Paper Abstracts

Cold-hardiness of Terrestrially Hibernating Hatchlings of the Northern Diamondback Terrapin, *Malaclemys terrapin terrapin*

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Diamondback terrapin (*Malaclemys terrapin terrapin*) hatchlings have been observed to hibernate terrestrially in the northern portion of their range. Field observations and laboratory experiments were conducted on hatchling terrapins from Stone Harbor, New Jersey and Bayville, New York. Hatchling terrapins frequently overwintered in the nest chamber in New Jersey, yet despite exposure to sub-zero temperatures (as low as -4.4˚ C) in the nest, winter mortality was low. In New York, terrapins typically emerged from their natal nests soon after hatching; however, the hatchlings, followed with the aid of miniature radio transmitters, were observed to hibernate in shallow burrows above the tide line. Laboratory studies showed that cold-acclimated hatchlings from New Jersey had low rates of evaporative water loss (2.8 mg g^{-1} d^{-1}) relative to other turtle species, which may prevent dehydration during hibernation. Hatchlings from eggs collected in New Jersey and reared on sterile vermiculite supercooled (i.e., remained unfrozen) to -15.1˚ C, whereas hatchlings collected from their natural hibernacula in New York had a much more limited supercooling capacity, freezing at temperatures near -5.1˚ C. Hatchlings from both populations were highly susceptible to inoculative freezing by ice and ice nucleating agents, which occur in their hibernacula. Therefore, freeze avoidance via supercooling is likely not a viable cold hardiness strategy in these turtles. However, hatchlings survived the freezing of their tissues at a temperature of -2.5˚ C for >72 h, suggesting that these turtles, like several other emydids, may survive brief chilling episodes in the nest by tolerating freezing.

Conceptualizing a Global, Multi-faceted Conservation Plan for Tortoises and Freshwater Turtles

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The problems facing the world's tortoises and freshwater turtles have become well publicized over the past decade. The recognized endangerment of a large proportion (65%) of Asia's turtles -the richest turtle fauna in the world- has led to a multitude of conservation efforts by a variety of organizations and institutions. However, endangered turtle species are found in all regions of the world. Generalized categories of conservation action include: 1) species assessments, 2) field ecological surveys, 3) university research (i.e., genetics, disease studies and relocation research), 4) assurance colony establishment (i.e., captive breeding), and 5) capacity-building (i.e., education, enforcement, turtle farming, turtle rescue centers, and protected area development). Prioritizing the most important category(s) of action for each species is required. Coordination and the building of partnerships among conservation organizations becomes essential because funds are limited and no single organization has the ability to implement projects in all of the categories. A comprehensive strategy is two-staged and should: 1) prevent the ultimate extinction of any turtle species and 2) ensure that viable, self-sustaining turtle populations exist in protected areas and that turtles are part of functioning ecosystems.

Effectiveness of a Bycatch Reduction Device on Crab Pots in Florida - Preliminary Results

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Diamondback terrapins (*Malaclemys terrapin*) drown in blue crab (*Callinectes sapidus*) pots throughout their range. The objectives of this study were to: 1) test if bycatch mortality of diamondback terrapins in commercial crab pots is reduced by using bycatch reduction devices (BRDs), 2) determine if BRDs enhance crab catch in Florida by comparing sex, size and number of blue crabs captured in standard crab pots with those captured in pots equipped with BRDs, and 3) formulate recommendations to the Florida Fish and Wildlife Conservation Commission for regulations that reduce terrapin bycatch mortality in Florida waters. We fished 15 control pots and 15 pots with BRDs (experimentals) for 10-day periods in each of six Florida counties from 2002 through 2004. Pots were baited and checked daily. We determined the sex of all captured terrapins and blue crabs and took measurements of each that would allow us to evaluate if BRDs affected the size of either species. Thirty-seven terrapins were caught in control pots and four in experimentals. Several were small enough that they would not have been prevented from entering either pot treatment, but we found that 73.2% of the terrapins in this study could have been prevented from entering crab pots with functional BRDs. There were no significant differences between the sex, number or measurements of legal-sized crabs captured in control and experimental pots at any of the study sites. We recommend that the Florida Fish and Wildlife Conservation Commission devise and adopt regulations that require the use of 45.0 x 120.0 mm BRDs on all commercial and recreational crab pots in Florida as soon as possible.

Aspects of Behavior and Ecology of Hatchling and Juvenile Diamondback Terrapins

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We have been studying the ecology and behavior of hatchling and juvenile diamondback terrapins for several years, using mark-recapture and radio-telemetry. Our data show that diamondback terrapin hatchlings utilize high marsh habitat such as *Spartina patens* and *Distichlis spicata* during their first fall following emergence from nests. At low tide they are often buried in the sand or sitting motionless at the surface under these marsh grasses. They feed on a variety of invertebrates mainly while submerged during high tide. Prey items include marsh snails, marsh crabs, amphipods, and spiders. Hatchlings return to terrestrial habitat to hibernate in October, digging shallow (4-10 cm depth) hibernacula in sandy soil, often around the base of vegetation such as seaside goldenrod (*Solidago sempervirens*) or larger shrubs and trees. Hatchlings have been radio-tracked and found to hibernate up to 200 m from the high marsh. Yearlings typically emerge from hibernation in April and move back to the high marsh, mainly hiding beneath accumulated wrack through early June. As *Spartina alterniflora* stalks grow larger and more prominent in June and July, the juveniles move into this lower marsh area, often burying in the mud or hiding beneath mats of marine seaweeds such as *Ascophylum*, *Sargassum* or *Fucus*. Home range and spatial ecology will be discussed.

Evaluation of the Seasonal Movements and Habitat Use of a South Carolina Diamondback Terrapin Population Using Sonic Tracking

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An automated acoustic passive tracking system was used to study the temporal and spatial movements of 13 adult female diamondback terrapins tagged with ultrasonic transmitters. From September 2002 through December 2003, automated acoustic receivers were moored within a cove of the Charleston Harbor estuary in South Carolina to continuously monitor habitat types known to be important to terrapins. These habitats include shallow water adjacent to a rocky shore, mudflat, tidal creek, and a sandy beach where females have been observed nesting. Presence/absence data from the receivers, coupled with recapture data, were used to document temporal activity patterns in these habitats. Ultrasound was used to document the reproductive status of terrapins in each habitat. Tagged females were detected in the water near the nesting beach from April-July. Terrapins were detected in the creek every month except from December-February, with the majority of these detections during July and August. They were detected near the rocky shore in April-July and in October, when aggregations of individuals and mounted pairs were observed in this area. Terrapins were active in the mudflat area from March-November, with peaks in detections in April and September. However, habitat use was highly variable between individuals. Temporal movement patterns were tidally influenced. Daily detection was greatest from late evening through early morning, regardless of tide stage. This system proved to be an efficient tool to constantly collect movement data on multiple terrapins simultaneously, increasing our understanding of terrapin daily behavior.

Lessons from Two Decades of Tracking Terrapins in Tidal Creeks: Kiawah Island, South Carolina

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Mark-recapture data from >1300 original captures (plus >1300 recaptures) of diamondback terrapins (*Malaclemys terrapin*) in a South Carolina salt marsh were used to examine demography and ecological factors critical for management recommendations and conservation. The study was initiated in 1983. Adult females were significantly larger than adult males. Adult sex ratios were strongly skewed in favor of males. Most terrapins captured in the tidal creeks were sexually mature, with first- and second-year individuals being absent and third- and fourth-year individuals being scarce, suggesting the use of a different habitat by young juveniles. Fifth- and sixth-year individuals were found commonly in the 1980s and early 1990s, but none of either sex has been found in recent years, suggesting that recruitment is dramatically reduced. Most individual adults exhibited high site fidelity, remaining in the same creek from year to year, although similar creeks were nearby. The observation of limited movement between adjacent tidal creeks is of particular significance to management considerations for the species. The lack of recruitment of juveniles is correlated with the onset of both recreational and commercial crab trapping and other human activities in the marsh habitat and, combined with high site fidelity and limited dispersal by terrapins from other creeks, has led to decreasing population sizes. Without the implementation of strong measures to assure sustainability, continued population declines at the site are likely.

Population Biology of the Diamondback Terrapin (*Malaclemys terrapin*): Integrating Ecology and Genetics to Define and Conserve Distinct Population Segments

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We are often forced to set management goals based upon only basic knowledge of a species perceived distribution and abundance, movement patterns, habitat requirements, or threats. Although it is especially difficult to define the boundaries of marine animal populations, doing so is the first step in defining a unit for conservation and management. I set out to define and delineate the boundaries of populations of diamondback terrapins in terms of both ecology and genetics. I sampled terrapins from throughout their range and conducted mark-recapture studies in North Carolina and in the Florida Everglades. Rangewide microsatellite genetic analysis revealed the presence of six regional populations or groups, indicating that terrapins display metapopulation-type structure. Recapture rates, population sex ratios, population structure, and genetic makeup varied substantially between the North Carolina and Florida Everglades sites. The Florida population consists of many more adult animals with a distinct lack of young juveniles, whereas the North Carolina population consists largely of juvenile turtles with very few adults. The population sex ratio is 1:1 in Florida, but 3:1 female-skewed in North Carolina. Microsatellite genetic analysis showed that males are the mechanism of gene flow within populations. Capture and recapture data indicate that site fidelity is extremely strong within each population, despite relatively high levels of gene flow among sites within regional populations. I compare and contrast terrapin habitat requirements, population structure, sex ratio, and gene flow in each of these two different populations and couch the results in a rangewide perspective.

Site Fidelity, Population Genetics and Mating Pattern in East Coast Diamondback Terrapins

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I have used six nuclear microsatellite DNA loci and mitochondrial D-loop sequences to investigate population genetic structure within and among estuaries. Although long-term mark-recapture data indicate that diamondback terrapins have high site fidelity, I was unable to find any population genetic structure within the Charleston Harbor estuary. I also genotyped terrapins from six additional estuaries along the east coast [ACE Basin (SC), Cape Romain (SC), NC, MD, NJ, and NY], as well as from the Florida Keys and Texas. I was unable to find significant genetic differentiation among terrapins from the Carolinas, but with geographic distance, genetic isolation increased to some extent. However, east coast terrapins were more similar genetically to those from Texas than to terrapins from Florida. The limited genetic structure along the east coast and the similarity between east coast and Texas terrapins probably reflects intentional mixing of animals along the east coast and introductions of Texas terrapins that took place at the beginning of the last century. I have also investigated the frequency of multiple paternity in this species. I have genotyped mothers and offspring from 27 clutches, including seven double clutches, which were collected during the 2003 nesting season at Long Island, New York. Multiple paternity, even between clutches, seems to be rare in this species compared to other species of turtle.

Using Turtles as a Vehicle for Environmental Education: Uniting Biologists and Educators

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Florida is home to over 8% of the world's known turtle species and is a significant area for both turtle diversity and habitat. Turtles are ancient creatures that walked the earth with the dinosaurs and today are important and visible elements in many ecosystems. Many of the twenty-five species that occur in Florida, as well as species worldwide, are now in decline and in need of conservation attention. Conservation efforts on their behalf are also beneficial to the ecosystems in which they are found. Consequently, turtles are an excellent group to use for teaching both ecology and conservation.

For the past twelve years, four-day workshops on the natural history and conservation of Florida turtles have been conducted for formal and non-formal educators. These workshops are based on the belief that education is the foundation for all successful conservation programs and that educators play a key role in conserving these ecologically important vertebrates. Classroom sessions are augmented with field trips to upland, riverine and coastal habitats to study several species in the wild. The goal is to provide educators with both a solid introduction to the ecology and conservation of Florida turtles and first-hand field experiences.

A biologist/environmental educator facilitates the workshops with assistance from other turtle researchers, thus providing an opportunity to unite biologists and educators. Field biologists have a responsibility to participate in conservation education programs that benefit the species that they study. Educators are our connection to both the public and decision makers. The workshops have increased the number of educators teaching about turtle ecology and conservation in diverse educational settings and have also recruited volunteers for field studies. Greater cooperative efforts between field biologists and educators can only improve the outlook for turtles worldwide.

The Diamondback Terrapin (*Malaclemys terrapin littoralis*) in Texas

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The first comprehensive account of the distribution and nesting of diamondback terrapins (*Malaclemys terrapin littoralis)* in Texas was compiled from recent (1990-2002) survey results and unpublished historical data. Sightings of diamondback terrapins from the late 1800s to 2002 were mapped along the entire Texas coast. Historical terrapin sightings were documented along both the northern (near Galveston Bay) and southern (south of Matagorda Bay) coast. Surveys since 1990 indicate that terrapin sightings are common locally along the southern Texas coast, but few recent surveys have been conducted in the northern historical range to determine if terrapins are still extant in those areas. Terrapin nesting was documented in Galveston Bay at South Deer Island in May 2002. One female was observed nesting in shell substrate, and the nest consisted of seven eggs. This nest is the only known and current documented record since the 1960s of terrapin nesting in Texas.

A Community's Response to Terrapin Mortality in Recreational Crab Traps

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Since 1982, a population of diamondback terrapins (*Malaclemys terrapin*) along the Kiawah River (South Carolina) has been part of a mark-recapture study. In 1999, research on the impact of incidental capture of terrapins in recreational crab traps indicated that this is a serious threat to the adult population. The research on this population, coupled with outreach and education programs, has motivated a concerned citizen to get involved in the politics of conservation. Great strides have been taken since this dedicated citizen mobilized the community, but the threat of ghost traps remains. This is a case study of one community's relationship with a diamondback terrapin population.

The Insular Ecology of *Malaclemys terrapin macrospilota* and *M. t. rhizophorarum* of Florida Bay and the Florida Keys

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The insular ecology and population dynamics of *Malaclemys terrapin macrospilota* and *M. t. rhizophorarum* are under investigation by collaborative investigators from many management, research, and educational institutions in south Florida. There are several concurrent methods applied in this study. The mark recapture study utilizes AVID microchips as a permanent marking system for all individuals encountered. Radio-telemetry units designed by American Wildlife Enterprises are attached using Marine-Tex. DNA and serum mercury samples are collected from blood drawn from each individual.

Results indicate extreme site fidelity over this time period for female terrapins. Furthermore, survival of individual terrapins over a 20-year span has been documented using data from previous researchers in the region. Notably, these individuals are currently residing in the same highly localized environment in which they were first captured in the early 1980s. This is reflected in our results from radio telemetry (n=18 individuals) and mark recapture data. Furthermore, the analyses of mitochondrial DNA (mtDNA) and nuclear DNA (nDNA) microsatellite markers support the physical evidence of limited dispersal. Comparisons of the populations of *M. terrapin* in Texas and Florida appear to indicate overall smaller populations currently exist on the Texas coast in otherwise comparable habitat. Florida terrapin populations represent localized assemblies with strong tendencies for long-term site fidelity. This has significant implications for management of these populations.

Diamondback Terrapin Road Mortality

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Road mortality of *Malaclemys terrapin* is a severe problem in areas where females seek nesting sites along edges of roadways crossing or adjacent to salt marshes. This problem is particularly acute near major population centers along the Atlantic coast of the United States. Roadways to barrier islands are

the principle remaining nesting habitat in certain natural areas; natural nesting habitat on barrier islands has disappeared due to intense human development. These causeways are slightly elevated above the salt marsh, providing the only suitable sites for nesting. Traffic on these roadways is heaviest during the nesting season, which coincides with the summer tourist season. Diamondback terrapin roadkills have been intensively studied in coastal New Jersey and are beginning to receive attention in other states (Delaware, Maryland, Georgia, and Florida). To date, strategies to minimize roadkill have focused primarily on heightening public awareness in various ways. Currently investigations are underway to seek additional solutions.

Texas Abandoned Crab Trap Removal Program, 2002 to 2004

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Each February since 2002, the Texas Parks and Wildlife Department has conducted a volunteer-based abandoned crab trap removal program in Texas coastal waters. Texas Parks and Wildlife Department staff facilitated between 14 and 25 collection sites coastwide during each of the three events to support this volunteer program. During these events, more than 10,000 volunteer man-hours were expended to remove a total of 15,499 abandoned crab traps, 70% of which were collected in the Galveston and San Antonio Bay systems, 5,569 and 5,226 traps respectively. Of the traps removed, 929 were examined to determine contents and condition. The examined traps contained 1,712 organisms representing 26 species. The most abundant species found were blue crab (*Callinectes sapidus*) and stone crab (*Menippe adina*), 61% and 18% respectively. Sheepshead (*Archosargus probatocephalus*) was the most abundant vertebrate species found and represented 8% of all organisms observed. The strong support for the program from volunteers and the resource benefit of removing these unsightly and wasteful artifacts of the commercial crab fishery justifies continuation of the Texas Abandoned Crab Trap Removal Program well into the future.

An Overview of the Regional Program to Remove Derelict and Abandoned Crab Traps from Coastal Waters of the Gulf of Mexico

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The wire crab trap dramatically affected the Gulf of Mexico blue crab (*Callinectes sapidus*) fishery. Crab traps were introduced into the Gulf of Mexico in the 1950s and are now the primary gear in use. Estimated number of blue crab traps in the fishery gulfwide exceeds 600,000. While adoption of the crab trap improved fishing efficiency, expanded fishing area, decreased labor requirements, and provided for more flexible working hours, proliferation of traps exacerbated problems associated with derelict or abandoned gear. Derelict traps pose a hazard to navigation, are a source of user group conflicts and visual pollution, and continue to fish. In addition, these traps may capture diamondback terrapins and they have been implicated in marine mammal deaths. For these reasons, states implemented programs to remove these traps. In 2003, the Gulf States Marine Fisheries Commission received funding from the NOAA Restoration Center's Community-based Restoration Program to develop a regional program to remove traps from Alabama, Mississippi, Louisiana, and Texas. This program, in conjunction with individual state efforts, has been responsible for the removal of over 30,000 traps from coastal waters.

Diamondback Terrapin Mortality in Eel Pots and Evaluation of a Bycatch Reduction Device

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We conducted the first study of diamondback terrapin (*Malaclemys terrapin*) bycatch and bycatch reduction in cloth-funnel eel pots used in commercial American eel (*Anguilla rostrata*) fisheries operating along the Atlantic Coast of North America. We describe terrapin bycatch in eel pots and estimate levels of terrapin bycatch in a section of the Patuxent River estuary, Maryland. Additionally, we evaluate the suitability of a novel eel pot bycatch reduction device (BRD) for commercial eel pot fisheries. Between 1987 and 2001, we documented 41 male and nine female terrapin captures in commercial eel pots. In 2002 and 2003, we conducted an experimental eel pot fishery. Terrapin bycatch in our experimental fishery consisted of 69 male and two female terrapins. In comparison sets, pots with large entrance funnels captured terrapins at a greater rate (0.458 terrapins$\cdot$pot$^{-1}\cdot$day^{-1}) than pots with small entrance funnels (0.008 terrapins$\cdot$pot$^{-1}\cdot$day^{-1}). We estimate that bycatch in eel pots resulted in 0.0-14.9% subadult-adult male and 0.0-3.7% subadult female terrapin mortality at our study site in spring and summer 2002. Our simple BRD eliminated terrapin bycatch and had no effect on eel catch, suggesting that it represents an economically viable solution to terrapin mortality in eel pots.

Demography, Environmental Variation and the Conservation of Terrapins

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We analyze a 17-year demographic data set of the diamondback terrapin in the Patuxent River estuary. Using the mark-recapture analysis software MARK, we estimate age- and time-specific survivorship and capture probabilities for male and female terrapins in this population. Consistent with other turtle species studied, female longevity and juvenile survivorship have the greatest effect on population viability. Additionally, we show that this population was stable throughout the first 13 years of the study, however in the last 4 years the population has been declining. We discuss potential factors contributing to this decline and what this may mean for the persistence of this population. We also present data from a recently started demographic study on Poplar Island in Chesapeake Bay. This site is unique because of the absence of nest predators and the high nest success. We discuss the importance of sites such as Poplar Island for the viability of terrapin populations.

Teaching About Terrapins: Local, Regional and International Community Based Conservation

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The Wetlands Institute initiated the Terrapin Conservation Project in 1989 to promote conservation of diamondback terrapins, a species of turtle under severe stress rangewide owing to human activities (habitat destruction, bycatch in commercial crab traps and road mortality). The Institute includes the world's only exhibit dedicated solely to terrapins, seen by approximately 30,000 visitors annually, including 10,000 school children. The Institute hosts classes, distance learning, and public education programs focused on terrapin life history, research and conservation activities. Brochures, magazine and newspaper articles, radio and television features, and television documentaries publicize the plight of terrapins. Another important way of informing and educating large numbers of people is through public

lectures, as well as participation in community events and regional festivals. The project's cornerstone program is a summer internship for undergraduate students. During the past 16 years, students from over 90 academic institutions have worked alongside professional researchers and presented their results at regional, national and international scientific meetings. In 2000, the Institute became the host research institution for the Asian Scholarship Program. Young Asian herpetologists (ten to date) learn conservation and research skills transferable to wildlife issues in their own countries. Some of our partners include local elementary and high school teachers, Richard Stockton College, Delaware Valley College, the Philadelphia Zoo, the New Jersey State Aquarium, the New Jersey Governor's School for the Environment, and the New York Turtle and Tortoise Society.

Comprehensive Education, Research and Conservation - the Diamondback Terrapin in Maryland

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Terrapin conservation efforts in Maryland are from within the State's Fisheries Service. The terraqueous species was the perfect segue between land and water, tradition and adjustment, apathy and regard. In 1998, the agency created a new program: Conservation and Stewardship. A component of the Conservation and Stewardship Program was Terrapin Station: Make Your Connection at Terrapin Station. Using the Wetlands Institute's terrapin program as a model, Maryland began salvaging female terrapins and gathering terrapin eggs for later "head-starting." Once again, the terrapin was the Charm of the Chesapeake.

With modest funding, but exceptional public involvement, the momentum for this species and its habitat accelerated. A method developed which could advance conservation of other species and habitats. School children took the terrapin to the Governor's Office, the State Legislature, and the United States Congress. The terrapin inspired "Living Shorelines," a strategy for preserving and restoring tidewater shoreline, wetlands and bog habitats. Private citizens assisted in investigating the harvest of terrapins to prove it is much greater than research and agency records indicate. Although destruction of terrapin habitat remains a key factor in conservation, the commercial harvest is by far the most immediate, inhumane and manageable threat to terrapin survival.

A new and diverse group of professions and citizens, including terrapin harvesters, connected to create a new diplomacy for natural resources management, science, effective conservation, and genuine stewardship. Unprecedented results continue; the process is enlightening, tragic and humbling. The turtle taught us tolerance and persistence. Despite its political relegation, the terrapin remains the Face of Restoration in Maryland.

Raccoon and People Management for Terrapin Conservation at Jamaica Bay Wildlife Refuge, New York

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Approximately 2,000 terrapin nests are laid each year in Jamaica Bay Wildlife Refuge (JBWR), part of Gateway National Recreation Area. JBWR makes up the northern part of Ruler's Bar Hassock, a 360 ha island in Jamaica Bay (a harbor near New York City). In the early 1980s predation on eggs was unknown and nearly all eggs hatched. Raccoons were introduced at that time and now predate 93% of nests. Nearly all unprotected nests are predated within 24 hours of oviposition. Large numbers of predated nests

are conspicuously visible to the 125,000 people who visit JBWR each year. Many visitors enjoy watching terrapins nest and know that raccoons are also a danger to ground-nesting birds. We documented that ca. 100 raccoons inhabit the refuge and that terrapin eggs make up a large fraction of their annual energy budget. We proposed a raccoon euthanasia program to the National Park Service with four years of supporting data, but were turned down due to concerns about public protests. We are now planning a three-fold approach to reducing raccoon predation on terrapin eggs at JBWR. Through public presentations and one-on-one encounters, we attempt to educate park users about the problems that raccoons cause and their history at JBWR. Next year, we plan an island-wide raccoon population census, while chemically sterilizing captured animals. We also plan to begin a taste-aversion training program for JBWR raccoons.

Terrapins and Traps: The Politics of Conservation

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An estimated two million commercial (or Maryland style) crab traps are annually deployed in the coastal waters where diamondback terrapins occur. Large numbers of terrapins drown in these traps (an average of one terrapin in every six traps in our studies). In the early to mid 1990s, research and extensive testing at The Wetlands Institute led to the development of a simple, inexpensive and highly effective Terrapin Excluder Device (TED) that greatly reduces the numbers of terrapins entering crab traps. In 1998, after two years of highly contentious public hearings, New Jersey adopted a much-amended excluder regulation, which was considerably watered-down from its originally proposed version. Testimony of opponents was often acrimonious. Politics and polemics generally prevailed over rational discourse. Scientific evidence was typically ignored or discounted. Subsequent research has repeatedly shown the effectiveness of terrapin excluders and two other states (Maryland in 1999 and Delaware in 2001) have also adopted excluder regulations. In recent years, it has become increasingly clear that ghost traps are a significant source of terrapin mortality in addition to traps that are in active use. For this reason, TEDs should be required on all crab traps, not just some deployed in specified areas, which is the case for the regulations so far adopted by Delaware, Maryland and New Jersey.