included only the upper 5 km of this spring-fed river (i.e., the portion of the river within park boundaries); although low-speed but powerfully-motored pontoon tour boats ply the upper 2 km several times daily, high-speed watercraft have been excluded from the park by fencing for several decades. Although some turtles may occasionally venture downstream, data for home range, nest-site fidelity, and population distribution suggest that most of the cooters living in the park probably never leave it. The study's investigators carefully illustrated carapacial and plastral scars of each individual encountered as part of their data collection. These markings allowed evaluation of boat encounters for 249 adult females, 239 of which were evaluated alive (many with multiple recaptures), and 10 of which were first found dead, presumably from Raccoon (*Procyon lotor*) predation. To maintain consistency of interpretation for this study, the illustrations were reviewed by three of the authors of the present paper.

RESULTS

Mean CL for 110 measurable *P. c. suwanniensis* examined in the CRI collection was 351 mm (239–437 mm). Not all specimens examined were measurable because of incomplete carapaces. Seventeen of 164 turtles (10.4%) exhibited damage clearly attributable to encounters with boat hulls and/or propellers (PCHP 7766, 7779, 7799, 7803, 7804, 7813, 7824, 7827, 7828, 7831, 7837, 7844, 7857, 7861, 7874, 7875, 7878; Fig. 4; Table 1). Mean CL for 13 measurable boat-damaged specimens was 356 mm (280–418 mm). Scars were restricted to the carapace.

FIGURE 4. Example from a Chelonian Research Institute (CRI) sample of healed boat-related injuries on female *Pseudemys concinna suwanniensis* collected at Cedar Key dumpsite, Levy County, Florida on 7 June 2004; maximum carapace length 340 mm; CRI specimen number PCHP 7766. (Photographed by Timothy J. Walsh).

Mean CL for 155 measurable *P. concinna* in the UF sample was 251 mm (range: 126–401 mm). Four (2.2%) individuals (mean CL = 231 mm, range: 215–266 mm; UF 13680-2, 13686-2, 13686-4, 13691-1), collected in two consecutive years from within the range of *P. c. suwanniensis*, bore scars indicating encounters with boats (Figs. 5 and 6; Table 1). The earliest evidence of a boat-related injury was observed on an adult male collected at Rainbow Run (RR), Marion County in 1952. The remaining specimens were collected in 1953 from the Wakulla River (220 km NW of RR), Wakulla County (male), and the junction of Wekiva Run with the Waccasassa River (34 km WNW of RR), Levy County (two males).

Mean CL for the 249 nesting females in the Wakulla River sample was 378 mm (328–427 mm). Ten females (4.0%; mean = 384 mm, range: 334–427 mm; Table 1), still living, bore scars clearly indicative of boat damage. Scars were restricted to the carapace.

DISCUSSION

It may be assumed that most, if not all, of the boat-struck turtles represented in our samples survived initial injuries. Those that die are rarely available for collection. Because many individuals struck by boats are likely killed upon impact or die later from injuries, the boat strike incidences we report likely underestimate actual strike frequencies. We therefore contend that the incidence of 10.4% damage detected in the Cedar Key (CRI) sample underestimates the true frequency of boat strikes in the represented population(s). This threat has existed for at least six decades and has yet to be addressed by conservation measures or from a management perspective. The FFWCC has projected the number of trailered boats to double along with the human population of the state between 2006 and 2060 (Cerulean 2008). Studies of Diamondback Terrapins (Burger and Garber 1995; Cecala et al. 2009) and Northern Map Turtles (Bulté et al. 2010) in New Jersey, South Carolina, and Ontario, respectively, suggest that this threat to Florida's freshwater turtles, including the Suwannee Cooter, will likely become greater with increased boating activity if appropriate management actions are not taken.

The Wakulla River sample, from Wakulla Springs State Park (WSSP), provides a valuable comparison to the two museum samples. Although taken relatively recently (1988–1993), the recorded boat-strike incidence (4.0%) is more similar to that of the older museum sample (UF: 2.2%) collected when boats were far fewer in number and typically slower. The lower boat strike frequency in the Wakulla River sample is clearly attributable to the sample site being entirely located within the protected upper 5 km of the river, where boat traffic is limited almost entirely to slow-moving pontoon-type tourist vessels that, for the most part, are more easily escaped by Cooters than the higher speed boat traffic common to unprotected rivers. Nonetheless, a 4% strike rate is not insignificant and underscores the fact that nothing short of total closure to motorized craft will assure freedom of turtles from this threat.

TABLE 1. Frequency of boat-related injuries in three samples of river cooters (*Pseudemys concinna* ssp.) from Florida. Samples are from the Chelonian Research Institute (CRI), the Florida Museum of Natural History (UF), and the Wakulla River, Wakulla County.

Sample	Years	n	Boat Injuries	Frequency (%)
CRI	ca. 2000–2004	164	17	10.4
UF	1928–2003	180	4	2.2
Wakulla River	1988–1993	249	10	4.0

FIGURE 5. Example from UF sample of healed boat-related injuries on an adult male *Pseudemys concinna suwanniensis* collected at Rainbow Run, Marion County, Florida on 13 December 1952; maximum carapace length 266 mm; UF 13680-2. (Photographed by George L. Heinrich).

FIGURE 6. Example from UF sample of healed boat-related injury on a male *Pseudemys concinna suwanniensis* collected at junction of Wekiva Run with the Waccasassa River, Levy County, Florida on 1 March 1953; maximum carapace length 215 mm; UF 13686-2. (Photographed by George L. Heinrich).

Evidence of boat strikes has been observed in other Suwannee Cooter field studies. From November 1995 to April 1996, Laine A. Giovanetto (unpubl. data) noted that 15.3% (34 of 222) of initial captures on Rainbow Run, Marion County, exhibited signs of injuries from boat collisions. During sampling from August 2010 to October 2011 at two sites along the Suwannee River, Levy County, Eric C. Munscher (unpubl. data) recorded boat strike frequencies for initial captures of 8.6% (11 of 128) at Manatee Springs State Park and 7.5% (5 of 67) at Fanning Springs State Park. It is notable that aquatic habitat within these parks is much smaller than that in WSSP and that home ranges of most turtles likely extend into unprotected riverine waters.

The four Suwannee Cooters exhibiting boat-related injuries within the UF sample were males, whereas injured females were represented in the CRI sample. However, the latter likely reflects size-biased harvest. Based on size at maturity for female Suwannee Cooters of 325 mm CL (Jackson and Walker 1997), and because mature males rarely exceed 285 mm CL (calculated from Jackson 2006), at least 12 of the 13 measurable boat-damaged specimens in the CRI sample were mature females.

Like Diamondback Terrapins, Suwannee Cooters exhibit pronounced sexual dimorphism (females larger). Roosenburg (1991) suggested that higher frequency of boat strike evidence on adult female Diamondback Terrapins is due to their larger size and comparatively reduced ability to avoid approaching boats, whereas Gibbons and co-workers (2001) proposed that adult females may be more exposed to boat traffic during

nesting forays. Evidence of boat strikes was reported to be 2–9 times higher in adult female Northern Map Turtles (*Graptemys geographica*) than adult males and juvenile females at two study sites (riverine and lacustrine) in Ontario, Canada (Bulté et al. 2010). Those authors suggested that adult females are more likely to encounter boats due to behavioral patterns (movement, habitat use, and aquatic basking). Although our study did not allow us to discriminate factors that may have accounted for sex-biased differences we observed in boat strikes within our samples, such information would be useful to conservation and hence a valuable focus of future research.

For late-maturing, long-lived organisms like turtles, annual removal of even a few reproductively mature or nearly mature females can lower population recruitment and lead to unviable populations (Congdon et al. 1993). Further, a population viability analysis of Northern Map Turtles (Bulté et al. 2010) showed that "boat-induced mortality in adult females could lead to rapid population extinction if the risk of mortality when hit by a boat is greater than 10%." Boat-related mortality in negative synergy with other anthropogenic threats, such as illegal take (Heinrich et al. 2010), can thus have serious implications for the future of the Suwannee Cooter and other turtle populations. We therefore encourage freshwater turtle researchers to document the frequency of this threat to their study populations.

Recommendations.–To ameliorate the threat of boat strikes, we recommend increasing where possible the number and size of areas on rivers that are closed to high-speed motorized watercraft. Florida rivers with areas currently restricting motorized vessels, such as WSSP, provide important protected zones, though still not entirely safe, for turtles. Giovanetto (1992) recommended banning motorized boats from the headspring of Rainbow Run to approximately 1 km downriver. That river is the only site supporting a long-term population study of Suwannee Cooters (Meylan et al. 1992; Huestis and Meylan 2004), and motorized watercraft are currently restricted only from the headspring to half that distance (0.54 km) downriver. Sites such as these two provide an opportunity to compare the frequency of boat-related injuries between closed and open zones along the same river. Where total closures are not possible, we recommend that motorized watercraft be restricted to those using electric or solar-powered energy sources, a conversion process being undertaken at WSSP.

We also suggest establishing reduced speed zones in areas open to motorized watercraft. Areas containing prime basking sites (e.g., fallen trees/limbs over water and floating vegetation mats) and consequently high numbers of turtles are especially appropriate to target (Bulté et al. 2010). Grant and Lewis (2010) found no evidence of boat-related injuries or mortality in a Costa Rican population of Spectacled Caimans (*Caiman crocodilus fuscus*) on waterways with enforced speed limits. In contrast, 36.6% of caimans exhibited scars or fresh lacerations from boat propellers on unregulated waterways. Reduced speed zones have also proven effective for the Florida Manatee (*Trichechus manatus latirostris*) in reducing boat-related injuries and have been identified as an important tool for conserving this species (Calleson and Frohlich 2007). Given the documented threat of boat strikes to the Suwannee Cooter, similar regulations are appropriate and justifiable management techniques.

Additional recommendations include the use of propeller guards (Jackson and Walker 1997). Although they would not eliminate injuries from blunt-force trauma, guards would reduce the frequency of propeller-caused injuries. Finally, as for all imperiled species, development of effective education programs complemented by increased law enforcement efforts would facilitate long-term management success for the Suwannee Cooter (Heinrich et al. 2010). One thing is clear: in a state where there is difficulty reducing the impacts of watercraft on the popular, emblematic, and endangered Florida Manatee, it will not be easy to garner support for riverine turtle protection. However, the difficulty of the task does not abrogate responsibility to address this conservation challenge.

Acknowledgments.–We thank Peter C. H. Pritchard for allowing us to examine specimens in the Chelonian Research Institute collection, and Max A. Nickerson for providing access to specimens at the Florida Museum of Natural History. Allen Foley and Karrie Minch (FFWCC), Daniel W. Pearson (Florida Department of Environmental Protection), and Tony Tucker (Mote Marine Laboratory) responded to requests for information. Matthew J. Aresco (Nokuse Plantation), Laine A. Giovanetto (New Jersey City University), Peter A. Meylan (Eckerd College), and Eric C. Munscher (SWCA Environmental Consultants) generously shared unpublished data. We appreciate helpful comments by Joseph A. Butler (University of North Florida) and Peter A. Meylan that improved this manuscript. Dale R. Jackson's research at Wakulla Springs was supported by The Nature Conservancy and the FFWCC.

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APPENDIX 1. Specimens examined at the Chelonian Research Institute (PCHP) and Florida Museum of Natural History (UF).

PCHP: 7757–7927, 7930–7941, 7943–7951, 7953–7975, 8004–8025, 8027–8137, 8171–8200.
UF: 779, 1424, 3968, 3986, 3988, 5959, 6517, 6520, 6521, 6522, 6525, 6580, 6581, 6584, 6585, 7063, 7878-1, 7878-3, 7878-4, 7878-5, 11115, 12682, 12683, 12684-1, 12684-2, 13508-1, 13508-2, 13508-3, 13508-4, 13508-5, 13508-6, 13510-1, 13510-2, 13518-1, 13518-2, 13518-3, 13520-1, 13520-2, 13520-3, 13520-4, 13520-5, 13527-1, 13527-2, 13527-3, 13527-4, 13527-5, 13527-6, 13532, 13545, 13546, 13546-2, 13547-1, 13547-2, 13547-3, 13547-4, 13547-5, 13547-6, 13548, 13549, 13554-1, 13554-2, 13554-3, 13556, 13560-1, 13560-2, 13560-3, 13561-1, 13561-2, 13575, 13587, 13604, 13606, 13612-1, 13612-2, 13615-1, 13615-2, 13615-3, 13615-4, 13622, 13625, 13629, 13630, 13642-1, 13642-2, 13642-3, 13642-4, 13645, 13649-1, 13649-2, 13649-3, 13663, 13665-1, 13665-2, 13666, 13673-1, 13673-2, 13673-3, 13677, 13680-1, 13680-2, 13684, 13686-1, 13686-2, 13686-3, 13686-4, 13691-1, 13691-2, 13691-3, 21472, 21473, 22377, 22378, 22379, 22380, 22381, 23074, 30079, 30118, 30120, 30122, 33569, 33570, 33571, 37155, 39895, 43848, 43851, 44209, 44224, 44227, 44759, 44857, 44858, 44859, 44861, 44862, 44863, 44864, 45145, 50057, 52913, 53830, 53842, 54814, 54815, 55869, 62777, 62778, 65578, 65579, 65580, 65581, 65582, 65927, 69365, 71062, 72723, 73799, 102898, 105386, 105449, 107776, 109037, 113442, 115893, 150619, 150990, 150992, 151149, 151150, 151536, 151538, 151539, 151540, 151694, 151695, 151714, 151715, 151716, 152460.

GEORGE L. HEINRICH is a field biologist and environmental educator specializing in Florida reptiles. His company, Heinrich Ecological Services, is based in St. Petersburg, Florida, USA and conducts wildlife surveys and research, natural history programming, and nature-based tours. A graduate of Memphis State University, his research interests focus on anthropogenic threats to Florida's non-marine turtles. Current collaborative projects involve two imperiled emydids, the Diamondback Terrapin (*M. terrapin*) and Suwannee Cooter (*P. c. suwanniensis*). His conservation education efforts include an annual four-day Florida turtle workshop for educators offered since 1993. George is an invited member of the IUCN Tortoise and Freshwater Turtle Specialist Group, served twice as co-chair of the Gopher Tortoise Council, is the founding president of the Florida Turtle Conservation Trust, and served as the Florida regional representative of the Diamondback Terrapin Working Group. He is pictured holding the carapace of a Suwannee Cooter. (Photographed by Robert Krause)

TIMOTHY J. WALSH became actively involved in herpetology at the age of 10 and has maintained an obsession ever since. At age 12, he was mentored by Dr. Jim Layne of Archbold Biological Station and was co-author of his first scientific publication at age 14. Tim went on to receive a degree in Zoo Animal Technology and has worked in the zoo, aquarium, and museum field since 1992. He held the positions of Senior Herpetologist with the Tennessee Aquarium and Collection Manager with the Chelonian Research Institute, and has been involved in a variety of research projects with Carolina Diamondback Terrapins (*M. t. centrata*), Spotted Turtles (*Clemmys guttata*), and Suwannee Cooters (*P. c. suwanniensis*). A member of the IUCN Tortoise and Freshwater Turtle Specialist Group, Tim is also an avid outdoorsman, accomplished photographer, and book collector. Tim is currently working towards a Master's degree in Museum Studies with the University of Leicester, works as the Manager of NatureWorks for the Orlando Science Center, and owns Natural Creations Concrete Design, LLC, a company specializing in creating animal habitats and landscape features for zoos, aquaria, museums, and residences. He is pictured holding a Gulf Coast Box Turtle (*Terrapene carolina major*). (Photographed by George L. Heinrich)

DALE R. JACKSON is Senior Research Zoologist at the Florida Natural Areas Inventory, Florida State University, Tallahassee, Florida, USA. He received his Ph.D. from the University of Florida and is a long-term member of the IUCN Tortoise and Freshwater Turtle Specialist Group, as well as former co-chair of the Gopher Tortoise Council. He has studied the evolution and ecology of Florida's freshwater turtles, especially the family Emydidae, for more than three decades. In conjunction with colleagues, he led an effort that culminated in 2009 with the State of Florida passing some of the most far-reaching regulations enacted in the United States to protect freshwater turtles from human exploitation. He now spends as much free time as he can teaching his two children to love turtles and enjoy nature as much as he does. He is pictured holding a Suwannee Cooter (*P. c. suwanniensis*). (Photographed by Ghislaine Guyot)

BENJAMIN K. ATKINSON is a Ph.D. candidate in the Department of Wildlife Ecology and Conservation at the University of Florida. He earned a B.S.Ed. in Environmental Education at Slippery Rock University and an M.S. in Interdisciplinary Ecology at the University of Florida. He holds courtesy appointments with the Wetlands Institute (Stone Harbor, New Jersey) and the Chelonian Research Institute (Oviedo, Florida). His professional interests include teaching, conservation ecology, and turtle osteology. He is pictured holding a Terrestrial Snail Sucker (*Tropidodipsas sartorii*). (Photographed by Josiah H. Townsend)