

Mid-Atlantic Diamondback Terrapin Working Group Organizational Meeting  
The Wetland's Institute, Stone Harbor, New Jersey - April 1-2, 2005

Attendees:

Ben Atkinson – The Wetlands Institute, Stone Harbor, NJ 08247  
Patrick Baker – Miami University, Oxford, OHIO 45056  
Chris Bennett – DE Department of Parks and Rec - Dover, DE 19963  
Meaghan Berner – Richard Stockton College, Pomona NJ 08240  
Nancy Butowski – MD DNR Fisheries, Annapolis, MS 21401  
Hugh Carola – Hackensack Riverkeeper Inc, Hackensack NJ 07601  
Dan Day - USGS Patuxent Wildlife Research Center, Laurel, MD 20708  
Matt Draud – Biology C.W.Post LIU Brooklyn NY 11548  
Paula Henry – USGS Patuxent Wildlife Research Center, Laurel, MD 20708  
Roz Herlands – Biology Program, Richard Stockton College, Pomona NJ 08240  
Howard King - MD DNR Fisheries, Annapolis, MS 21401  
Holly Niederriter – DE Div Fish and Wildlife – Smyrna DE  
Joseph Penta – Floral Park NY 11004  
Tom Radzio – Ohio University, Athens Ohio 45701  
Willem Roosenburg – Ohio University Biological Sciences, Athens Ohio 45701  
Victoria Ruzika – The College of William and Mary Biology, Williamsburg, VA 23185  
Brint Spencer – Philadelphia Zoo. Philadelphia PA 19104  
Stephanie Szerlag – Saint Joseph's University, Philadelphia PA 19131  
Christina Watters – The Wetlands Institute, Stone Harbor, NJ 08247  
Ralph Werner – Biology Program, Richard Stockton College, Pomona, N.J.  
Roger Wood – The Wetlands Institute, Stone Harbor, N.J. 08247

Roger Wood and students and staff at the Wetlands Institute met the group on Friday evening for an Icebreaker at the Institute.

April 2, 2005

Welcome and Introductory comments were presented by Willem Roosenburg.

The following summaries were handed to introduce ourselves and our area of expertise and for purposes of discussion.

Mid Atlantic Diamondback Terrapin working group compilation (see attached)  
Summary of questionnaire returns – locations, and type of activity (research, management, education) Prepared by P. Henry, 4.1.2005  
Summary of Virginia's Fisheries that May Impact Diamondback Terrapin Populations in State Waters. Submitted by R. Boettcher 4.2.2005

Morning session was a series of short slide and poster presentations

Matt Draud (Oyster Bay Harbor, NY) presented overview of findings from published paper on hatchling mortality (*Journal of Herpetology*, vol 38, 2004). Working on nesting, hatchling telemetry (radio), sonic telemetry with adults, feeding study with hatchlings. Plans are to start paternity and genetics within nests study this year.

Stephanie Szerlag (Tuckerton, NJ) <poster>: studying road mortality on Great Bay Rd.;  
Abstract - *Road occurrence and mortality of the northern diamondback terrapin, Malaclemys terrapin terrapin, in the Jacques Cousteau National Estuarine Research Reserve was examined during the nesting season (May - July) of 2004. Traffic measuring devices were stationed on sections of Great Bay Boulevard, an access road through salt marsh habitat to obtain traffic volume estimates. Road occurrences of 600 adult female terrapins were recorded, with 53 of those being road mortalities (8.83%). Analysis of the relationship between traffic volume and road mortality showed that a significantly greater percentage of road kills were observed in the transect section with the highest traffic volume. The majority of the road killed terrapins were discovered in the morning, suggesting that nesting*

*terrapins may be subjecting themselves to the high volume of early morning traffic. Terrapins appear to be attracted to the roadside as it meets the requirements for a suitable nesting habitat. One hundred terrapins were tagged during the first week of the nesting season with PIT tags in order to observe their effectiveness in a mark-recapture study of road reoccurrence with the boulevard. Of the 100 tagged, 16 were recaptured (25 total recaptures). Of those, six were long-term recaptures (19-45 days after initial tagging date). It should also be noted that greater terrapin occurrence was observed on or around the full and new moons.*

Ben Atkinson (Sea Isle City, NJ) <poster>: Presented ongoing barrier fencing project to keep terrapins off roadway in road mortality "hot spot".

Chris Bennett (Corporate Restoration Project, Delaware) and Holly Niederriter. Installing fencing about the shoreline related to DELDOT bridge construction. Silk fencing is being installed along Delaware State Park (Lowes Bay) of the shoreline. The goal is to get the terrapins over and create more nesting habitat. Objective is to look at predation ressure, nesting occurrence, hatchling emergence, and to test effectiveness of 18" round culverts under the road.

Brent Spencer (Philadelphia Zoo). There is an audience at the Zoos interested in terrapins. In Penn they have a head start program as part of an education effort. Suggestions for a Cooperative Zoo Project in which Zoos are asked to participate with animals that could be transported in a traveling exhibit. There is a need to come to a consensus as to what should people do with excess pet animals, overwintering animals.

Roger Wood (The Wetlands Institute). Presented overview of research and management initiatives in NJ and Florida. Information on ongoing activities is updated on the Institutes website ([www.wetlandsinstitute.org](http://www.wetlandsinstitute.org)) and for terrapins in particular ([www.terrapinconservation.org](http://www.terrapinconservation.org)). During the nesting season the roads are monitored 24 hours and terrapins are tracked throughout the year so that data are available on where and when terrapins hibernate, the time and place distribution of roadkills. Discussed the needs for BRD on crabpots – there are differences in the regulations between NJ, DE, and MD. Importance of BRDs as well for controlling mortality in ghost pots – Suggested comparing data on trapped terrapins from States with and without the BRD requirements. Turtle eggs collected from roadkilled gravid females are headstarted. When chronologically 10 month terrapins are released they are closer to the size of wild 3 year olds. Initiating a field population study in Stone Harbor, NJ.

Ralph Werner (Richard Stockton College). Initiated blood work to investigate pathogens in terrapins.

Ben Atkinson (The Wetlands Institute). <poster>: barrier fencing project to keep terrapins off roadway in road mortality "hot spot". He is also studying the application of skeletochronology for aging turtles.

Hugh Carola (Hackensack NJ). Presented concerns of terrapins found on the 15W/16W exits of the NJ Turnpike. This is close to a superfund site.

Patrick Baker (Cape May, NJ). Studying hibernation and overwintering in the nest of several turtle species, sources of mortality and effect of physiological responses to cooling/supercooling mechanisms.

Afternoon Session was focused on current management and direction by State agencies. Most of the discussion centered around an initial presentation made by Howard King, Director of Fisheries in the MD DNR on the management of the Diamondback terrapin in Maryland.

1. The diamondback terrapin is managed as a commercial species – it is not listed under the wildlife heritage program. There is information that the demand for terrapins are increased; however there are problems with the reporting of harvest. Annual commercial harvest varies significantly between what dealers report buying and what waterman report catching. Tracking and enforcement is very difficult due to the way permits are issued and the lack of resources for enforcement.

2. In MD, there are proposals to institute changes in the coming 2-3 years to better manage terrapins and track harvesting pressures. More information is needed on wintering areas in the Chesapeake Bay –

Wintering harvest techniques too efficient. Hibernacula are intensively dredged for terrapins and can result in efficient and complete removal of localized populations. Research needs listed include demography and locations of hibernating turtles.

3. BRD are only required in recreational crab pots in MD: this is based on the depth of the water in the Bay and distance from shoreline that terrapins are located with respect to the areas permitted for commercial pots. Although the BRD is supplied with new recreational pots – it is up to the buyer to install. (Conservation question: can we lobby manufacturers to make crab traps with Terrapin Excluder Devices pre-installed).

4. Ghost pots – retrieving them out of the water at the end of the season are under State enforcement in MD. In Delaware – Inland Bays – successful ghost trap round-up December 1-March 31; used prisoners to pull traps. Suggestions were put forth to compile a list of States with ghost pot retrieval programs and gather information on how the programs are run and by whom.

5. There was some discussion on the standardization of terrapin population censuses: there are multiple methods – which work best and how should data be recorded? Should we create a standard technique and protocol so that methods can be repeated in multiple locations and findings compared more directly.

The presentation by Howard King was very productive and it was suggested that we seek to bring management of all Bay states together at the next meeting.

## Mid Atlantic Diamondback Terrapin working group – Summaries

**\*\* indicates participant in the 2005 Mid Atlantic Region diamondback terrapin workshop**

### **Patrick Baker \*\***

#### **Research:**

Objective: To understand how hatchling terrapins survive terrestrial hibernation in northern part of their range

Location: Cape May, NJ

Life stage or age class: Hatchlings

Brief description of methods: nest survey, lab experiments

Methods used for identification: pit tags are inserted in nesting females and head-started hatchlings

### **Phil Allman**

#### **Research:**

Objective: Explore the evolution of life history traits in a long lived ectotherm

Understand the energetic consequences of the observed variation in egg size across the range

Location: Field Sites include: FL, SC, MD, NY, RI

Life stage or age class: eggs, embryos, and hatchlings

Brief description of methods:artificial incubation with a common garden design growth study

Methods used for identification:na

### **Stephanie Szerlag \*\***

#### **Research:**

Objective: To assess road mortality and occurrence of nesting females on Great Bay Boulevard and determining appropriate conservation measures.

Location: Barnegat Bay Watershed/JCNERR/Rutgers Marine Field Station

Life stage or age class: adult females

Brief description of methods: surveys along Great Bay Boulevard to monitor nesting and road mortality, Mark recapture, using PIT tags

Methods used for identification: pit tags inserted into right plastron area close to margin (Biomark Inc PIT TAGS)

### **William Moulden**

#### **Education**

1. Objective: Redeem, tag & release gravid females from Maryland wholesale fish markets.

Target audience: Students in grades K-12. Secondary audience:Maryland legislators .

Brief description of educational methods used and outreach activities. Exploit current Maryland terrapin regulations classifying this reptile as a commercial fishery. Purchase gravid females at \$4 per animal.

Conduct various biometric measures in a schoolhouse setting, tag using a small metal monel tag with a 3 digit number engraved. Release terrapins to confined egg laying beaches with students observing the egg laying. Release redeemed females to undisclosed sites in tributaries closed to commercial fishing. All data archived. Outreach activities limited to Maryland legislators. *Terrapin Redemption Program*: On-going, 400+ terrapins redeemed, tagged, and released.

2. Served as Chairman of the Governor's, Diamondback Terrapin Task Force. Published, *Maryland Diamondback Terrapin Task Force Final Report, September 6, 2001*. Primary recommendation, among several dozen, was to close the terrapin fishery until such time that resource managers had reliable specie data in which to make informed fishery decisions. All recommendations have been ignored, no data has been forthcoming. Both reported and the much larger unreported terrapin catches continue unabated.

3. Objective: Preservation & restoration of the Severn River.

Target audience: Students; land owners; county, state, and federal leaders.

*Authentic learning through experiential methodologies. Since 1990, project orientation has resulted in:Reforestation of SAV to the Severn River: The construction of an .2 acre tidal SAV nursery (1995) serves to propagate 1,000 Redhead Grass plugs annually for SAV reforestation operations within the*

Chesapeake Bay. 10+ acres reforested to date. Peninsula Project: Creation of a half mile long strand habitat, with 3 acres of tidal wetlands. COMPLETE Preservation of the Green Cathedral: Preservation of the last remaining riparian forest (one square mile) on the Severn River. Restoration of Brewer Creek: Complete restoration of an entire suburban subwatershed encompassing 40 property owners involved in two dozen tidal, nontidal, and upland projects. Hidden Pond: Fish passage and spawning habitat project. Under Construction, .Restoration of Oysters Reefs to the Severn River. On-going, 4 reefs built to date, 25 million spat seeded. Edgehill Bog: Conversion of a half acre degraded stormwater floodplain to a terraced bog serving as a safe harbor for endangered and threatened species. Howard's Branch Atlantic White Cedar Wetland: 3 acre restoration of a degraded reservoir lake bottom. Planting of approximately 800 Atlantic White Cedars (AWC) creating one of the largest cedar forests in the Western Hemisphere. Earth Day (2000) planting was ranked as one of the top ten (#7) most significant Earth Day projects.

### **Willem Roosenburg \*\***

#### **Research**

1. Objective: Long-term life history study and physiological ecology of diamondback terrapins  
Location: Patuxent River, Maryland; Life stage or age class: All age size and sex classes; Brief description of methods: Mark-recapture, experimental manipulation of eggs; Methods used for identification: Marginal scute notching with a minimum of three notches except off-sight animals with a single location marks.
2. Objective: By-catch reduction and experimental approaches to eliminating terrapins as bycatch in commercial fishing gear; Location: Patuxent River, Maryland; Life stage or age class: All size and sex classes except hatchlings; Brief description of methods : Experimental tests of different bycatch reduction device in commercial eel and crab pots; Methods used for identification: Marginal scute notching with a minimum of three notches except off-sight animals with a single location marks.
3. Objective: Determine response of terrapin populations to newly created habitat from dredged material; Location: Poplar Island, Maryland; Life stage or age class: All size and sex classes, but focused most on nests and hatchlings; Brief description of methods: Survey and location of terrapin nests, monitoring throughout the incubation period, mark-recapture release of hatchlings  
Methods used for identification: All adults are marked with PIT tags and a single marginal notch in 9R. All hatchlings are marked with binary coded wire tags and 2 digit cohort marginal notching
4. Objective: Understanding geographic variation in terrapin egg size  
Location: Patuxent River, Maryland; Charleston South Carolina, Barrington, Rhode Island  
Life stage or age class: Eggs and hatchlings; Brief description of methods: Collection and experimental manipulation of eggs; Methods used for identification: No animals will be released

### **Nancy Butowski\*\***

#### **Research:**

Objective: Assess potential terrapin encounters w/commercial crab pots and determine efficiency of TED's in commercial crab pots; Location: Coastal (Ocean) Bays; Life stage or age class: adult  
Brief description of methods: CRAB POTS SURVEY +/- TED's; Methods used for identification: N/A

**Education:** MDNR does not actively conduct any educational activities.

#### **Other activities recently conducted or ongoing:**

MDNR Fisheries Service issues a scientific collection permit for the study of terrapins including: a demographic study on the middle Patuxent River; terrapin monitoring on Poplar Island; further studies on bycatch reduction devices in eel and crab pots; and studies of egg and hatchling energetics.. Terrapin beach habitat was considered as part of the Maryland shoreline erosion plan and beach replenishment activities within MDNR.

Target audience: Scientific community and State planners.

### **Regulations: MD**

*Commercially harvested regulations:* A person needs a commercial license to catch terrapins for commercial purposes. Currently, there is a limited entry program in place for all license types with a mandatory two-year apprenticeship. Open harvesting season: Closed season May 1-July 31st  
Habitat allowable for harvesting – NA Methods used for harvesting – NA Size and or sex limitations of the harvest: Minimum size of 6 inches in length measured along the bottom shell. A person may not possess, destroy or disturb any terrapin eggs.

*Regulations to control bycatch:* For commercial – none; For recreational: A crab pot set for noncommercial purposes shall have a turtle reduction device which is attached to each entrance or funnel in the lower chamber; is constructed of wire or plastic; is rectangular in shape; has dimensions which do not exceed 1 ¾ inches in height and 4 ¾ inches in length.

*Recreational regulations:* Collecting and owning terrapin as pets: Size limit does not apply to a person who owns a terrapin. No more than 3 terrapins may be kept as pets.

*Official reporting requirements:* From the watermen – All persons licensed by MDNR to harvest fish (shellfish and terrapins included) are required to make monthly reports of fishing activity. Failure to report can result in suspension or revocation of their fishing license. From the processing plants – Require dealer reports of all fish sold. Landings data – Landings data are entered into a fishery database. Data on dockside value and landings (pounds) are compiled by month, by area, and by year. This information is accessible via the MDNR website and available for use by whoever needs it. Current regulations for collecting or destroying fishing gear post season – Wire bank trap or channel pounds including all hedging and all stakes, must be removed 30 days after the trap is removed or by December 1, whichever is earlier. All crab pots shall be removed from State waters by December 31 of each year and may not be set in State waters before March 31 of each year. MDNR Natural Resource Police are responsible for enforcing regulations. There are problems with abandoned or lost crab pots that aren't addressed by the regulations.

A contact person, office or department, web address where regulatory information is found.

Harley Speir  
MDNR Fisheries Service  
Manager, Regulatory and Compliance Program  
Tawes State Office Bldg. B-2  
580 Taylor Avenue  
Annapolis, Maryland 21401

### **MD Comprehensive Wildlife Conservation plans -**

In Maryland, diamondback terrapins and snapping turtles are the only species of turtles not under the purview of the Maryland Wildlife and Heritage Division. Since these two species are commercially harvested, they are managed under the Maryland Fisheries Service.

### **Ruth Boettcher Research**

Submitted a FY06 State Wildlife Grant proposal to begin gathering baseline information on Diamondback Terrapins (DBTE) reproductive success on Virginia's barrier islands via shoreline monitoring on select islands.

### **Education: N/A**

### **Regulations: VA**

Commercially harvested regulations: Commercial harvest is not allowed in VA waters. Open harvesting season: N/A Habitat allowable for harvesting: N/A Methods used for harvesting: N/A

Size and or sex imitations of the harvest: N/A Regulations to control bycatch

For commercial: There are no DBTE BRD requirements for any commercial gear in VA.

Cull ring requirements are as follows: Crab pots - Each pot must have at least two unobstructed cull rings, one at least 2<sup>5</sup>/<sub>16</sub> inches inside diameter and the other at least 2<sup>3</sup>/<sub>16</sub> inches inside diameter located one each in opposite exterior side panels of the upper chamber of the pot; except the 2<sup>5</sup>/<sub>16</sub> inches diameter ring may be closed in pots set on the seaside of Eastern Shore, within the crab dredge areas (see 4 VAC 20-90-20 for boundary lines) or within Pocomoke or Tangier Sound. Note: A 300 hard crab pot limit is in effect for the Virginia tributaries of the Chesapeake Bay and the Virginia tributaries of the Potomac River, and a 500 hard crab pot limit is in effect for the Chesapeake Bay and coastal waters. No person may place, set or fish more than a combined total of 500 hard crab pots in Virginia tidal waters. Peeler Pots – Cull ring requirements pertaining to crab pots also apply to peeler pots with one exception; peeler pots

with a mesh size less than 1<sup>1</sup>/<sub>2</sub> inches are exempt from cull ring requirements. No person may place, set or fish or attempt to place, set or fish more than 300 peeler crab pots. Pound Nets - Each trap must have at least four unobstructed cull rings of at least 1<sup>1</sup>/<sub>2</sub> inches inside diameter, located two each under water in the lower portion of two opposite side panels (perpendicular to the shoreline) of the retention box. Eel Pots - It shall be unlawful for any person to place, set or fish any 1/2-inch by 1/2-inch mesh rectangular or square eel pot unless such pot contains at least one unrestricted 4-inch by 4-inch escape panel consisting of 1/2-inch by 1-inch mesh. In addition, it shall be unlawful for any person to place, set or fish any 1/2-inch by 1/2-inch mesh cylindrical eel pot unless such pot contains at least one unrestricted 4-inch square escape panel of 1/2-inch by 1-inch mesh. For recreational: There are no DBTE BRD requirements for any recreational crab pots in VA. Cull devise requirements are the same as those established for commercial crab and eel pots. It is unlawful for any person to use more than 5 crab pots or more than two eel pots when licensed for recreational purposes. There are no crab harvest or bycatch reporting requirements for recreational licensees.

Recreational regulations:Collecting and owning terrapin as pets:

It is lawful to collect and possess live for private use only, and not for sale, no more than 5 individuals of diamondback terrapins (4 VAC 15-360-10). Private use is defined as use in the home, not for scientific or educational purposes.

The collection, or capture and release of live DBTEs for scientific or educational purposes requires a Scientific Collection Permit from the VA Dept. of Game and Inland Fisheries (VDGIF). This permit is good for 2 years and has a processing fee of \$40.00.

A VDGIF Salvage Permit is required for the collection of dead DBTEs for scientific or educational purposes. The salvage permit covers a period of three years and has a processing fee of \$60.00. To display more than a personal limit (i.e., 5 animals) of live DBTE's for educational purposes, a VDGIF Exhibitor's Permit is required. This is a one-year permit with a fee of \$20.00 for state agencies, educational institutions, towns, etc. and a \$50.00 fee for private businesses.

Official reporting requirements:

From the watermen – Watermen are required to report all crab pot and peeler pound net crab harvest and bycatch data monthly (reports are due on the 5<sup>th</sup> of the next month). A review of bycatch data from 1994 – 2004 revealed *no* reported incidental capture of DBTEs, suggesting not all bycatch is being reported.

From the processing plants – N/A Landings data– N/A

Current regulations for collecting or destroying fishing gear post season.

Hard crab pots and peeler pots are not allowed in Virginia's waters from December 1 – March 31.

After a 3 – 4 day grace period following the Dec. 1 close date, VA Marine Resources Commission's (VMRC) Marine Patrol conducts aerial surveys to determine compliance with the gear removal requirement. Pots found via flyovers are checked by boat to identify ownership of gear (note: the only method of identifying peeler pot and hard crab pot ownership is via a surface floating buoy that must display the licensee's last 4 numbers of his/her Commercial Registration License. There is no regulation requiring the attachment of a license # tag directly on the pot itself). First time violation of the gear removal regulation is considered a class 3 misdemeanor which can result in a fine up to \$500. The issuance of a second citation is considered class 1 misdemeanor and may result in a fine up to \$2,500.00 and/or 12 months in jail. A third violation of any kind will result in a hearing before the full Board and the offender may face a 2-year revocation of all his/her commercial licenses.

It is the responsibility of Marine Patrol officers to ensure that all identifiable pots are removed from VA waters during the closed season and that citations are issued to the offenders. Marine patrol officers are also supposed to remove all abandoned or derelict pots whose ownership cannot be determined.

Contact person, office or department, web address where regulatory information is found.

VMRC's marine fisheries regulations contact Lewis Jones at 757-247-2073 or [lewis.jones@mrc.virginia.gov](mailto:lewis.jones@mrc.virginia.gov).

VMRC regulations online go to <http://www.mrc.state.va.us/regindex.htm>.

Information on DBTE regulations contact Ruth Boettcher at 757-442-2429 or [ruth.boettcher@dgif.virginia.gov](mailto:ruth.boettcher@dgif.virginia.gov).

Information on nongame regulations in general contact Ray Fernald at 804-367-6913 or [ray.fernald@dgif.virginia.gov](mailto:ray.fernald@dgif.virginia.gov).

VDGIF regulations online go to <http://www.dgif.state.va.us/wildlife/scp.html>.

**Comprehensive Wildlife Conservation** - So far, state/federally listed, imperiled, rare or otherwise declining species have been assigned to tiers of "relative conservation need". The DBTE is a Tier II

species. The definition of the Tier II classification is as follows: "Very High Conservation Need. Has a high risk of extinction or extirpation. Populations of these species are at very low levels, facing real threat(s), or occur within a very limited distribution. Immediate management is needed for stabilization and recovery".

**Mike Haramis, Dan Day\*\*, Paula Henry \*\***

**Research**

Objective: Define characteristics of hibernacula and assess effects of commercial harvest methods on local populations of DT in Bay.

Location: MD Tangiers Area

Life stage or age class – overwintering all ages

Brief description of methods- commercial scrape to collect turtles, mark and release

Identification methods used: 3 methods single locational tag which consists of a drill hole in the right or left 10<sup>th</sup> or 11<sup>th</sup> marginal scute + small metal (approx 15x3 mm) monel tag with a 4 digit number etched on 1 or (newer) 2 sides + PIT with a 10 alphanumeric code is inserted in the animal (Ongoing)

Objective: Evaluate current use of land in eastern shore, based on nesting attempts, and risk relative to continued development

Location: 68 sites on eastern shore

Life stage or age class – nests (so far)

Brief description of methods- GIS analyses using informational layers from land use coverages overlaid on presence absence of nesting activity attempts

Identification methods used: presence absence recorded based on nest depredation, sites monitored 3 times in 2003. Relative vegetation coverage using PVC grids, and geomorphology of beach area. GIS analyses ongoing)

Objective: Population estimates of terrapins found across areas of variable land use and habitat types

Location: MD Eastern Neck NWR (north of Bay Bridge), Martin NWR (Tangiers Area)

Life stage or age class – all

Brief description of methods- recapture techniques were used for tracking terrapins throughout the year.

Trapping methods used depend on accessibility within different habitat. Mark– recapture

Identification methods used: 3 methods single locational tag which consists of a drill hole in the right or left 10<sup>th</sup> or 11<sup>th</sup> marginal scute + small metal (approx 15x3 mm) monel tag with a 4 digit number etches on 1 or (newer) 2 sides + PIT with a 10 alphanumeric code is inserted in the animal (ONGOING)

Objective: Evaluate food resource needs and habitat use during critical life stages

Location: Martin NWR, marsh, open water, tidal

Life stages: juvenile – adults, males and females

Brief description of methods: 45 modified box traps located in 3 habitat areas to collect, MR, and use of stable isotope analyses on whole blood and plasma. (ongoing)

**Victoria Ruzicka\*\***

**Research**

Objective: a study of the nesting ecology and predation of diamondback terrapins that inhabit the lower Chesapeake Bay region of Virginia

Location: Lower Chesapeake Bay region – York River

Life stage or age class – adult females and hatchlings

Brief description of methods- monitoring shorelines, mark-recapture, counting/weighing eggs, weighing females, GPS nests, searching for predation evidence

Identification methods used: filing numbers into scutes

**Regulations**

It is lawful to collect and possess live for private use\*\*only, and not for sale no more than 5 individuals of any non-listed species of amphibian and reptile, and no more than 20 individuals of any non-listed species of aquatic invertebrate and nongame fish (4VAC 15-360-10). Non listed terrestrial vertebrates may be taken in unlimited numbers for *private use* only. \*\*private use means for use in the home, not for scientific or educational purposes (which requires a permit).

No regulations to control by catch (Reporting)

**Ralph Werner, VMD\*\***

**Research**

Objective: Establish reference blood values for the diamondback terrapin

Location: Stone Harbor, NJ, Wellfleet Cape Cod, MA

Life stage or age class – all

Brief description of methods- capture of wild terrapins, taking a femoral vein blood sample, processing the sample

Identification methods used: NA

**Tom Radzio\*\***

**Research**

Project 1 Diamondback terrapin mortality in the American eel pot fishery and evaluation of a by-catch reduction device (completed with Dr. Roosenbrg, completed)

Objective: (1) Quantify sex, size, age, and capture rates of terrapins in cloth-funneled eel pots, (2) evaluate the suitability of a prototype eel pot BRD for the commercial American eel pot fishery

Location: Patuxent River, MD (Horse Landing to Long Point)

Life stage or age class – Juvenile-adult males and juvenile females

Brief description of methods- (1) Sporadic observation of by-catch in the commercial fishery (1992-2001), (2) Comparison sets to test for eel pot entrance funnel size and BRD effects of terrapin by-catch and eel catch rates (2002)

Identification methods used: Marginal scute notching

Project 2 Diamondback terrapin mortality in eel pots (ongoing with Dr. Roosenberg)

Objective: (1) Estimate late-spring terrapin mortality in cloth-funneled eel pots fished in a section of the Patuxent River, (2) Quantify spring terrapin activity patterns in creek, nearshore river, and offshore river habitats, (3) determine BRD effects on eel and terrapin catch in pots with large entrance funnels.

Location: Patuxent River, MD (Horse Landing to Long Point)

Life stage or age class – Juvenile-adult males and juvenile females

Brief description of methods- (1) Sample terrapin capture rates in eel pots with small (2002) and large (2003&2005) entrance funnels in creek, nearshore river, and offshore river habitats, (2) estimate spring and summer commercial eel potting effort in terrapin habitats using float count surveys, GPS, and GIS Arc View (2002 &2005), (3) maintain long term demographic study and estimate local terrapin population size using mark-recapture

Tagging method: Marginal scute notching

**Education:**

Objective: provide interns with research experience in estuarine ecology

Target audience: undergraduates and recent graduates

Brief description of methods: interns assist on field projects

**Chris Rowe**

**Research**

Objective: Initiate mark and recapture surveys of diamondback

Location: Rhode River estuary, MD

Life stage or age class – subadult, adult (both sexes)

Brief description of methods- Annual mark and recapture

Identification methods used: 1. single drill hole in left marginal scute #12

Identification method used: PIT tag insertion in right hind leg, slightly above tarsal region

**Education**

Objective: to begin baseline studies on population status and trends.

Target audience: State regulators

**John Wnek**

**Research:**

Objective: To determine the reproductive output of terrapins on human impacted nest sites versus non-impacted sites.

Location: Barnegat Bay (central New Jersey) – Sedge Islands

Life Stage: Adult Females and Hatchlings

Brief description of methods: Nesting females are monitored, captured, measured, and marked using PIT tags (10 alphanumeric code) and shell notching (3 notches marginal scutes). Straight carapace length, width, plastron length, and mass are recorded.

All nests are marked with respective female code number. Nest markers are placed 5 m due east of the nest. Nests are surveyed for clutch size, and random clutches are analyzed for egg length, width, and mass. All eggs are returned to the nest in the orientation and depth. Several nests are monitored for temperature and soil moisture content at various depths including top, middle and bottom levels. Egg development is monitored and recorded throughout the project, including egg predation. Nests are monitored for hatchling status including hatching time, emergence, overwintering, and predation. Identification method used: Animals are marked with PIT tags (10 alphanumeric code) and shell notching (3 notches marginal scutes).

### **Education:**

Objective: To promote an awareness of terrapins within the Barnegat Bay estuary including critical habitat requirements and conservation.

Target Audience: In schools, we target elementary and middle levels through our after school Outreach Program. One of our lessons focuses specifically on terrapin biology, conservation, and habitat protection. We also work with numerous Barnegat Bay stakeholders providing workshops on terrapins (including biology, ecology, conservation).

Within the school program, we created curriculum integrating NJ Core Content Education Standards so that teachers could easily incorporate lessons into their classroom. Basic information including external anatomy, differences between terrapins and other aquatic turtles, nest ecology, predation (all levels), and human caused mortality are available for educators. We also teach visiting school groups about the aspects listed above with trained staff.

We have a traveling displays with terrapin education material that we bring to festivals, community presentations, and special events. We also provide multimedia presentations about local turtles, with an emphasis on terrapins to numerous organizations. The information covers basic biology, ecology (preferred habitat), nesting aspects, predation on nests and individuals, conservation, and human-caused mortality.

**Location Base: The Natural Resource Education Foundation of NJ – Lighthouse Center for Natural Resource Education in Waretown, NJ on Barnegat Bay.**

### **Regulations: Through NJ State DEP – Division of Fish and Wildlife...**

New Jersey has a harvest season from November through March, but it is illegal to possess terrapin eggs. Terrapins collected must be equal and greater than 5 inches carapace length.

A couple of years ago, and prior, NJ Division of Fish and Wildlife was listing terrapins as a permitted turtle in captivity under their “Exotic and Non-game Species Program.” Therefore, terrapins could be kept under their permitting process, which is filed annually. Another division with the NJ Division of Fish and Wildlife, shellfisheries, regulates harvesting permits of terrapins, thus the “Exotic and Non-game Species Program” no longer regulates and/or permits terrapins. *Therefore, shellfisheries division is responsible for handling the holding permit for terrapins, but there is no current mechanism in place to do so. I am in contact with this office as they are trying to establish a policy.*

### **Holly Niederitter\*\* and Chris Bennett\*\***

#### **Research**

Objective: To determine use of newly created nesting habitat and evaluate nest success and predation compared to natural sites as well as existing human-altered nesting sites.

This project was initiated in response to another project that documented 60-120 adult females being killed by vehicles as they tried to cross a major highway to get from bays to nesting areas. We are hoping that creation/enhancement of nesting habitat on the bay side of the highway will keep females from trying to cross the road.

Location: Delaware Seashore State Park, Rehoboth and Indian River Bays, Eastern Sussex County, DE.

Life stage or age class): Adult females and their nests.

Brief description of methods: Habitat creation study slated to start this May. We plan to rotate one hour watching sessions at each site monitored and collect data on nest sites, nesting females, predation and, perhaps, hatchling emergence. The goal is to determine effectiveness of semi-centralized created habitat both in terms of deterring females from crossing roads and in terms of nesting success. The project will span two years.

The precursor for this study is an ongoing roadside survey documenting road mortality via daily surveys of road from bicycles. All turtles (alive or dead) were GPS'ed and live turtles were escorted as appropriate, sampled and nests were GPSed. A couple different methods of fencing were tried to keep females from crossing the road; the one that seemed to work best was 3' tall snow fencing with opaque (silt fence) backing to keep females from seeing through the fence.

This year, fencing will be added/alterd to see if females can be "corralled" to nesting habitat on the bay side of the road. Future work will include monitoring terrapin use of culverts to get from bays to nesting areas.

Tagging methods used: We notch marginal scutes in unique combinations.

### **Education**

Highway Signs On Highway 1 – Delaware Seashore State Park, Eastern Sussex County, DE

Objective: Signs are placed in Delaware Seashore State Park where terrapins nest.

Target audience: All ages

Brief description of methods and activities. Posters, news media, press releases.

Weekly Interpretive Program – Delaware Seashore State Park Campground

Objective: Increase awareness of Diamondback Terrapin Ecology and human impacts on terrapin population in Delaware's inland bays.

Target audience : All ages

Brief description of methods and activities. Interpretive presentation by seasonal biologists.

### **Other activities recently conducted or ongoing:**

There is currently a beach replenishment project underway on several municipal ocean beaches in Delaware. There are other shoreline development projects underway as well. Mostly small developments. Delaware commercially harvested regulations. Open harvesting season: Sept 1 – Nov 15 . Habitat allowable for harvesting: 4/person; Methods used for harvesting: Unknown; Regulations to control bycatch: Recently (2000) passed regulation requiring exclusion devices on recreational crab pots. Collecting and owning terrapin as pets: Cannot collect or sell native wildlife without a permit (each person, however, may have one for personal use; i.e. as a pet). Reporting requirements: None Landings data: Currently not collected; Current regulations for collecting or destroying fishing gear post season: none

Contact person, office or department, web address where regulatory information is found.

<http://www.dnrec.state.de.us/DNREC2000/Rules.asp>

Ken Reynolds – [Ken.Reynolds@state.de.us](mailto:Ken.Reynolds@state.de.us)

Comprehensive Wildlife Conservation plans - Just as a reference for certain species and a reviewer of criteria for species classification as tier 1 or 2. Delaware has a draft plan in review with partners. Much of the habitat mapping is complete.