

- swamp rainforest of south-eastern Nigeria. *Journal of Zoology*, London 246:125–133.
- LUISELLI, L., AKANI, G.C., AND CAPIZZI, D. 1999. Is there any interspecific competition between dwarf crocodiles (*Osteolaemus tetraspis*) and Nile monitors (*Varanus niloticus ornatus*) in the swamps of central Africa? A study from south-eastern Nigeria. *Journal of Zoology*, London 247:127–131.
- LUISELLI, L., AKANI, G.C., POLITANO, E., ODEGBUNE, E., AND BELLO, O. 2004. Dietary shifts of sympatric freshwater turtles in pristine and oil-polluted habitats of the Niger Delta, Southern Nigeria. *Herpetological Journal* 14:57–64.
- LUISELLI, L., AKANI, G.C., BELLO, O.A., ANGELICI, F.M., AND UDE, L. 2006a. Home range area may vary considerably in relation to habitat contamination in two African terrapins from pristine and oil polluted habitats. *Amphibia–Reptilia* 27:255–261.
- LUISELLI, L., AKANI, G.C., AND POLITANO, E. 2006b. Effects of habitat alteration caused by petrochemical activities and oil spill on the habitat use and interspecific relationships among four species of Afrotropical freshwater turtles. *Biodiversity and Conservation* 15:3751–3767.
- LUISELLI, L., AND LEA, J. In press. Pollution: petrochemicals and heavy metals. In: Heatwole, H. (Ed.). *Amphibian Biology*. Oxford, United Kingdom: Oxford University Press.
- LUISELLI, L., POLITANO, E., AND ANGELICI, F.M. 2000. Ecological correlates of the distribution of terrestrial and freshwater chelonians in the Niger Delta, Nigeria: a biodiversity assessment with conservation implications. *Revue d'Ecologie (Terre et Vie)* 55:3–23.
- MATHUR, D., AND SILVER, C.A. 1980. Statistical problems in studies of temperature preferences of fishes. *Canadian Journal of Fisheries and Aquatic Sciences* 37:733–737.
- MORROW, J.L., HOWARD, J.H., SMITH, S.A., AND POPPEL, D.K. 2001. Home range and movements of the Bog turtle (*Clemmys muhlenbergii*) in Maryland. *Journal of Herpetology* 35:68–73.
- NIGER DELTA ENVIRONMENTAL SURVEY. 1998. *Environment and Socio-Economic Characteristics*. Volume 1. Port Harcourt, Nigeria: Niger Delta Environmental Survey, p. 272.
- ODU, C.T.I., NWBOSHI, L.C., FAGADE, S.O., AND AWANI, P.E. 1989. Final Report on Post-Impact Study of SPDC “8” Nun River Delivery Line Spillage. Report to Shell Petroleum Developmental Company.
- PLUMMER, M.V., MILLS, N.E., AND ALLEN, S.L. 1997. Activity, habitat, and movement patterns of softshell turtles (*Trionyx spiniferus*) in a small stream. *Chelonian Conservation and Biology* 2:514–520.
- POLITANO, E. 1998. A study of the fauna of the Niger Delta and environmental impact assessment of the construction of two natural gas pipelines in the Rivers State. TSKJ—Aquateer Reports, Port Harcourt, p. 532.
- SINGH, J., MOFFAT, D., AND LINDEN, O. 1995. *Defining an Environmental Development Strategy for the Niger Delta* (two volumes). Lagos, Nigeria: World Bank (Industry and Energy Operations Division, West Central Africa Department).
- STATSOFT, INC. 1996. STATISTICA for Windows, release 5.0. Tulsa, OK: Statsoft Inc.

## LEGAL ISSUES

### Legislative Closure of the Maryland Terrapin Fishery: Perspectives on a Historical Accomplishment

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“Always Look a Gift Terrapin on the Plastron” (Whilden 2007), offers Marguerite Whilden’s views and opinions on the closure of the Maryland diamondback terrapin (*Malaclemys terrapin*) fishery through legislative action in 2007. As members of the Chesapeake Terrapin Alliance (CTA), the advocacy group that led the 2007 legislative effort to end the terrapin harvest, we clarify our reasoning and justification to close the commercial fishery. Furthermore, we correct some of the errors, inaccuracies, and misconceptions presented by Whilden’s article and clarify that this legislative action is in the best interest of long-term conservation of terrapins in Maryland.

Conservation is wrought with challenges and pitfalls, which obstruct practices that are in the best interest of the species. Fisheries species are perhaps the most challenging to manage because of the influence of a user group that is widely admired by humans. Commercial fishing, in particular the watermen heritage of Chesapeake Bay, is steeped in tradition and elicits compassion from the general public that admires their age-old profession and the ability to eke out a living under challenging conditions. However, commercial fishermen quickly adopt new technology and techniques that increase their efficiency. As a result, many fisheries worldwide have collapsed due to overfishing

even when resource managers had the knowledge and justification to take action. For many of these fisheries, the life history of the target species combined with the harvest data were indicative of population decline, yet sometimes, for a variety of reasons, managers failed, and continue to fail, to manage fisheries appropriately. Consequently, fishery collapse has recurred, particularly in organisms with delayed maturity, low reproductive rates, and low neonate survivorship, such as whales, many sharks, deep-sea pelagic fishes including orange roughy, and many turtles. In contrast to fishery species with high population growth potential, species with delayed maturity and low reproductive rates take decades to centuries to recover from overexploitation. Frequently, conservation actions are taken after the fisheries have collapsed, further prolonging recovery. Because terrapins have delayed maturity and low reproductive rates (Roosenburg 1991) and were being overexploited for Asian markets, we pursued closing this fishery permanently.

Research and data that documented the effects of harvest on turtles and terrapins populations focused our effort to close the terrapin fishery. Modeling studies of turtle populations illustrate that these long-lived organisms with delayed maturity and slow reproductive rates cannot sustain harvest (Crouse et al. 1987; Congdon et al. 1993, 1994; Heppell et al. 1996; Heppell 1998). Most modeling of aquatic turtles and terrapins in particular indicates that population growth and stability is most sensitive to change in adult survivorship (Mitro 2003). Thus, a critical aspect of population persistence is the breeding stock or “capital” necessary to maintain the population. The recruitment “interest” in populations with these life-history traits is insufficient to sustain a harvest, which thereby quickly begins to deplete capital to sustain the fishery, leading to population and fishery collapse. The diamondback terrapin is a species that meets these criteria, and therefore, a commercial harvest of juveniles and adults is unsuitable (Mitro 2003).

Focused efforts to address terrapin conservation in Maryland began in 2001 with the formation of a Maryland Diamondback Terrapin Task Force (MDTTF) at the end of Governor Parris N. Glendening’s administration. The recommendations of the task force were issued to the Secretary of the Maryland Department of Natural Resources (MDNR) in a final report on 20 September 2001. The number one recommendation of this report was to “establish an immediate moratorium on the commercial harvest ...”. This recommendation was based on the terrapin’s vulnerable life history and the fact that standing stocks within Chesapeake Bay had never been evaluated.

Unfortunately, in the ensuing years, under a new governor, the MDNR–Fisheries Service implemented conservation alternatives to a moratorium recommended by the 2001 MDTTF under the Glendening administration. The United States Geological Survey (USGS) initiated a study to determine bay-wide population numbers; whereas, MDNR

funded a study to assess the effects of eel pots and develop a by-catch–reduction device. However, MDNR did not close or restrict the commercial harvest.

In 2006, a legislative effort led by Whilden attempted to close the terrapin fishery, but a political compromise altered the bill and directed the MDNR to adopt the recommendations of the MDTTF. Consequently, MDNR implemented 2 recommendations of the MDTTF through emergency regulations. Recommendations enacted included establishing a legal slot-size limit (harvesting within the range) between 4 and 7 inches in plastron length and adopting a shortened harvest season. The MDNR opted for a more restrictive season than suggested by the task force because new data provided by the USGS indicated that fishing pressure during the winter months by dredging in hibernacula could effectively decimate local populations. Days before the implementation of these recommendations, the MDNR dropped a third recommendation requiring a limited license holder entry into the terrapin fishery. In 2006, unlimited market demand from Asian buyers for terrapins of any size resulted in a 23-fold increase in terrapin take during the shortened 2006 season.

During the summer of 2006, prior to the MDNR’s release of the regulations mandated by the 2006 legislation, we and other disappointed terrapin advocates joined forces and formed the CTA to put forth a legislative effort to close the commercial harvest permanently. The Maryland Watermen’s Association appeared to have the political influence to keep the terrapin fishery open in spite of a growing body of scientific literature that suggested the commercial harvest was unsustainable. Our group included terrapin research biologists, an attorney, a lobbyist, and staff from national and international conservation organizations that work on turtle conservation. We also solicited help from various terrapin advocates and collected over 5000 signatures, mostly of registered voters, supporting the bill to close the fishery. Only after the 2006 regulations had the unintended result of increasing the annual harvest to over 10,000 terrapins did the MDNR begin to consider a harvest moratorium (a temporary closure). However, there were no guarantees that a moratorium would be implemented or that the terrapin fishery would not be reopened in the future. The 2007 legislative effort succeeded and on 24 April 2007, newly elected Governor Martin O’Malley signed into law the bill that ended the commercial terrapin harvest in Maryland.

Whilden’s version of the events leading up to the signing of the terrapin protection bill into law is confusing and contains numerous contradictions and misconceptions. For example, Whilden laments that “the fate of the terrapin resource rests with the regulatory agency which, for all intents and purposes, has been stripped of its traditional fishery management authority.” This is incorrect; all that was removed from the MDNR by the 2007 legislation was its authority to allow the commercial harvest of terrapins to continue or to reopen the fishery in the future.

Whilden also states, “The problem is that the 2006 regulations were based on traditional agency speculation and fisheries management theory, not fundamental turtle conservation theory, commercial market data or predictable harvester’s behavior. There were virtually no reliable science data available to justify the scheme.” We agree. However, the regulations based on the 2001 MDTTF recommendations demonstrated the weakness of the 2006 law. The statement suggesting that management authority for terrapins should remain with the MDNR (which in fact it has) while later pointing out that the “traditional fishery management authority” was incompetent in its 2006 management decisions seems confusing and contradictory.

Additional confusion arises from Whilden’s statement, “In response to public concern, a harvest prohibition bill was introduced in the 2006 legislative session. Although the bill was modified by the bill sponsor to appease the Department of Natural Resources, the amended bill turned out to be a much more formidable law for terrapin conservation. In adopting the 2001 Governor’s Diamond-back Terrapin Task Force report, the 2006 legislation was sound and retained the traditional authority of the fisheries agency.” Whilden fails to mention that she was the main force behind the 2006 legislation that implemented the third MDTTF’s recommendation and a shortened harvest season. This resulted in a 23-fold increase in the terrapin harvest and over 10,000 terrapins were legally harvested under Whilden’s “formidable law for terrapin conservation.” The alarming data from the 2006 season provided the final “nail in the coffin” for the concept of sustainable terrapin harvest and made closing the terrapin harvest the only responsible option.

Whilden’s criticism of the 2007 legislation continues by highlighting the 3-terrapin pet possession regulation in Maryland. She states, “Everyone is now entitled by law to collect up to three terrapins from the wild even though we have no idea how many terrapins remain in the wild.” Marylanders have had the legal right to possess 3 terrapins as pets since 1975 (and an unlimited number prior to 1975). This was not a new entitlement from the 2007 legislation. The few terrapins collected as pets has never been suggested as a significant threat to the wild population. Furthermore, Whilden states, “The last minute amendment to allow continued terrapin farming does not seem to alarm the bill drafters, although no one can explain what this means to the wild resource.” Apart from ignoring the concerns and reluctance expressed in debate about the aquaculture compromise, a careful and thorough read of the amendment clearly reveals that wild-caught terrapins from Maryland may not be used for aquaculture. Therefore, under the 2007 legislation, no terrapin taken from the wild can be sold for any reason (pet, aquaculture, or consumption).

Whilden stated “The Terrapin Institute opted to support the new governor and urged the new terrapin lobby to leave the 2001 Terrapin Task Force recommendations in the law.” The fundamental confusion is the difference between rec-

ommendations and laws. In order for recommendations to be followed, each one must have laws or regulations written, passed, and enforced to support and implement them. The 2001 MDTTF presents a variety of alternative recommendations. The purpose of the 2007 terrapin legislation was to implement the first recommendation of the 2001 task force: to close the commercial fishery. Scientific evidence supports that a terrapin fishery is unsustainable. The new governor understood this and therefore signed the 2007 terrapin bill into law.

Whilden posits that “by-catch mortality, destruction of nesting beaches, and poaching continues...”. Existing law requires all recreational crab pots be equipped with by-catch reduction devices primarily to reduce the by-catch of terrapin (commercial crab pots are not allowed, by law, to be set in the Bay’s tributaries, which are primary terrapin habitats). Unfortunately, by-catch mortality remains a problem because of lack of enforcement. Whilden correctly states that nesting beach destruction continues. Unfortunately, the preferred “traditional fishery management authority”, the MDNR, has no jurisdiction over permitting alteration of nesting habitat, which lies with the Maryland Department of the Environment (MDE). There are currently 3 bills in the Maryland general assembly, all supported and endorsed by the CTA, to strengthen MDE’s regulations and enforcement capacity on shoreline protection. Furthermore, there are protected nesting beaches in national wildlife refuges, state parks, and wildlife management areas. Prior to the 2007 legislation, much of the commercial terrapin harvest occurred in water adjacent to protected nesting beaches. With the passing of the 2007 legislation, the harvest has now ended. However, Whilden suggests that “poaching continues”; if she knows of poaching, we strongly urge her to report this information to the Natural Resources Police immediately.

Curiously, Whilden, a long-term terrapin advocate, casts doubts on the closure of Maryland’s terrapin fishery that fulfills the first recommendation of the MDTTF. Furthermore, the 2007 terrapin legislation has not stripped MDNR of its regulatory authority as implied by Whilden. The permanent fishery closure is a landmark accomplishment that sets the cornerstones upon which the MDNR can build a sound terrapin conservation program. Effective science-based conservation efforts require a thorough understanding of existing regulations, management authority, law enforcement, legislative process, the current political landscape, and the ability of advocates to work together toward common goals. It is our intention and that of the CTA to continue to work with the MDNR, other government agencies, conservation organizations, and terrapin advocates to help ensure the long-term survival of diamond-back terrapins in Maryland.

### Literature Cited

CONGDON, J.D., DUNHAM, A.E., AND VAN LOBEN SELS, R.C. 1993. Delayed sexual maturity and demographics of Blanding’s turtles (*Emydoidea blandingii*): implica-

- tions for conservation and management of long-lived organisms. *Conservation Biology* 7:826–833.
- CONGDON, J.D., DUNHAM, A.E., AND VAN LOBEN SELS, R.C. 1994. Demographics of common snapping turtles (*Chelydra serpentina*): implications for conservation and management of long-lived organisms. *American Zoologist* 34:397–408.
- CROUSE, D.T., CROWDER, L., AND CASWELL, H. 1987. A stage-based population model for loggerhead sea turtles and implications for conservation. *Ecology* 68:1412–1423.
- HEPPELL, S.S. 1998. Application of life-history theory and population model analysis to turtle conservation. *Copeia* 367–375.
- HEPPELL, S.S., CROWDER, L.B., AND CROUSE, D.T. 1996. Models to evaluate headstarting as a management tool for long-lived turtles. *Ecological Applications* 6:556–565.
- MITRO, M.G. 2003. Demography and viability analysis of a diamondback terrapin population. *Canadian Journal of Zoology* 81:716–726.
- ROSENBERG, W.M. 1991. The diamondback terrapin: habitat requirements, population dynamics, and opportunities for conservation. New perspectives in the Chesapeake system: a research and management and partnership. In: *Proceedings of a Conference*. Chesapeake Research Consortium Pub. No 137, pp. 237–234.
- WHILDEN, M. 2007. Always look a gift terrapin on the plastron. *Turtle and Tortoise Newsletter* 11:23–25.

## **The Gopher Tortoise in Florida 2007**

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After being listed as a Species of Special Concern for the last 28 years, the gopher tortoise was reclassified as threatened by the Florida Fish and Wildlife Conservation Commission (FWC) this fall; the revised status classification will become official in early November (8 November or shortly thereafter). In addition to approving the listing reclassification at their 12 September meeting, the Commissioners also gave a unanimous “thumbs up” to the long-awaited gopher tortoise management plan. The plan was the result of intensive efforts by 2 FWC issue teams and a dedicated stakeholder advisory group. Boyd Blihovde, a former co-chair, represents GTC on this advisory group, which includes a wide diversity of interests, ranging from humane organizations to the development industry. The collaboration of agency staff and stakeholders to create this blueprint for gopher tortoise conservation is unprecedented and has been highly commended.

The first FWC tortoise issue team (dubbed GT-1) of 21 members met in 2004; a smaller 11-person GT-2 team convened in 2005 and worked with the stakeholders, who also first convened in 2005. Stakeholders and FWC staff will be hammering out the detailed permitting and relocation guidelines over the next 4–6 months. The timing is critical to assure that scientifically based, user-friendly guidelines are in place to facilitate responsible, humane relocations during the 2008 tortoise activity season and beyond.

The management plan’s overall conservation goal is to restore and maintain secure, viable populations of gopher tortoises throughout the species’ current range in Florida. Specific objectives include increasing the amount of protected habitat; conducting appropriate vegetation manage-

ment to maintain tortoise habitats (e.g., prescribed fire); restocking tortoises to protected, managed, suitable habitats where densities are low; and drastically decreasing tortoise mortality on lands proposed for development.

Numerical targets for these objectives are given to help measure progress. A suite of conservation actions are proposed for the plan’s first 5-year cycle: general categories include regulations, permitting, law enforcement, local government coordination, habitat preservation and management, population and disease management, landowner incentives, education and outreach, and monitoring and research. An adaptive management approach will be used to implement the many actions proposed in the plan, allowing easy adjustments to policies, guidelines, and techniques, based on observed conservation benefits/detriments and sound science. The plan is available on the agency Web site: MyFWC.com, under Imperiled Species, Management Plans.

This year is also noteworthy for an interim incidental-take policy that will greatly reduce tortoise entombment associated with urban development until the new permitting system outlined in the plan can be implemented. Under this policy, all incidental-take permits issued for applications received by the FWC after 30 July 2007 will include a provision requiring developers to relocate tortoises out of harm’s way. Although this relocation requirement does not apply to existing incidental-take permits, the FWC is contacting those developers holding current permits to determine the status of construction, and, if development has not yet occurred, FWC staff will encourage developers to relocate tortoises and will expedite the review process to facilitate such relocations.