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Diamondback Terrapins (*Malaclemys terrapin*) in a crab trap.

Terrapins in the Stew

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Imagine for a moment an animal species whose very existence threatened our survival. What would we be willing to do? One consideration would certainly be to control its numbers, possibly even to ponder its extermination. Perhaps we would embark upon a crusade to eliminate every last individual, conceivably starting with females so no more would be created. What kind of animal might fall into this category? Something big and scary with large teeth or claws and a ravenous hunger would do. A creature with a propensity for insensate carnage and destruction might also fit the bill. Perhaps at times in the dim past such creatures may have existed, or at least creatures that were thus perceived. However, humans now determine the destiny of the world, and this niche is rarely occupied. Tigers, sharks, crocodiles, and the like might have fallen into this category, but only rarely and in very specific times and places. One animal that would definitely not be considered threatening is a turtle. Unlike the rest of the reptilian clan, people are almost universally fond of turtles.

Yet a campaign is afoot to eliminate the inoffensive Diamondback Terrapin (*Malaclemys terrapin*). Sure, you wouldn't want to intentionally place a finger in a terrapin's mouth as it could give a nasty bite, but this would be the same with almost any animal. Nevertheless, the terrapin is being subjected to a campaign of systematic extermination. Traps take terrapins along with crabs. The same traps, when lost or discarded, continue to remove adults indiscriminately. Roadways built along or through marshes unequally target reproductive females by mimicking nesting grounds. Unsustainable take for markets and by-catch

severely decimate numbers. Hits by boat propellers, habitat loss, shoreline and coastal development, pollution, and predation also take their toll.

In order to address these concerns, we need to answer two simple questions: (1) Is present legislation for the protection of these turtles based on an adequate knowledge of terrapins' biological needs? (2) Can anything be done by either state or national governments to check the extermination of terrapins? These questions were posed, not in a magazine article, but in a government publication, "The Natural History and Cultivation of the Diamond-back Terrapin" by Coker in 1906. We haven't progressed very far since then.

Carl Hiaasen (2006; reprinted in *IGUANA* 13(2): 154–155) eloquently framed the problem regarding Gopher Tortoises and developers permitted to bury them if willing to pay a price, "If your kids asked to bury a small animal alive, you'd be horrified. You'd tell them that's an awful thing and that they ought to be ashamed. Most children wouldn't dream of doing it, of course, because they know what's wrong and what's right. Unfortunately, they don't make the rules." Although we don't bury terrapins, we might as well.

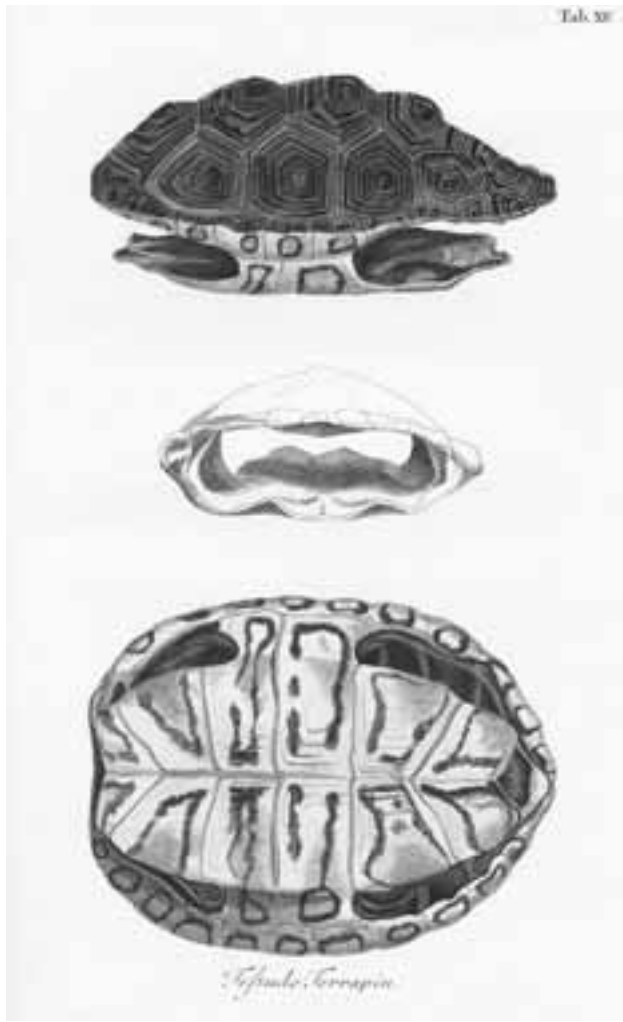
Diamondback Terrapins are unique. The word terrapin often is used to refer to a variety of North American aquatic turtles, but especially the genus *Malaclemys* — the Diamondback Terrapin. Diamondback refers to the conspicuous ridges on the scutes of the carapace. The etymology of *Malaclemys* has been lost over the years, with possible translations of "Mali" range from bad, to soft, to soft heads, to soft prey, none of which are convincing. The Greek word for chelonian gives rise to "clemmys," and "terrapin" is a derivation of torope, from the Virginia Algonquian tongue. John White first illustrated this turtle in watercolor around 1585 (Lorant 1946). A terrapin also was pictured in "Their Manner of Fishing in Virginia" (Plate XIII, Incolarum Virginiae piscandratio) in de Bry's *India Occidentalis* (1590). The Diamondback Terrapin was formally described for science by Schoepff (1792–1801) as *Testudo terrapin* (in "Tab. XV").

Diamondback Terrapins tolerate a wide range of salinity, although they are most commonly found in brackish environments. Oddly enough, unlike sea turtles, which also are found in saltwater, terrapins are thought to drink only fresh water. Found from Massachusetts to Texas, seven subspecies are currently recognized. Nesting takes place multiple times a year in warmer portions of their range and only once annually near the northern limits. Some variation occurs, with some Georgia terrapins nesting less frequently than their New Jersey brethren.

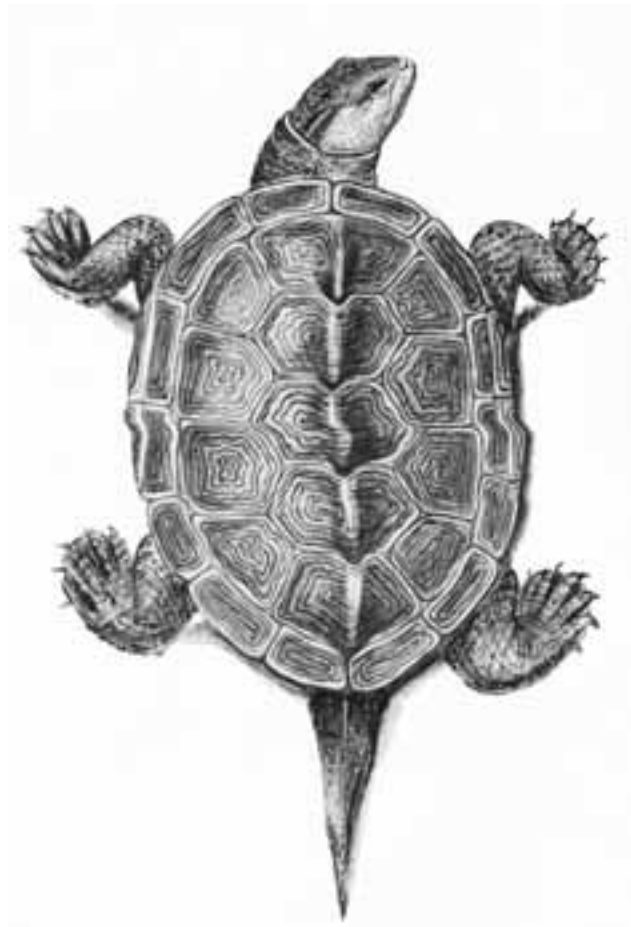


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Diamondback Terrapins (*Malaclemys terrapin*) are suffering from overharvesting and inadvertent mortality.



Schoepff's *Testudo terrapin* Tab. XV (1792–1801; above); White's terrapin (~1585; above right), and de Bry's "Their Manner of Fishing in Virginia" (1590; right). Note the terrapin in the water below the canoe in the latter image.



Female *Malaclemys* are larger than males. The species exhibits temperature dependent sex determination (TSD).

The origin of this species is uncertain, but most authorities believe that it evolved from Map Turtles (*Graptemys*) or from a common ancestor shared with *Graptemys* (Dobie 1981, Lamb and Ostentoski 1997, Wood 1977).

Terrapins appear in myriad folktales (usually as a trickster) from pre-contact Native American legends to Uncle Remus's Brer Terrapin (Brer Tarrypin), who beats Brer Bear in a tug of war by diving underwater with the rope and tying it to a branch (Chandler 1881). Much more recently, in "Time of the Turtle," Jack Rudloe (1979) experiences a run of bad luck after capturing a batch of Diamondback Terrapins. He related a myth prevalent among the local fisherman that terrapins, locally known as "wind turtles," bring ill fortune. He traced the story back to local Native American tribes that regarded terrapins as sacred animals.

Tales tell of terrapins in the Chesapeake being so great in number that slaves and indentured servants complained about the frequency of turtles in their diets. A corollary rumor tells of a law passed by the State of Maryland prohibiting excessive meals of terrapin to said complainants. I have never been able to

find evidence other than old news stories (Anonymous 1892), one of which stated, "In some of the old records of the State



JIM HARDING

Diamondback Terrapins tolerate a wide range of salinity, although they are most commonly found in brackish water.



PHIL ALLMAN

Female terrapins, such as this individual, are larger than males; like many turtles, sex is determined by temperature during incubation.

(Maryland) there were clauses that the slaves should not be fed on terrapin more than three times a week.”

Gourmet Delicacy

Undeniably the terrapin was sufficiently tasty that many never complained about eating too much terrapin. True (1884) wrote, “Philadelphia furnishes the best market for this species, but it is also sold in large numbers in Baltimore, Washington, New York, Boston, Chicago, Pittsburg, Cincinnati, Saint Louis, and many other cities.” He went on to quote a price of up to fifty cents each, quite expensive for the time. The price and harvest continued to rise and, within a few years, approximately 400,000 pounds a year were harvested, representing a value of about \$44,000 (True 1887). Cookbooks from the mid-1800s to the early 1900s confirm the popularity of terrapins. The first of these recipes is from *The White House Cookbook ...* (Gillette et al. 1887).

Stewed Water Turtles, or Terrapins

Select the largest, thickest and fattest, the females being the best; they should be alive when brought from market. Wash and put them alive into boiling water, add a little salt, and boil them until thoroughly done, or from ten to fifteen minutes, after which take off the shell, extract the meat, and remove carefully the sand-bag

and gall; also all the entrails; they are unfit to eat, and are no longer used in cooking terrapins for the best tables. Cut the meat into pieces, and put it into a stewpan with its eggs, and sufficient fresh butter to stew it well. Let it stew till quite hot throughout, keeping the pan carefully covered, that none of the flavor may escape, but shake it over the fire while stewing. In another pan make a sauce of beaten yolk of egg, highly flavored with Madeira or sherry, and powdered nutmeg and mace, a gill of currant jelly, a pinch of cayenne pepper, and salt to taste, enriched with a large lump of fresh butter. Stir this sauce well over the fire, and when it has almost come to a boil take it off. Send the terrapins to the table hot in a covered dish, and the sauce separately in a sauce tureen, to be used by those who like it, and omitted by those who prefer the genuine flavor of the terrapins when simply stewed with butter. This is now the usual mode of dressing terrapins in Maryland, Virginia, and many other parts of the South, and will be found superior to any other. If there are no eggs in the terrapin, “egg balls” may be substituted.



Brer Tarrypin (Chandler, 1881), “Terrafin fishing” (Leslie, 1888).

Stewed Terrapin

Plunge the terrapins alive into boiling water, and let them remain until the sides and lower shell begin to crack — this will take less than an hour; then remove them and let them get cold; take off the shell and outer skin, being careful to save all the blood possible in opening them. If there are eggs in them put them aside in a dish; take all the inside out, and be very careful not to break the gall, which must be immediately removed or it will make the rest bitter. It lies within the liver. Then cut up the liver and all the rest of the terrapin into small pieces, adding the blood and juice that have flowed out in cutting up; add half a pint of water; sprinkle a little flour over them as you place them in the stewpan; let them stew slowly ten minutes, adding salt, black and cayenne pepper, and a very small blade of mace; then add a gill of the best brandy and half a pint of the very best sherry wine; let it simmer over a slow fire very gently. About ten minutes or so, before you are ready to dish them, add half a pint of rich cream, and half a pound of sweet butter, with flour, to prevent boiling; two or three minutes before taking them off the fire peel the eggs carefully and throw them in whole. If there should be no eggs use the yolks of hens' eggs, hard boiled. This recipe is for four terrapins.

The *New York Times* (Anonymous 1891) even recommended terrapins as Lenten fare. For some unfathomable reason, terrapins and turtles to this day are considered “fish” by the Roman Catholic Church — but that really isn't all that surprising. In Maryland statutes, the terrapin also was defined as a “fish” and remains classified as such (Whilden, 2007).

For the next course there is still lobster and terrapin, the former as croquettes and the latter a stew; that is what it is, although the dish is put down simply as terrapin. Terrapin is a very embarrassing dish; it may be a good deal veal, and then arises the question whether terrapin made of veal can be eaten in Lent, or it may be a good deal bone that you cannot eat with or without religious scruples. The bones left in are proof positive that some terrapin is present if you do not get it on your plate. If you add wine to this dish do it gently and economically. Terrapin has too subtle a flavor to be drowned in sherry or Madeira.

Advice for the preparation of Lenten dinners (*New York Times* 1891).

Diamondback Terrapins were so popular as gourmet food from the mid-1800s through the 1920s that wild stocks began to diminish early in the 1900s (Babcock 1926, Finneran 1948, McCauley 1945). The terrapin fishery was able to supply markets initially, but the increasing demand and decreasing numbers of wild terrapins necessitated another solution. Terrapins were popular, not only in the United States, but many were exported to locales including London, Paris, Berlin, Guam, and Cuba. A number even found their way to rubber-rich Manaus in Brazil. The new idea was to establish experimental terrapin “pounds,” primarily in Georgia and North Carolina (Barney 1922; Coker 1906, 1920; Gadow 1901; Hatsel and Hildebrand 1926; Hay 1904; Hildebrand 1929, 1932, 1933). Ironically, most of our early knowledge about the biology of *Malaclemys* came from these farms.

Terrapin probably would have been driven to extinction if not for the one-two punch of the great depression and prohibition. The latter rendered access to sherry (a key ingredient in terrapin stew) almost impossible. Two eminent herpetologists, Archie Carr and Roger Conant, suggested that consumers discovering that the Diamondback Terrapin wasn't orders of magnitude tastier than less expensive turtles and the decreasing availability and increasing cost of household help contributed to the survival of the species (Pritchard 1979).

Gone Fishing

Some (Coker 1951, Hurd et al. 1979) suggested that populations gradually recovered after the heavy exploitation of the terrapin stew boom, and that terrapins were out of the woods — but the reprieve, if indeed it existed, seems to have been fleeting. Once again, wild populations are under intense pressure, this time due to demand from Asian communities in the United States and abroad. This threat is every bit as real as it was around the turn of the 20th century. As demand continues to increase, commercial harvesters are increasing efforts to supply the market. Recent years have seen harvests increase five-fold, while wild populations have dropped to as little as a quarter of their former size. The total take in Maryland for 2006 was reportedly over 10,000 terrapins — a twenty-fold increase over the previous year (Whilden 2007). One Maryland waterman has turned himself into the “terrapin king.” He converted his property into a turtle farm, “breeding tens of thousands of hatchlings for sale as food or pets. We are sending the babies to China — thousands and thousands and thousands,” Lewis said (Pelton 2006). The U.S. Census Bureau even has an industry title for “Terrapin Catching” (NAICS Code 114119; Census Industry Code 0280).

An Order of Crab with a Side of Terrapin

Many of us enjoy a dinner of crabs, but most of us don't realize the price for that meal is paid in terrapins. The primary cause of terrapin mortality throughout a large portion of the species' range is incidental capture and drowning in commercial crab traps, with deaths estimated in the tens of thousands (Seigel and Gibbons 1995). An early estimate in South Carolina alone was 2,835 terrapin captures per day in April and May (Bishop 1983). A single trap in Maryland was found with 49 entire and



Ghost traps continue to kill terrapins.



ROGER WOOD

Roads are sought by migrating turtles because they mimic the high ground that females use for nesting,

many partial turtle shells (Roosenberg 1991). Up to 78% of a population could be captured in a single year (Roosenberg 1997). Since the distribution of the Blue Crab (*Callinectes sapidus*), for which the two million commercial crab traps annually deployed were designed, coincides closely with that of the terrapin, Diamondbacks are especially at risk (Watters and Wood 2003). Although these traps were never intended to capture terrapins, they do.

These figures do not take into account recreational traps. In one small Maryland community, over half of the waterfront properties are weekend homes, and most of the docks have traps in the water all week long. While many full-time residents check their traps often enough to preclude terrapin drowning, that would be impossible for the weekenders.

Ghost Story

“Ghost traps” are abandoned or lost crab traps that continue to execute their function. They not only continue to deplete the downward spiraling population of crabs, but also take many terrapins. Ghost traps have been found with over 50 dead terrapins (Roosenberg 1991). Of the two million commercial crab traps placed in U.S. waters each year, as many as 25% become ghost traps, and these devices take a long time to rust away. Consequently, tens (or even hundreds) of thousands of traps work tirelessly to catch terrapins and other creatures — without any purpose. The results can be staggering (Watters and Wood 2003).

Our fish dinners also are paid for in terrapins. By-catch in several fisheries can be substantive. One that is getting considerable attention is the eel-pot fishery, which has great potential for harm and has been relatively understudied (Radzio and Roosenburg 2005).

Why Did the Terrapin Cross the Road?

The same roads we take to reach vacation destinations on barrier islands or the beach kill turtles. Road mortality inadvertently targets reproductively mature females because the roads mimic the high ground that female terrapins use for nesting. Each year, thousands of gravid terrapins are killed by vehicular traffic. In a six-year period, a single seven-mile stretch of road accounted for over 4,000 terrapin deaths (Wood and Herlands 1997).

Habitat loss continues to be a problem for terrapins. The two main culprits are waterfront development (Roosenberg 1991) and pollution (Ford et al. 2008). Many waterfront properties are bulk-headed or rip-rapped, denying access to terrapins. Several spill incidents in the last few years have affected prime terrapin habitat. Without access to nesting sites or unpolluted water, Diamondbacks cannot survive.

Due to the elimination of their natural predators, Raccoons (*Procyon lotor*) have increased in number and densities and are considered the major nest predators of terrapins (Butler 2000, Burger 1977, Seigel 1980). They are, after all, a human-subsidized predator, with great fondness for handouts from our trashcans. In some areas, the problem is so great that they destroy 100% of terrapin nests (Feinberg 2004). Consequently, many previously thriving populations have become sinks (Ner 2003).



TOMAS DIEBNE



ROGER WOOD

Thousands of gravid terrapins are killed each year by vehicular traffic.



PETER KING

Mortality attributable directly or indirectly to human activities appears to be exceeding the species' reproductive capacity.

Even boat traffic takes a toll, with 20% of turtles in some populations, predominantly females, showing propeller scars (Roosenberg 1991).

Jay Leno, in a potato chip advertisement, said, "Eat 'em, we'll make more." Unfortunately that doesn't apply to Diamondback Terrapins.

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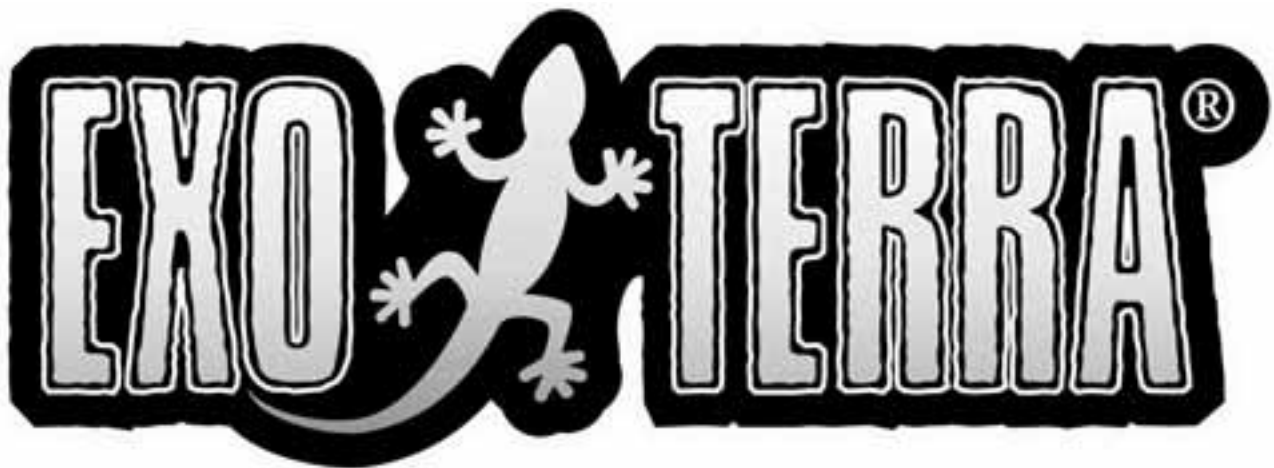
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