CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

Sixteenth meeting of the Conference of the Parties
Bangkok (Thailand), 3-14 March 2013

CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

A. Proposal

Inclusion of *Malaclemys terrapin* in Appendix II; in accordance with Article II, paragraph 2 (a) of the Convention and Resolution Conf. 9.24 (Rev. CoP15), Annex 2a as per:

a) Criteria A. It is known, or can be inferred or projected, that the regulation of trade in the species is necessary to avoid it becoming eligible for inclusion in Appendix I in the near future; and

b) Criteria B. It is known, or can be inferred or projected, that regulation of trade in the species is required to ensure that the harvest of specimens from the wild is not reducing the wild population to a level at which its survival might be threatened by continued harvesting or other influences.

B. Proponent

United States of America [*]

C. Supporting statement

1. Taxonomy

1.1 Class: Reptilia

1.2 Order: Testudines

1.3 Family: Emydidae

1.4 Species: *Malaclemys terrapin* (Schoepff 1793)

1.5 Scientific synonyms: *Testudo terrapin* (Schoepff 1793)
Testudo concentrica (Shaw 1802)
Testudo ocellata (Link 1807)
Testudo concentrata (Kuhl 1820)
Testudo concentrica [var.] (Gray 1831)
Emys concentrica (Dumeril & Bibron 1835)
Emys macrocephalus (Gray 1844)
Emys concentrica (Dumeril & Bibron 1854)
Malaclemys concentrica (Gray 1863)
Malacoclemmys terrapen (Boulenger 1889)
Malaclemys terrapin (Bangs 1896)

Holbrook, 1842

[*] *The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CITES Secretariat or the United Nations Environment Programme concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.*

1.6 Common names: English: Diamondback terrapin
French: Tortue à dos diamanté
Spanish: Tortuga espalda de diamante

1.7 Code numbers: Not applicable, as not included in CITES.

2. Overview

Malaclemys terrapin is a member of the North American family of freshwater turtles (Emydidae) inhabiting the brackish coastal waters (including coastal swamps, estuaries, lagoons, tidal creeks, mangrove thickets, and salt marshes) of the United States along the Atlantic Ocean and the Gulf of Mexico, from Cape Cod, Massachusetts, in the north, to Corpus Christi, Texas, in the south (Iverson, 1992). A breeding subpopulation is also found in Bermuda (Davenport et al., 2005; Bacon *et al.* 2006) on the eastern end of the island (Outerbridge, 2010).

Malaclemys terrapin are currently collected for use primarily as pets and are exported primarily to Asia. Exports of this species from the United States have increased from under 1000 individuals per year in 1999 to 3000 individuals per year by 2010, with a high of 6000 individuals exported in the year in 2006. Turtle life history traits, such as delayed sexual maturity and high juvenile mortality make this species particularly vulnerable to the loss of just a few adults from the population. Based on the best available information, the U.S. population of *M. terrapin* is thought to exceed 100,000 (van Dijk, 2011), and the Bermuda population is less than 100 individuals (Outerbridge, 2010). Researchers and wildlife managers consider most *M. terrapin* subpopulations to be “declining to stable” in the United States (Butler et al 2006). Although most U.S. states now have legislation that regulates the collection of *M. terrapin* (Watters 2004), this species is still taken from the wild in parts of its range within the United States. *Malaclemys terrapin* was reassessed in 2011 by IUCN for its Red List of Threatened Species, and the draft assessment recommended an upgrade to Vulnerable due to an observed population decline.

At the 2010 Conservation and Trade Management of Freshwater and Terrestrial Turtles workshop, held in St. Louis, Missouri, U.S. State resource managers and turtle specialists recommended including this species in CITES Appendix II. Regulating international trade within CITES Appendix II would ensure that exports are not detrimental to the species’ survival in the wild and would help in stemming illegal trade.

Malaclemys terrapin qualifies for inclusion in Appendix II by satisfying both Criteria A and B of Annex 2a of Resolution Conf. 9.24 (Rev. CoP15). Because the species faces an entire suite of threats, including international trade, it can be inferred that regulation of trade in the species is necessary to avoid it becoming eligible for inclusion in Appendix I in the near future (Criterion A). Likewise, available information indicates that the regulation of trade in the species is required to ensure that the harvest of specimens from the wild is not reducing the wild population to a level at which its survival might be threatened by continued harvesting or other influences (Criterion B).

3. Species characteristics

3.1 Distribution

Malaclemys terrapin is native to 16 states in the United States (Alabama, Connecticut, Delaware, Florida, Georgia, Louisiana, Maryland, Massachusetts, Mississippi, New Jersey, New York, North Carolina, Rhode Island, South Carolina, Texas, Virginia), occurring along brackish coastal waters of the Atlantic Ocean and the Gulf of Mexico, from Cape Cod, Massachusetts, in the north, to Corpus Christi, Texas, in the south (Iverson, 1992).

A breeding subpopulation is also found in Bermuda (Davenport et al., 2005; Bacon *et al.* 2006), which was considered native by Parham *et al.* (2008) and attributed to subspecies *centrata*.

The seven subspecies within the United States are distributed as follows (van Dijk, 2011):

* *M. terrapin terrapin* occurs from the northern shore of Cape Cod, Massachusetts, southward to the vicinity of Cape Hatteras, North Carolina, where it intergrades with *M. terrapin centrata*;

* *M. terrapin centrata* occurs from the vicinity of Cape Hatteras, North Carolina, southward to southern peninsular Florida, where it meets and intergrades with *M. terrapin tequesta*;

* *M. terrapin tequesta* occurs from southern peninsular Florida to Florida Bay, where it intergrades with *M. terrapin rhizophorarum*;

* *M. terrapin rhizophorarum* occurs from the Florida Keys westward at least to the Marquesas Keys;

* *M. terrapin macrospilota* occurs from the Gulf coast of peninsular Florida, intergrading with *M. terrapin pileata* in the panhandle and with *M. terrapin rhizophorarum* in Florida Bay;

* *M. terrapin pileata* occurs from Louisiana, where it intergrades with *M. terrapin littoralis*, to the Florida panhandle, where it intergrades with *M. terrapin macrospilota*;

* *M. terrapin littoralis* occurs from western Louisiana and the coast of Texas, at least as far south as Corpus Christi Bay, Texas.

Anecdotal reports that this species is found in Mexican waters (e.g., Carr 1952) have been disputed (Smith and Smith 1979); there is no credible information indicating occurrence in Mexico (Iverson, 1992; Mexican RL WS participants, Sept. 2005).

3.2 Habitat

Malaclemys terrapin is found in brackish coastal waters (salinity range = 0 to 35 parts per thousand). Typical habitats include coastal swamps, estuaries, lagoons, tidal creeks, mangrove thickets, and salt marshes. Although *M. terrapin* is found in brackish water, periodic access to freshwater is necessary for long-term health (Ernst and Lovich, 2009).

3.3 Biological characteristics

The diet of *M. terrapin* consists largely of invertebrates, such as crustaceans and mollusks (Tucker *et al.* 1995), but individuals also eat large amounts of plant material, including the alga *Ulva* (sea lettuce) (Burke, unpub. data). In some places, *M. terrapin* are an important predator of the salt marsh periwinkle (*Littoraria irrorata*), a snail that feeds on salt marsh cord grass (*Spartina alterniflora*). *M. terrapin* obtain drinking water by skimming the water's surface following a rain.

Marked variation in life history traits of *M. terrapin* can be attributed to a broad latitudinal distribution. Female turtles from northern populations mature later and at a relatively larger size than those from southern populations. Because clutch size and body size are strongly correlated, females from northern populations may produce up to a record of 28 eggs per clutch (Burke, pers. comm.), whereas smaller females from southern populations produce 4-6 eggs per clutch. Average annual reproductive output depends on the number of clutches produced per season. In northern populations, the average female may produce 0-3 clutches of about 10-13 eggs in a single nesting season (0 - 30 eggs/year); however, little if any information is available on whether females skip reproduction in particular years. For detailed reviews of reproductive data, see Butler *et al.* (2006), Ernst & Lovich (2009), and van Dijk (2011).

3.4 Morphological characteristics

Malaclemys terrapin has pronounced sexual dimorphism; females are larger than males (Carr 1952). Female turtles mature later and at a larger size than males. The maximum recorded size for an adult female, 25 cm carapace length (CL), is much greater than that of males (14 cm). Size differences may reflect resource partitioning (diet, habitat) between the sexes (Tucker *et al.* 1995).

3.5 Role of the species in its ecosystem

Where they occur, *Malaclemys terrapin* play an extremely important role in maintaining functional coastal saltwater marsh ecosystems, including tidal creeks, lagoons, and estuaries. They help disperse seeds and manage vegetation levels, control insect and snail populations, and help keep water clean. In some places, *Malaclemys terrapin* are an important predator of the salt marsh periwinkle (*Littoraria irrorata*), a snail that feeds on salt marsh cord grass (*Spartina alterniflora*). Silliman and Bertness (2002) conducted a series of experiments that showed that when *M. terrapin* and other predators are removed, periwinkles overgraze the cord grass leaving a barren mudflat. For this reason, healthy *M. terrapin* populations are essential for maintaining primary production in salt

marsh ecosystems, and inclusion of this species in CITES would provide conservation benefits to the wetland ecosystem that the species occupies.

4. Status and trends

4.1 Habitat trends

Habitat destruction poses a serious and ongoing threat to *Malaclemys terrapin* populations. The range of *Malaclemys terrapin* is coincident with dense areas of human population. Coastal development, particularly salt marsh draining, increased use of coastal waterways for commercial and recreational purposes, and loss of sand dunes, an important habitat for nesting, contribute to the loss and degradation of this species' habitat (van Dijk, 2011). Four of the five U.S. states with the highest levels of estuarine wetland losses are found within the range of the terrapin: Florida, Louisiana, New Jersey, and Texas (Tiner 1984), and the coastlines of these four states together comprise 67% of terrapin range.

4.2 Population size

The U.S. population size of *M. terrapin* in the United States is unknown; however, it is presumed to exceed 100,000 (van Dijk, 2011). The Bermuda population is small (less than 100 individuals) and has very low recruitment; native populations are localized to three brackish water ponds on a golf course on the eastern end of the island (Outerbridge, 2010).

4.3 Population structure

Hart (2005) noted a 1:1 sex ratio in the U.S. state of Florida, but a review by Lovich and Gibbons (1990) showed that a male-biased sex ratio is expected in these turtles due to differential age of maturity in males [sooner] and females [later] (Ernst and Lovich, 2009). The Bermuda population is dominated by females (Outerbridge, 2010).

There are seven recognized subspecies of *Malaclemys terrapin*; however, these subspecific designations do not correspond well with genetic data (Hauswaldt and Glenn 2005, Hart 2005).

4.4 Population trends

According to a range-wide survey of researchers and state biologists, most *M. terrapin* subpopulations are "declining to stable" (Butler et al 2006). Significant local declines have been documented in the U.S. states of South Carolina (Gibbons *et al.* 2001, Dorcas *et al.* 2007), New Jersey (Avissar 2006), and Maryland (Roosenburg pers. comm.) due to crab trap mortality and vehicle strikes. An island in the U.S. state of New York had 2,053 nests in 1999, which is the largest nesting population observed anywhere in the species' range (Feinberg and Burke 2003).

On Kiawah Island, in the U.S. state of South Carolina, population estimates from a mark-recapture study of *M. terrapin*, suggest a decline of 75% over the last two decades (Gibbons *et al.* 2001, Dorcas *et al.* 2007). High male and juvenile mortality rates in this subpopulation, likely due to incidental drowning in crab traps, result in an increase in the proportion of large females (Dorcas *et al.* 2007). Commercial and recreational crab trapping is a contributing factor to the decline of subpopulations in the U.S. states of South Carolina, Maryland, and New Jersey (Bishop, 1983; Wood, 1997; Roosenburg *et al.* 1997).

In the U.S. state of New Jersey, researchers found a significant decrease in the number and size of adult females of *M. terrapin* relative to the results of a study conducted 12-13 years earlier in the same tidal creek (Avissar 2006). This demographic shift was not attributed to crab trap mortality because the site is closed to trapping; however, a decline in large females is consistent with the observation that road mortality of nesting females has increased (Avissar 2006, Szerlag and McRobert 2006). A long-term study in the coastal town of Cape May in the U.S. state of New Jersey documented 4,020 road kills during a 7-year study (Wood and Herlands, 1997). The extent to which the *M. terrapin* population declined during this time is unknown, but it is likely substantial because the area also has a significant commercial and recreational crab fishery (Wood, 1997).

In the coastal town of Jamaica Bay in the U.S. state of New York, researchers found significantly high (92-100%) and consistent raccoon predation on *M. terrapin* eggs during the years 1998-2010

(Feinberg and Burke 2003, Burke unpub. data). Unprotected nests very rarely survive. High levels of raccoon and rat predation on hatchlings have also been recorded. While in 1998-9 this population had the largest number of nests of any reported *M. terrapin* population, 12 years later the number of nests had dropped 43%. Jamaica Bay's cord grass marshes, on which *M. terrapin* depend, are disintegrating at a rapid rate, and the bay is predicted to be essentially marsh-free within 50 years.

There are no clear indications that subpopulations along the Gulf of Mexico coast have been significantly impacted by the Deepwater Horizon oil spill of 2010. The impact of hurricanes, such as Katrina in 2005, on *M. terrapin* populations remains poorly understood (van Dijk, 2011).

4.5 Geographic trends

The extent of occurrence for a coastal species like *M. terrapin* is difficult to determine. The distribution of *M. terrapin* is best described as discontinuous along the ~5,000 km of coastline between Cape Cod, Massachusetts, and Corpus Christi, Texas. Within these bounds, *M. terrapin* inhabit salt marshes that form on the bay side of barrier islands, and the extent to which they move inland via estuaries varies considerably (van Dijk, 2011).

5. Threats

M. terrapin populations have been heavily affected by urbanization range-wide. Beginning in the 1700s, impacts of urbanization were primarily through increased sediments and sewage loads and through intensive resource use. With increased industrialization, pollutants changed rapidly to more complex chemicals and increased movement of surface material (Odum *et al.* 1984; Hanson and Lindh 1993; Ehrenfeld 2001). Wide-scale diking, dredging, and filling of urban salt marshes became common around cities beginning in the mid-1800s with the advent of heavy machinery, often associated with the maintenance of shipping channels and development of industrial sites. Dredging has continued; development and fill deposition accounted for 73% of estuarine losses in the United States from 1986 to 1997 (Dahl 2000).

Four of the five U.S. states with the highest levels of estuarine wetland losses are found within the range of *M. terrapin*: Florida, Louisiana, New Jersey, and Texas (Tiner 1984), and the coastlines of these four states together comprise 67% of the range of *M. terrapin*. Three of the five largest cities in the United States, New York City, Houston, and Philadelphia, are located on estuaries within the range of *M. terrapin*. In June 2011, 150 nesting individuals of *M. terrapin* crossing the run-ways at JFK Airport caused flight delays of thirty minutes or more (http://www.cbsnews.com/stories/2011/06/29/national/main20075461.shtml). Clearly, *M. terrapin* and their habitat have been strongly impacted by urbanization. Coastal development is particularly problematic because it frequently destroys nesting beaches (Roosenburg 1991, Roosenburg and Place 1994). Three consequences of development for *M. terrapin* are: (1) higher concentration of nesting habitat in remaining areas resulting in greater predation rates of nests; (2) alteration of incubation conditions potentially affecting survivorship and gender (*M. terrapin* have temperature-dependent sex determination); and (3) increased predation of adult females.

Predicted sea-level rise represents a particularly severe impact on *Malaclemys terrapin* habitat, as it would affect inter-tidal and supra-tidal coastal marshland (Michener et al., 1997) and nesting beaches at the seaward side (Schlacher et al., 2007); shoreline hardening and armoring and other coastal defenses would generally prevent landward shift of intertidal marshes, thus restricting terrapins to an ever-narrower strip of habitat.

In U.S. states with a commercial blue crab (*M. terrapin*) fishery, incidental drowning in crab pots is considered to be the major threat to *M. terrapin* (Butler *et al.* 2004). *M. terrapin*, attracted to the bait, enter through an underwater opening, become trapped, and drown within a few hours (Wood 1997, Roosenburg 2004). Small males and juveniles are caught more frequently than adult females due to the limitations on the size of the trap entrance.

Adult females of *M. terrapin* are frequently struck and killed by motor vehicles while attempting to cross motorways in search of nesting sites (Wood and Herlands 1997, Szerlag and McRobert 2006). Large females of *M. terrapin* often bear scars from the propellers of motor boats. Hatchlings of *M. terrapin* migrating to water after nest emergence can get trapped in tire tracks from vehicular traffic on nesting beaches. If the hatchlings are unable to escape, they may die of dehydration or be crushed by a subsequent vehicle.

Human-subsidized predators, native or introduced animals whose populations prosper as a result of association with humans and human-altered habitats, are another threat to *M. terrapin* populations (Boarman 1997). Studies in the U.S. state of New York identified (locally introduced) raccoons (*Procyon lotor)* and Norway rats (*Rattus norvegicus*) as major predators on the adults, juveniles, and eggs of *M. terrapin*, accounting for a nest depredation rate of 92% and emerging hatchling predation rate of up to 20%, respectively (Feinberg & Burke, 2003; Draud *et al.* 2004).

6. Utilization and trade

6.1 National utilization

Malaclemys terrapin are currently collected for use primarily as pets. Prior to the European settlement of North America, *Malaclemys terrapin* was utilized for food; however, as human populations increased throughout the species' range, the exploitation reached unsustainable levels. Experiments with captive propagation for commercial purposes were initiated by the United States Government in the early 20th century because the range-wide population was believed to be in danger of extinction (Hay 1917). Terrapin stew was a popular delicacy in the United.States, and *Malaclemys terrapin* were exported to several European countries. In the late 19th century, 400,000 lbs were harvested annually (True, 1887). By 1920, *Malaclemys terrapin* populations had dwindled, and only 823 lbs were harvested that year on the Chesapeake Bay in the eastern United States and were priced at USD125 per dozen. Prohibition (sherry was a main ingredient in soup) and the great depression (people could not afford the high cost of soup made with *M.terrapin*) helped reduce demand for *Malaclemys terrapin*. This allowed the population to slowly recover and avoid extinction (Carr 1952). Although most U.S. states now have legislation that regulates the collection of *M. terrapin* (Watters 2004), this species is still taken from the wild in parts of its range. In 2006, the last year in which this species was legally harvested in the U.S. state of Maryland, watermen reported a catch of 10,500 individuals of *M. terrapin*. Declines in populations are now mostly associated with increased anthropogenic activity, usually the use of crab pots (reviewed in Roosenburg, 2004; Seigel and Gibbons 1995), but also habitat loss and commercial harvest (van Dijk, 2011).

6.2 Legal trade

U.S. trade data were obtained from the U.S. Fish and Wildlife Service Law Enforcement Management Information System (LEMIS) for the period 1999 through 2010 (see Table 1 and Figure 1; LEMIS 2011). These data are compiled from U.S. wildlife declaration forms required for import or export of any fish and wildlife.

The exports in Table 1 and Figure 1 were reported as commercial trade (LEMIS 2011). Of the 26,342 individuals exported during this time period, 7,309 individuals (27.7%) were sourced as wild; 19,029 individuals (72.2%) were reported as captive bred or ranched; and 4 individuals (0.02%) were reported as "other."

The data show that exports of this species from the United States have increased from under 1,000 turtles per year in 1999 to 3,000 turtles per year by 2010, with a high of 6,000 turtles exported in the year 2006. Overall, there appears to be an increasing trend in export of *Malaclemys terrapin* from the United States. Specimens were primarily exported to Asia.

An earlier analysis of LEMIS data by Franke and Telecky (2001) from 1989–1997 showed that the number of live *Malaclemys terrapin* exported from the United States totalled 4,002 specimens (1989: no data provided by LEMIS; 1990: 5; 1991: 41; 1992: 102; 1993: 508; 1994: 1,089; 1995: 1,420; 1996: 392; and 1997: 445) (Franke and Telecky 2001). According to Reed and Gibbons (2002), the number of *Malaclemys terrapin* exported from the United States during 1996-–2000 totalled 2,936 specimens. In addition, according to a survey of online animal dealers, Reed and Gibbons (2002) estimated that 40% of the turtles for sale were wild-caught (using descriptions and sizes of animals provided by the seller) and that the average selling price per specimen was USD80 (with a range from USD35 (minimum) to USD125 (maximum)).

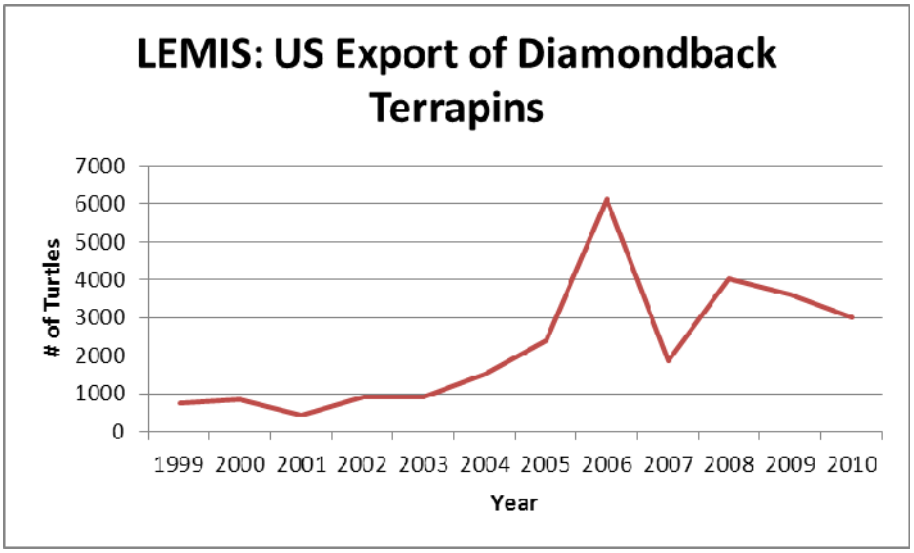
The market demand for northern *Malaclemys terrapin* from Asian markets led to the permanent closure of the terrapin fishery in Maryland in April 2007; however, several other U.S. states still allow commercial harvest of terrapins. Asian countries began importing *Malaclemys terrapin* and other U.S. species due to the depletion of most of their native turtle species, with some vendors selling as many

as 2,000-3,000 of these turtles in a single year (pers. comm., L. Bankey, National Aquarium, June 11, 2012).

Table 1. U.S. Export Data for *Malaclemys terrapin* 1999-2010 (LEMIS 2011)

Year	# Individuals	# Shipments
1999	737	19
2000	846	31
2001	422	27
2002	911	38
2003	904	35
2004	1499	76
2005	2399	78
2006	6129	96
2007	1867	77
2008	4021	77
2009	3609	69
2010	2998	88
Total	**26,342**	**711**

Figure 1.



6.3 Parts and derivatives in trade

Historic trade was in the meat of *Malaclemys terrapin*. More recent exports are of live animals.

6.4 Illegal trade

The extent to which *Malaclemys terrapin* is subject to illegal trade is unknown. Commercial interest in *M. terrapin* remains high, primarily for the pet trade and, to some extent for use as food, in Asia. Hatchlings sell in pet markets of Hong Kong for USD50-100 a piece (Roosenburg pers. comm.). Additionally, harvest of *Malaclemys terrapin* for turtle farms in Asia is taxing wild populations in the United States and contributing to potential illegal harvest in U.S. states where they are currently protected (van Dijk, 2011).

6.5 Actual or potential trade impacts

Given the species' population dynamics, slightly increased rates of loss of juveniles and adults significantly affect a *Malaclemys terrapin* population. Turtle life history traits, including delayed sexual maturity and high juvenile mortality make *Malaclemys terrapin* particularly vulnerable when it comes to removing even a few adults from the population.

7. Legal instruments

7.1 National

Malaclemys terrapin is not protected under the U.S. Endangered Species Act or other U.S. Federal laws.

The U.S. state of Massachusetts has designated *M. terrapin* as Threatened in this state. All U.S. states within this species' range, except New York have designated this species as a Species of Greatest Conservation Need (see Annex 1) (Nanjappa and Conrad 2011). Legislation in the U.S. state of Maryland ended the commercial harvest of *M. terrapin* in this state in 2007. State protection or harvest regulation in the remaining U.S. states within the species' range has been recommended (Roosenburg *et al.* 2008).

7.2 International

None known.

8. Species management

8.1 Management measures

A 2004 workshop on *M. terrapin* showed that the status of their populations in most U.S. states within the species' range was not known and that priority state management actions to be taken included crab pot regulations, habitat protection, field studies, and range-wide distribution and population surveys (Butler et al 2006). The largest management efforts for this species in the United States by far revolves around preventing individuals from drowning in crab pots and only secondarily, the protection of eggs (predator control, nest protection, head starting; pers. comm. Burke, Senior Co-Chair of the Diamondback Terrapin Working Group, 2012). In the U.S. state of New Jersey, the use of barrier fences along costal roadsides to reduce road mortality of nesting females has been a successful management technique (Szerlag & McRobert 2006; Wood & Herlands 1997 [1993]; Wood & McLaughlin 2010).

8.2 Population monitoring

Population monitoring for *Malaclemys terrapin* is not consistent across the species' range and is largely carried out by researchers from universities or private institutions; however, U.S. State and Federal-led monitoring programs exist. A table summarizing monitoring efforts is included in Annex 2.

8.3 Control measures

8.3.1 International

None known.

8.3.2 Domestic

The species is protected at the U.S. state level throughout much of its range (see Section 7.1 Legal Instruments, National).

8.4 Captive breeding and artificial propagation

This species is bred in captivity by hobbyists, but no large-scale captive-breeding programs exist (Burke, Senior Co-Chair of the Diamondback Terrapin Working Group, 2012). In 2006, researchers at the University of Alabama initiated a head-starting program with 150 hatchlings to be raised in captivity to a larger, less vulnerable size before being released back into the marshes of Dauphin Island in the U.S. state of Alabama. This site once held the second largest *Malaclemys terrapin* farm in the United States, shipping 10,000 turtles annually circa 1900 (http://main.uab.edu/Sites/MediaRelations/articles/68802/).

8.5 Habitat conservation

There are a number of U.S. Fish and Wildlife Service wildlife refuges and other protected areas within the range of *Malaclemys terrapin*; however the proportion of the species' habitat that is protected has not been quantified.

Brennessel (2006), in a report by the Northeast Diamondback Terrapin Working Group, suggested the six actions below to protect *Malaclemys terrapin* habitat. Efforts to implement these actions are ongoing.

a. Land acquisition;

b. Mitigation of damage and disturbance caused by recreational use;

c. Restoration of nesting areas;

d. Restoration of natural nutrient and water flow;

e. Review of proposed development activities within habitat areas; and

f. Review of proposed dredging of estuaries and coastal systems.

8.6 Safeguards

N/A

9. Information on similar species

There are no similar species in international trade.

10. Consultations

The United States Fish and Wildlife Service sent a consultation letter to Bermuda (considered a Dependent territory of the UK); however, we have not received a response.

We also consulted with all U.S. States where this species occurs and have incorporated the information received into the appropriate sections of this document.

11. Additional remarks

This species was recommended for inclusion in Appendix II by State resource managers in U.S. range states and turtle specialists at the 2010 workshop on the Conservation and Trade Management of Freshwater and Terrestrial Turtles in the United States held in St. Louis, Missouri (convened and hosted by the U.S. Fish and Wildlife Service).

The Diamondback Terrapin Working Group is a group dedicated to *Malaclemys terrapin* research, conservation, management, and education. It was formed in 2004 by individuals from academic, scientific, regulatory, and private institutions working to promote the conservation of the *Malaclemys terrapin*, including the preservation of intact, wild populations and their associated ecosystems throughout their range (http://www.dtwg.org/index.html). Members include all 16 U.S. range states and Bermuda.

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State Regulation of Diamondback Terrapins (DBT− *Malaclemys terrapin*) *

State	State Protected Status	Harvest Restrictions	Regulatory Citation
Alabama	SGCN**		AL 220-2-92
Connecticut	SGCN	No take of DBT allowed	490 CGS Section 26-1
Delaware	SGCN	Non-commercial take season	AC Title 7 3000-3900
Florida	SGCN	With permit no person may possess more than 2 DBT	FAC 68A-4.001-4.008
Georgia	SGCN	Cannot keep DBT without permit	GC 27-1-28
Louisiana	SGCN	Commercial Open season (Jun16-Apr14) No shipping out of state of DBT Apr 15-June15	LA 632.8
Maryland	SGCN		MD 10-909
Massachusetts	Threatened; SGCN		321 CMR 3.05
Mississippi	SGCN		MSC 1972: 49-5-101 MSC 1972: 49-1-41
New Jersey	SGCN	Commercial	
New York		Commercial (DBT open season Aug1-Apr30)	ECL 11-0103, 0512; 6 NY CRR Part 3 and 175
North Carolina	SGCN	Collection license needed for the taking of more than 5 DBT	GS 113-129
Rhode Island	SGCN	No commercial or personal collection of DBT	RIGL 20 -37 (1-5)
South Carolina	SGCN	No commercial or personal collection of DBT	SCC Title 50 Article 23 Section 50-5-2300
Texas	SGCN	Collection license needed	PWC 1.101(1)
Virginia	SGCN	DBT protected under state law	4 VAC 15-30-10

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** SGCN – State designation of Species of Greatest Conservation Need

Population Monitoring Efforts for Diamondback Terrapins

Country/State	Location	Institution/Affiliation	Yr.	Researcher
USA				
Alabama	Dauphin Island	University of Alabama		Thane Wibbels
Florida	Everglades NP	U.S. Geological Survey, Southeast Ecological Science Center, Davie	2002	Kristen Hart
	Talbot Island	University of North Florida		Joseph Butler
	Florida Keys	Richard Stockton College of NJ	1980	Roger Wood
	Florida Keys	Miami Museum of Science		Brian Mealey
	Kennedy Space Center	Towson University		Rich Seigel
Georgia	Jekyll Island Causeway	Savannah River Ecology Lab University of Georgia Georgia Sea Turtle Center	2007	Andrew Grosse John Maerz Terry Norton Brian Crawford
Louisiana	Rockefeller Wildlife Refuge	Louisiana Department of Wildlife and Fisheries	2011	Will Sellman
Maryland	Chesapeake Bay and Patuxent River	Ohio University		Willem Roosenburg
	Chesapeake Bay	Maryland DNR	2010	Scott Smith
Massachusetts	Cape Cod/Wellfleet Bay	Wheaton College Wellfleet Bay Wildlife Sanctuary MA Association of Conservation Districts		Peter Auger, Barbara Brenessel & Bob Prescott Don Lewis
Mississippi	Grand Bay National Estuarine Research Reserve	NOAA Environmental Cooperative Science Center and the MS Nature Conservancy	2007	Christina Mohrman (Grand Bay NERR) and Tom Mohrman (MS Marine Resource Coordinator, TNC)
New Jersey	Southern NJ	The Wetlands Institute and Richard Stockton College of NJ	1974 1989	Roger Wood & Patrick Baker
	Barnegat Bay Estuary	Drexel University		Harold Avery & Jim Spotila
	Hackensack Meadowlands	NJ Meadowlands Commission	2009	Brett Bragin
	Barnegat Bay	Marine Academy of Technology and Environmental Science		John Wnek
	Wildwood Crest	Lower Cape May Regional High School Marine Science classes	2000	Joe Grottola
New York	NY side of the Long Island	C.W. Post University		Matt Draud
	Jamaica Bay	Hofstra University		Russell Burke

Country/State	Location	Institution/Affiliation	Yr.	Researcher
Rhode Island		Barrington Land Conservation Trust		Charlotte Sornborger
South Carolina	Kiawah Island	Davidson College Savannah River Ecology Lab	 1983	Mike Dorcas Whit Gibbons
Texas	Galveston Bay	University of Houston Clear Lake	2009	George Guillen
Virginia		College of William and Mary		Randy Chambers
Bermuda	Eastern end of Island (Golf Course)	Bermuda Zoological Society	2008	Mark Outerbridge