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TURTLE AND TORTOISE NEWSLETTER

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Turtle and Tortoise Newsletter

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TURTLE AND TORTOISE NEWSLETTER (ISSN 1526-3096) is an international newsletter dedicated to providing an open forum for the timely exchange of information on freshwater / terrestrial turtle and tortoise conservation and biology issues. It incorporates and merges the previous publications of the Newsletter of the IUCN Tortoise and Freshwater Turtle Specialist Group and the Box Turtle Research and Conservation Newsletter.

Submissions are welcome from any source or individual and are in no manner limited to Specialist Group members. Articles may cover any aspects of turtle and tortoise news or research, with a preference for conservation or biology. TTN focuses on freshwater and terrestrial turtles and tortoises; items dealing with sea turtles should be directed to Marine Turtle Newsletter, an independent and separate publication. Of particular interest to TTN are news items and preliminary research or field reports dealing with conservation biology, population status and trends, human exploitation or conservation management issues, community conservation initiatives and projects, legal and trade issues, conservation and development threats, geographic distribution, natural history, ecology, reproduction, morphology, captive propagation, and husbandry. Newsnotes, announcements, commentaries, and reviews of interest to the turtle conservation and research community are also welcome. Submissions will not be peer-reviewed, but minor review and final acceptance for publication is at the discretion of the Editorial Staff. Submit material directly to either H. Kalb or A. Salzberg at the addresses above.

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The cover photo, by Don Lewis, is of a fully mature female, *Malaclemys terrapin.* Female 815 is 18.0 cm in carapace length and was first observed on 20 August, 1999, in Wellfleet's Blackfish Creek. She was next seen on 9 May 2000, shortly after emerging from winter brumation, swimming in Blackfish Creek. She recorded only marginal 0.1 cm growth in carapace width and had lost 12 grams since her late August weigh-in.

Erratum

The editors wish to apologize for crediting the article "Tortoise Reserve: Their Projects and the New Chelonian Slide Collection" in issue 1 to the wrong author. The correct author is David Lee, The Tortoise Reserve, Inc., P.O. Box 7082, White Lake, NC 28337; E-mail: TorResInc@aol.com.

A Too Brief and Woefully Incomplete Terrapin Primer

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Diamondback terrapins are elusive turtles of the Atlantic and Gulf seacoasts' rich estuarine system of rivers, creeks, coves, bays and marshes. According to *Turtles of the United States and Canada* (Smithsonian Institution Press, Washington and London, 1994), there are seven formally described subspecies: *Malaclemys terrapin terrapin* from Cape Cod to Cape Hatteras, *M. t. centrata* from Cape Hatteras to northern Florida, *M. t. tequesta* on the Atlantic coast of Florida, *M. t. rhizophorarun* in the Florida Keys, *M. t. macrospilota* from the Florida Bay to the panhandle, *M. t. pileata* from the Florida panhandle to western Louisiana, and *M. t. littoralis* from western Louisiana to western Texas.

An important part of East Coast history and lore, diamondbacks were said to have fed our impoverished soldiers during the hard times of the Revolutionary War. Nearly harvested to extinction in the last century, terrapins were thought to be making a slow recovery, but today their numbers may once again be on the decline as pressures from development, pollution and commercial activities intensify on their fragile habitat. Vacation and retirement homes press deeper into the terrapins' environment as demand escalates for "waterfront" property. Accidental spills, hazardous debris, and "ghost" equipment from seafood harvesting and farming all take their toll on these turtles and their habitat. And commercial activities, whether directly targeted at terrapins or affecting diamondbacks only as a by-product of fishing other species, continue to threaten their long-term survival.

Even in Maryland, where the terrapin is a state icon and is still harvested commercially, they have acknowledged the species is "declining in population and requires concerted conservation efforts." Maryland's governor recently proclaimed May 13th, 2000, as Diamondback Terrapin Day to increase "public awareness for natural resources, conservation, and stewardship for this species."

Diamond in the Rough

For this all too brief primer, though, I will focus on my paludal pals of the North—terrapins of the Land of Ooze, the salt marshes of Outer Cape Cod. These terrapins are medium size with distinct gender dimorphism. Mature females range from eight to nine inches long, weighing around three pounds, while males grow to almost five inches and about two-thirds of a pound. This pair captured last summer well illustrates the size difference between the sexes. The female (#697 on the left) also proved to be a surprising success story. Marked after nesting in June 1997, she was hit by a car the following year and given emergency treatment. Her cracked shell patched, she was returned to the creek with only a hope and prayer for recovery. But here she appeared on 13 September 1999, fully healed and engaged in normal mating with only a few bumps and scars to recall her unfortunate encounter with humans.

Terrapins have a hingeless shell. The carapace has 13 scutes ringed like diamond facets, ten around the perimeter with three in the center - eight costals and five vertebrals. The plastron is symmetrically bisected with six sections on each side of the centerline. A turtle's age can be estimated by annual growth marks, especially on the plastron, as demonstrated by this five-year old female. A terrapin's shell smoothes with wear and tear and usually by ten years, a turtle's age can no longer be easily determined. While we are not certain how long our Cape Cod terrapins live, we suspect they reach at least 40 or 50 years of age.

Reproduction and Nesting

Males reportedly reach sexual maturity after the third year, while females wait until at least the sixth. Our nesting season, which varies in each geographical area, lasts from early June through mid July. Two clutches of pinkish white

eggs, ranging in number from 4 to 18, are laid above the wrack line with remarkable nesting site fidelity. Last summer terrapin #145, a twenty-something female, was spotted digging her nest in tire tracks on a dirt road. She had been observed nesting at this identical spot a decade earlier on that very same date, 6 July.

Designed for the water, terrapins encounter their greatest risk when ashore for nesting. Predators, especially fox and raccoon, have been known to specialize in hunting this protein-rich prey. But today, the worst danger comes from human activities. Trophy vacation homes ring their nesting sites; teetering at dune's edge, these million-dollar houses demand protective seawalls to delay the inevitable advance of the bay.

Other sites are lost to decorative landscaping, locking loose dune soil in lawns and invasive ground cover. Turtles are forced to march inland and search for less suitable locations, increasing their vulnerability and reducing the viability of hatchlings. Dirt roads, free of vegetation, offer a risky but attractive alternative, and each year more and more turtles are hit either while nesting in roads or while in transit to upland sites.

Not content with just any nest, turtles have been seen digging as many as ten test holes before finally depositing their eggs. Yet others have been considerably less fussy. Some have dropped eggs in the hands of observers who interrupted their nesting. And then there was turtle #765. She became so impatient during processing (see description of research methods below) last June, that she laid a clutch of eggs on the Sahara-colored rug of my jeep. A surprised surrogate mom, I located a secluded south-facing site several feet above the high water mark with ample loose soil surrounded by protective vegetation. Imitating a nesting female, I dug a narrow vertical shaft, gently stacked the four eggs together, and covered and smoothed the hole. Having witnessed wholesale predation of terrapin nests throughout the summer, I decided to paint the site with human scent as a warning. As luck would have it, this nest escaped predators and on 27 September I became the proud virtual father of four infant hatchlings.

A Quarter Century of Research

Scratching out an existence at the absolute edge of their range, terrapins of the Outer Cape serve as a signal species within our coastal environment. Recognizing this importance, the Massachusetts Audubon Society's Wellfleet Bay Wildlife Sanctuary has conducted research since 1980, with informal observations stretching back to the mid-1970s. The core of its data collection program consists of capture, mark, and recapture studies. From spring to fall, turtles are captured in creeks, coves, and bays by a variety of strategies: wading, canoeing, kayaking, netting, trapping and seining. During the nesting season, researchers and volunteers walk designated shorelines, observe and mark nests, and capture/recapture turtles after their eggs have been deposited. Each turtle is measured for carapace and plastron length and width, weighed, examined for general health and anomalies, individually marked, and digitally photographed for follow-up study. Through these methods, the histories for many turtles now span several decades. We can construct growth models and develop demographic profiles of the Outer Cape population. And, by the percentage of marked and unmarked terrapins discovered in each capture event, we can obtain population estimates and follow trends.

The diamondback terrapin is a shy creature, extremely sensitive to human disturbance. They are so rarely seen that most people are surprised to learn they share the same habitat with them. They are very hardy critters, though. We find a number of turtles with missing appendages, yet they seem to hold their own. One breeding female, which we affectionately dubbed Stumpy, has two missing forelimbs. Yet twice each year she drags herself onto the beach to nest.

But they can be killed. No matter how robust, terrapins must breathe to live. Trapped in pots or netting, turtles will drown. No matter how strong, terrapins can't withstand the weight of a vehicle. And no matter how resilient as individuals, the species can't survive if their environment is lost. As nesting sites and nurseries and foraging habitats disappear, so do diamondback terrapins.

Mysterious Terrapin Die-Off on Cape Cod, Massachusetts

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As November clouds enshrouded Cape Cod, a tragedy played out in their shadows. Nearly a hundred rare turtles, ranging from two-year-old juveniles to ancient breeding adults, died. Their bodies, hidden by murky creek waters and soon covered in a thick layer of winter ice, resurfaced in a late January thaw as mute witness to a terrapin die-off unprecedented in the annals of the Outer Cape. What killed these turtles of Cape Cod Bay?

Northern Diamondback Terrapin,
Malaclemys terrapin terrapin

The northern diamondback terrapin occupies a unique niche in Wellfleet Harbor, living year-round in its rich estuarine system of rivers, creeks, coves, bays and marshes. While this subspecies can be found from Cape Hatteras to Cape Cod, Wellfleet marks its absolute northern limit, where they are subject to severe climatic variations as well as the steady advance of human activity into their once-secluded salt marsh habitat. Observing an animal at the extreme edge of its range serves as an important bellwether to monitor the health of an ecosystem. The State of Massachusetts lists the diamondback terrapin as a threatened species and, recognizing its signal role within the harbor environment, the Massachusetts Audubon Society's Wellfleet Bay Wildlife Sanctuary has organized research studies of terrapins for nearly a quarter of a century.

Diamondbacks are medium-size turtles that spend their entire lives in estuaries, salt marshes and tidal creeks. Except for occasional basking on mud flats and creek banks, only female terrapins ever leave the water, twice yearly, to nest in upland landforms within fertile salt marsh habitats. Wild turtles are so sensitive to human disturbance that many residents and annual visitors to Cape Cod are surprised to learn they share the same waters with these shy creatures. For most, the only glimpse they gain of a diamondback terrapin is the mirage of a gray-green head about the size of a thumb, snorkeling for a quick breath, nearly invisible against the wave tops.

First Sign Unnoticed

Diamondback terrapins of the Blackfish Creek estuary system (see map) comprise perhaps the largest subpopulation of this threatened species within Wellfleet Harbor. Suitable upland nesting sites are abundant and each is surrounded by a rich nursery system of salt marsh creeks, which protects and nourishes hatchlings and juveniles. The turtles of Blackfish Creek have been under research observation since the spring of 1980.

Wellfleet tides are significant, and during new and full moon periods often range nearly 15 feet. Flats are uncovered and marshes are flushed dry except for scattered tidal pools. Adult terrapins, which venture beyond the security of marsh channels, are swept in the tidal flow and join a "turtle parade" during astronomically significant daylight low tides. They paddle with the current to the mouth of the bay between Indian Neck and Lieutenant Island, only to return with the incoming tide.

In mid-October, as water temperatures over the shallow tidal flats of Blackfish Creek began to dip, fewer and fewer terrapins "marched" in the parade as they began to slip into the early stages of winter brumation. On 26 October, the last active terrapin was sighted for 1999. But fall weather continued unusually mild, with a series of storms beginning in mid-November separating long periods of warm temperatures.

The Blackfish Creek terrapins likely exploited these interludes, but no one was watching; our attention had been diverted elsewhere. As water temperatures in Cape Cod Bay slipped below 50°F and westerly winds whipped across from the mainland, cold-stunned sea turtles began to appear on our beaches in record numbers. Since mid-November, 220 Kemp's ridleys—the rarest sea turtle in the world—were recovered, plus 58 loggerheads and five green turtles. Sizes ranged from a tiny 1200-gram ridley to a 200-pound, tagged female loggerhead.

On December 7, a resident discovered a terrapin on Fox Island and brought it to the Wildlife Sanctuary, but we missed this first sign of the die-off. A mature, well-nourished female of 1116 grams, she appeared dead, but once warmed in the lab, began to stir as though recovering from cold stunning. While there were no obvious signs of predation, she had sustained a serious slice on her throat and was euthanized. Unfortunately, distracted by the record sea turtle strandings, we did not follow up this early sign, which appeared then as an isolated incident.

Nearly a Hundred Dead Turtles Found

When we returned to the Fox Island system in January, we began to discover terrapin remains at an alarming rate. The weather had turned bitter cold after the December holidays and a thick ice cover formed. In late January, an unusually high tide coupled with a brief thaw cracked the ice pack over the marshes and began to expose dead turtles: four on 26 January, five on the 27th, six on the 28th, two the next day, one the following, and nine on 31 January. All were recovered from the frozen marsh in rivulets as though deposited with each new flood tide. All were well nourished, none showed any signs of predation, and all were partially decomposed, suggesting that the deaths had occurred in the fall before the freeze would retard the process.

Following a brief respite in mid-February, another series of remains were uncovered in the same marsh, but further south nearer to Field Point. These terrapins exhibited the same forensic characteristics as the first; however, the state of decomposition of the turtles found in March and early April indicated that a series of events rather than a single incident had caused the die-off. Initially, when the numbers were still relatively small, speculation had centered on one occurrence that might have excavated brumating terrapins from their hibernacula. Perhaps a mooring had dragged along the muddy bottom; maybe winds had driven an anchored boat so that its keel or centerboard had plowed through a pod of sleeping turtles. But after examining the latter terrapins, Bob Prescott, director of the Wellfleet Bay Wildlife Sanctuary, was reported in the Cape Cod Times of 25 March as saying, "This is not a single incident. It happened a number of times through the fall."

The loss of as many as a hundred turtles from this threatened species' northernmost habitat can only be described as tragic, no matter what brought it about. Quoting from the Cape Cod Times of 19 March, "[Dr.] Tom French, assistant director of the state Division of Fisheries and Wildlife, and head of the state's Natural Heritage and Endangered Species Program rated the Wellfleet die-off a 6 on a scale of 1 to 10 in terms of the Cape's overall diamondback terrapin population, an 8 or 9 for the Wellfleet Bay population."

It's not just numbers that color the event tragic. At an individual level, ten of the dead terrapins were well known to researchers. One turtle, a six-year-old male, had last been seen on 28 August as he paddled through the channel in hot pursuit of his sweetheart. Five mature females had been observed nesting in this same marsh since 1989. And one of the last turtles found, another six-year-old male, had been captured on 13 September while courting another marked terrapin.

Nor do signs point to a natural or weather-related occurrence. Two similar habitats in Wellfleet Harbor, under the same level of research scrutiny, yielded only a single dead terrapin and the remains of six turtles, respectively, over the same period. Tom French was reported as saying these deaths in the Fox Island marsh were "probably the result of an unusual activity."

"Probable Cause"

While definitive causation of this die-off will never be known with scientific certainty, continued scrutiny of this marsh environment produced some important and convincing clues. A kayak inspection of the flooded marsh on 26 March discovered a long sheet of loose aquaculture netting that had become anchored in debris and stretched across the main transport channel supporting the terrapins within this habitat. Nearly invisible as it lay mostly buried in the muck when the creeks are empty at low tide, and equally disguised in the murky estuarine waters at high tide, the net was only found only when it snagged the kayak's keel.

The material was wedged securely into the bottom and just reached to the surface at maximum tide, creating a perfect seine to trap anything that passed through the creek. Unable to dislodge it by kayak, an expedition returned to the creek at low tide the next morning and located this and a half dozen netting obstructions that blocked varying portions of the main and side channels; all potentially lethal to turtles.

The principal blockage spanned the entire channel that hugs the terrapin nesting sites in the Fox Island Wildlife Management area. One end of this net, which stretched about 30—40 feet long and more than seven feet high under tension, had become entangled with a green crab trap buried in the muddy creek bank; the other end was held by a long line with a ruptured plastic marker buoy. The rope was buried in the mucky bottom and spanned across to the opposite side, supporting the net tautly under water pressure. As the tide flowed through the creek, the net flared open and blocked passage for anything larger than its webbing size.

A second set of netting and debris blocked a side channel another 50 feet inside the marsh, along with several other similar, though not as severe, blockages.

Working Hypothesis

The Blackfish Creek terrapins are flushed through these channels as the marsh empties and refills with the ebb and flow of our substantial tides. Last fall as water temperatures over the flats began to plunge, turtles that had not yet entered hibernation, or that slipped in and out of brumation with the mild weather, would be sluggish, almost torpid, during these forced tidal migrations. Encountering the net and pushed against it by a substantial current, turtles would be trapped, not energetic enough to swim free against the tide, and they would drown. The same effect would occur during inflow and outflow as terrapins were thrust into opposite sides of the netting. The result would be deaths on both sides of the nets, dispersing turtle remains in the pattern we observed. The sharp pressure of the netting may also explain neck slashes on several turtles and slices cut deeply and cleanly into the carapace of some shells.

While we shall never be able to prove for certain what caused the deaths, these obstructions best explain the forensic and circumstantial evidence of the die-off, from the state of the terrapin remains to the extreme localization of the event and the dispersal of the dead turtles. The real question for policy makers should be: Who is responsible for clearing lethal debris before it becomes a threat to endangered species and other salt marsh wildlife?

Terrapin Conservation Efforts

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The diamondback terrapin (*Malaclemys terrapin*) has been considered a status review species by the US Fish and Wildlife Service for over a decade. In part its conservation status has remained unchanged because the USFWS watches state designations and most states have little information concerning current population trends. Issues are further complicated by the fact that many states cover terrapin regulations under fisheries units, while state wildlife agencies typically oversee conservation status listings.

Several key issues face diamondback terrapins. These include a commercial harvest, illegal unregulated traffic for food markets, loss of nesting beaches through shoreline erosion and bulkheads construction, road mortality of nesting females, increased egg predation by growing populations of raccoons which are supplemented by garbage associated with coastal development, and fatal collisions with boats and jet skis. One of the most serious problems is the drowning of terrapins accidentally captured in crab pots. New Jersey and Maryland require terrapin excluders on all recreational crab pots. In several states similar programs are now under consideration. The Terrapin Research Consortium, a joint effort of the Terrapin Institute, Tortoise Reserve, and State of Maryland, has been convened to track these state innovations and efforts, share with others in the field, and bring about conservation and stewardship.

Diamondback terrapins are one of the most successful outreach and education species and enable a comprehensive conservation curriculum for citizens living in estuarine communities. The Maryland Fisheries Service, concerned with a vastly changing culture and economic conditions, devised a pilot program directed towards citizens who do not fish or otherwise do not fit into the typical resource agency demographics. The project which beckons "Make your connection at Terrapin Station" has thirteen connections to serve, at least one of these should pique everyone's interest. Without much of a budget or promotional expertise, the Terrapin Station project with the persistence of a diamondback has developed quite a momentum of its own. Among the Terrapin Station devotees are a group of elementary school students who are Head-Starting terrapins in their classroom. As part of their holistic and integrated education, the students study habitat loss and restoration needs. They became concerned at the proposal to armor off yet another terrapin nesting beach. Students with terrapins in-hand petitioned Maryland's Governor at the regularly scheduled Board of Public Works meeting and were successful in modifying the project such that this particular nesting beach would be preserved. The students also asked the Governor to proclaim a special day for the terrapin and suggested May 13, 2000, as this is the start of the breeding season in Maryland. The Governor obliged and plans are a foot around the tidewater of the State to celebrate in small and meaningful ways. Another very dedicated Terrapin Station student from a suburban high school is head-starting terrapins, assisting State biologists with monitoring and tagging, and meeting with middle school students once a week to guide them in their head-starting efforts. This student is our first Jr. Gillie, a subset of Terrapin Station in which high school students participate in a semester of intern stewardship and in turn mentor another grade level. The same student met personally with his Congressman and another top-ranking Member of Congress to ask for support of additional federal funding for wildlife and for their consideration of a national Terrapin Day. Both agreed to support an important funding bill. The diamondback seems to bring out the nobility in us all. More challenges and problems await.

One on-going problem is terrapin catch in "ghost" crab pots. Abandoned pots in some cases continue to capture and drown terrapins for years. The North Carolina Audubon Society, the Tortoise Reserve, and the Terrapin Institute have joined in a campaign to recover ghost pots in the vicinity of Ocracoke Island, North Carolina. During the aerial surveys for nesting colonial birds Audubon staff members reported seeing thousands of ghost pots in shallow waters around Ocracoke Island. Many of these result from various hurricanes that have hit coastal areas over the last five years. The date of the crab pot clean up has not been announced, but it will be during the summer of 2000. Watermen and other local citizens will be invited to join in a weekend long retrieval of unattended pots. The pots will be fitted with by-catch excluders and given back to crabbers who volunteer to place excluders on an equal number of currently active pots. We plan to present a public program on the cultural and natural history of the terrapin during the weekend cleanup, and will attempt to make this an educational and festive event. Assuming the program is well received we will consider hosting similar events along the North Carolina and elsewhere along the mid-Atlantic states in future years.

Terrapin Research at Gateway National Recreational Area

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The Gateway National Recreation Area (GNRA), managed by the National Park Service (NPS), is a large estuarine park in the mouth of the Hudson River, which constitutes New York Harbor. GNRA is comprised of four "units" encompassing a total of 26,000 acres. The three New York units are "Jamaica Bay," "Breezy Point," and "Staten Island"; the New Jersey unit is "Sandy Hook." All four units are located in the Hudson-Raritan Estuary, the southern-most section of the Hudson River Watershed.

Jamaica Bay Wildlife Refuge (JBWR), the largest unit of GNRA, has been the main focus of our study so far. JBWR is a 9,155-acre estuarine wildlife refuge located at the southwestern corner of Long Island, New York. The refuge runs through the boroughs of Queens and Brooklyn and consists of a main island called Rulers Bar Hassock and several smaller islands. JBWR has at least 100,000 visitors each year, while GNRA as a whole had 6.4 million visitors in 1996. As the fifth most highly visited national site in the United States, GNRA has about the same number of visitors as Yosemite and Yellowstone National Parks combined. Thus, GNRA provides an invaluable service by creating opportunities for the public to learn about and interact with estuarine ecosystems and their inhabitants.

We began studying diamondback terrapin (*Malaclemys terrapin*) nesting ecology at the Jamaica Bay Wildlife Refuge in 1998. We advertised for help with the terrapin research and found a number of interested volunteers, mostly from New York City and Long Island. With their help, we found populations of nesting terrapins at three different locations in Gateway National Recreation Area in 1998. We made estimates of activity levels based on such evidence as nest depredation, turtle egg shell fragments, dead adult female terrapins found in upland regions, hatchlings, false nests, and tracks leading inland from the water.

Female terrapins nested from 3 June through 23 July (51 days) and laid up to two clutches per season, depositing an average of 10.9 eggs per nest. Nesting activity increased with daily high temperature and high tide. Seasonal activity levels peaked three times during the nesting season, on 17–20 day intervals. The majority of females were captured when there was 25–75% cloud cover. The majority of nests were counted in shrub-land, mixed-grassland, and dune habitats, but nest density was highest in habitats devoid of vegetation, such as artificial sandy trails and beaches.

Previous research at JBWR showed that until the mid-1980s, there were no major mammalian predators inhabiting the Refuge, which accounted for extremely low nest predation and for extremely high nest and hatchling survivorship. A raccoon population appears to have become established in the late 1980s and early 1990s. We counted 1,319 and 1,840 in 1998 and 1999, respectively, lost to raccoon predation at the Refuge. Of 77 nests that we observed being deposited, 92.2% of those were destroyed by raccoon predation in 1999. An overall nest survivorship of 5.2% was determined (n=77), and hatchling survivorship in successful nests (n=3) was 54%. We also found the carcasses of 23 female terrapins that were apparently killed by raccoons as the terrapins came on land to nest.

Our research at Gateway is branching into four different directions. We are now surveying several more nesting beaches in GNRA, in an attempt to learn more about other important nesting beaches and how predation rates vary between them. To that end we are focusing on smaller islands that do not support raccoon populations but apparently are used by nesting terrapins. We also expect to begin work at the Sandy Hook unit of GNRA, where the nesting population appears to be at least as large as at JBWR, and raccoon predation of nests has occurred all along. We will also be studying JBWR nesting in greater detail to determine the importance of predation by plant roots, while at the same time monitoring nest temperatures and resulting hatchling sex ratios. We are beginning a study at JBWR to determine the size of the raccoon population, using night vision equipment and radio telemetry to document their movements during and after the terrapin-nesting season. We will also attempt to use taste aversion training to modify raccoon behavior. Finally, we just received funding to begin radio tracking 20 terrapins in Jamaica Bay as well as a major mark-recapture study throughout GNRA.

Arizona Game and Fish Department "Sponsor-a-Tortoise" Program

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Desert tortoises (*Gopherus agassizii*) occur in two major populations in the United States and Mexico, the Mojave Desert and the Sonoran Desert populations. The Mojave population occurs north and west of the Colorado River and in 1990 was listed by the U.S. Fish and Wildlife Service as threatened. The Arizona Game and Fish Department considers the tortoise a species of special concern throughout Arizona, including the Sonoran population south and east of the Colorado River.

Desert Tortoise Ecology

An important difference between the two populations is the absence of tortoises in valleys in the Sonoran Desert. Sonoran tortoises generally live on steep desert-mountain slopes in rocky burrows, while their counterparts in the Mojave Desert live primarily in valley floors and low mountain bajadas.

Studies in the Mojave Desert suggest that local populations need 20,000 to 60,000 tortoises to ensure survival of future generations. Local populations in the Sonoran Desert occur in isolated mountain ranges and most likely contain fewer than 20,000 tortoises. Their habitat has been fragmented and isolated by roads, canals, and agricultural and urban development, possibly severing corridors of dispersal. Currently, we do not know how many tortoises each local population in the Sonoran Desert needs to survive.

Information Needs

The Arizona Game and Fish Department's Desert Tortoise Project is working to determine how the relatively small tortoise populations in Arizona persist, and to predict the likelihood of their persistence into the future, by asking the following questions: At what rate do desert tortoises reproduce? How does reproduction vary by year and by individual? What factors affect reproductive rate? Also, the study of tortoise movements and home range may help identify other factors limiting local population sizes, such as specific habitat features necessary for shelter (e.g., boulder cover sites).

Desert tortoises can live to at least 30 years of age (some may live to 100), so information collected over many years is important to determine how reproductive rate, movements and home range, and survival vary during tortoises' long life spans. Obtaining this information will help ensure that tortoises in the Sonoran Desert do not become endangered in the future.

Project Methods

The Desert Tortoise Project relies primarily on the use of radio telemetry to study tortoises in the wild. We attach small radio transmitters, each with a unique frequency, to individual tortoises. By tuning a receiver to a particular tortoise's frequency, project biologists can relocate the same individual over time. By tracking a number of

Figure 1. Radiograph of a desert tortoise showing shelled oviductal eggs.

Observations on Hibernation in Captive Box Turtles in New Jersey

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Over a period of thirty years, I have maintained a captive box turtle population outdoors in New Jersey and made many observations of individual turtles. Much of my time was spent using herps for educational purposes rather than conducting research projects. Consequently, a truly scientific study was never conducted, and relevant statistical data were not collected. However, over the many years spent maintaining these turtles in outdoor enclosures, some patterns of behavior were very evident.

Most of the turtles were wild caught specimens (the others are captive-bred offspring from the wild-caught adults). The majority of the animals were "road rescues," unwanted pets, or turtles that were injured or ill. It seemed every time someone who knew me found a box turtle wandering on the roadside, I ended up caring for it. Years ago, before the current New Jersey legislation, it was possible to rehab turtles and return them to the location where they were found. For a turtle whose origin was unknown, finding a herper who would care for it was another option. However, the rest remained in my pens. (Now, with the current laws, releasing turtles or finding "homes" is no longer legal. I have a Scientific Holding Permit, and any turtle I obtain for rehab must remain in my care.)

The following information is important to understand the overall nature of my observations:

All the turtles were adults at the time they were found, and a significant number appeared to be quite old. Many of them (particularly those found twenty or thirty years ago) have lived out the remainder of their days in a peaceful setting, but eventually old age has taken its toll. Today, though there are still a few dozen turtles being kept outdoors, many are offspring of the original captives.

Over the years most of the collection was composed of eastern box turtles, *Terrapene carolina carolina*. There were also Gulf Coast (*T. c. major*), three-toed (*T. c. triunguis*), and intergrades in the group. About 90% of the eastern box turtles were from New Jersey, but some specimens were from North Carolina, Virginia, and Pennsylvania. Obviously, the Gulf Coast and three-toed box turtles were not originally from the Northeast, but their actual location of capture is unknown. There was also no way to determine from their previous keepers the home range of the eastern box turtles that were acquired after being maintained as pets for many years.

Several trends were obvious:

First, turtles that came from warmer climates were usually the first to emerge from hibernation. This was especially true during their first few years in captivity. This group included the Gulf Coast, three-toed, and eastern box turtles from Virginia and North Carolina. Individuals in this category were usually also the last to enter hibernation and would be wandering around weeks after the local turtles had permanently dug in for their winter sleep. During those years when unexpected "heat waves" occurred in January, February, or March, members of this group were the ones most likely to emerge.

A second observation is related to eastern box turtles that had been kept indoors as pets for many years and had not been allowed to hibernate. These also remained active a week or two longer than the local turtles that had always been housed outdoors. The former group also emerged a week or more earlier. Similarly, the offspring of box turtles from the collection also emerged somewhat earlier, but it should be noted that I housed all offspring indoors during the winter for at least two years. They therefore showed similarity to the pet box turtles not accustomed to hibernation.

Third, these trends were more pronounced during the turtles' first few years of being allowed to hibernate outdoors. After the turtles had lived in the New Jersey climate for many years, the difference in hibernation lengths between the groups was less noticeable. Also, local turtles commonly faired better during the hibernation period than did those that were allowed to hibernate outdoors for the first time, or those that had been moved to New Jersey from other geographic areas. It seemed that box turtles kept indoors, or those that came from a home range with a "short winter," never consumed enough food prior to hibernation. These usually emerged very light in weight, but they regained the lost ounces when allowed to rehydrate upon coming out of hibernation.

In conclusion, shorter hibernation lengths were most common in turtles originating from warmer climates regardless of the species. The variations in hibernation duration became less evident over time. Long-term captive adults housed indoors, or captive-bred young being hibernated outdoors for the first time, demonstrated similar behavior to the turtles from southern climes. From these data, it can be assumed local New Jersey box turtles not only have fewer problems adjusting to outdoor hibernation in a captive environment, but also "instinctively" enter hibernation earlier and emerge later. The non-native turtles or locals that either never hibernated or had not hibernated for years, apparently "prefer" to remain active, and they require time to habituate to their new environmental conditions.

Of course, these observations are based on a relatively small captive population. The conclusions do not imply that similar results would necessarily occur in other areas of the country, or under conditions that vary from those in my collection. Nonetheless, clearly local turtles are better suited to preparing for, and surviving, hibernation than are those that are not used to the region's climatic conditions. But even box turtles that have never hibernated, and those coming from regions of the country where hibernation lengths are very short, have the ability to adapt to the conditions of another area of the country after time. (It should be noted, however, that without close monitoring and proper treatment, some of the non-local turtles would probably not have survived after emerging.)

Current Status of Seychelles Terrapins

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Editors' note: The term *terrapin* in this article applies to a freshwater turtle. Turtles of the genus *Pelusios* are commonly called African side-necked mud turtles.

The Seychelles islands support three native taxa of freshwater turtle, two are endemic subspecies of African species (*Pelusios subniger parietalis* and *P. castanoides intergularis*) and the third a full endemic species (*P. seychellensis*). Both *P. s. parietalis* and *P. c. intergularis* are well-known and well-defined taxa, but *P. seychellensis* is very poorly known (being recognised from only three museum specimens collected in 1894). *P. seychellensis* appears to intergrade with *P. c. intergularis,* and continued taxonomic research may now suggest that the two form a hybrid complex, with *P. seychellensis* being extinct in a pure form.

Of the two definitely extant subspecies, *P. s. parietalis* inhabits marshes, either shallow muddy woodland pools or open reed beds. *P. c. intergularis* is typically riverine, although it occurs in some of the deeper reed beds in very low numbers. Both marshes and rivers in the Seychelles have been extensively disturbed by development, pollution, and alien water plant invasion (water hyacinth and water lettuce). It has long been believed that the terrapin populations are in decline (Bour, 1984).

The first population estimates were made in 1996 when all of the main terrapin sites were surveyed (Gerlach & Canning, 1996). Monitoring over the next three years further refined these estimates. By early 1999 the populations were estimated to be 400-450 adult *P. s. parietalis* and 200 *P. c. intergularis*. The endemic species *P. seychellensis* was suspected to be either extinct or an invalid species. In 1997 The Nature Protection Trust of Seychelles started its Seychelles Terrapin Conservation Project. The goals of this group were to raise awareness of the terrapins' threatened status and the need for wetland conservation, and to reintroduce terrapins to secure sites (such as Aride, North, and Silhouette islands). Towards this latter goal, the NPTS established a captive breeding programme using rescued "pets" and terrapins removed from development sites. These terrapins were obtained with the support of the Seychelles Government's Division of Environment.

By early 1999 the main populations of *P. s. parietalis* had been restricted to the reed beds at Anse Forbans on Mahé and Anse Kerlan on Praslin. *P. castanoides* was mainly restricted to the Rivière Mare Anglaise on Mahé with a small population on Praslin (also at Anse Kerlan). Significant populations may remain on La Digue, but are in continuing decline due to ecological problems in the marsh.

In 1999 the Anse Kerlan marsh was drained to allow expansion of the airport on Praslin and the development of a golf course. This drainage has eliminated the main *P. s. parietalis* population, reducing the estimated remaining population to 180–190 *P. s. parietalis* and 150 *P. c. intergularis*, which represents declines of 57 and 21% respectively. These major declines are due entirely to habitat destruction. Unfortunately, the importance of marshes is not widely appreciated in Seychelles. This is exemplified by the favourable Environmental Impact Assessment given for the Anse Kerlan drainage project prepared by the director of BirdLife Seychelles. There is an urgent need to raise the profile of marsh conservation in Seychelles before the last remaining fragments are lost.

Because there was no prior publicity about the drainage at Anse Kerlan, the Seychelles Government's Conservation Section and NGOs were unaware of the project, and we lost a chance to rescue the terrapins from the site. Had we access to this information, we could have begun restoration of populations in reserve sites. Consequently, the captive-breeding project of the Nature Protection Trust of Seychelles has now become crucial for the survival of both endemic subspecies.

The captive-breeding project obtained its first eggs from *P. s. parietalis* in January–March 1999; unfortunately, all were laid in the water and did not hatch. Later that year, with financial support from the U.S. Ambassador's Self-Help Fund, the enclosures were improved to enhance breeding conditions. More eggs were laid in January 2000, again in the water. Of these, two were rescued before they became waterlogged. One of the eggs hatched on 3 March. This is the first successful captive breeding of a Seychelles terrapin. It is hoped that the cause of the eggs being deposited in the water can be identified before the next laying season and that *P. c. intergularis* can also be persuaded to breed.

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Mid-Atlantic Turtle Conference Held in Maryland

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More than 160 citizens; representatives from academic, public, and private non-profit organizations; and just plain "turtle folks" turned out for the Conservation and Ecology of Turtles of the Mid-Atlantic Region Conference. The conference, organized and coordinated by the Jug Bay Wetlands Sanctuary, took place October 30–31, 1999, at the Patuxent Research Refuge National Wildlife Visitor Center in Laurel, Maryland. More than 50 biologists highlighted the results of studies on the ecology, biology and behavior of mid-Atlantic turtles. Other sponsoring organizations were the Mid-Atlantic Turtle and Tortoise Society, the Tortoise Reserve, Hudsonia Limited, Fisheries Service of Maryland's Dept. of Natural Resources (MD DNR) and the Patuxent Research Refuge.

Keynote speaker Dr. Michael Klemens of the Wildlife Conservation Society made a plea for the protection of reptile and amphibian habitats in suburban environments and for conservationists and scientists to get more involved in local land-use planning. In concluding remarks, Dr. Erik Kiviat, Science Director at Hudsonia, Ltd., summarized the conference presentations and identified important areas for future investigations.

Conference proceedings will be published in 2000. For more information about the conference or the proceedings, contact the author.

Abstracts

A Pairwise Comparison of Home Range and Seasonal Movements of Native and Introduced Box Turtles (*Terrapene carolina*) within the Wildlands of the Baltimore Zoo. Nicole M. Castagna, Lois K. Tiffany, and Don C. Forester.

Natural History and Population Characteristics of *Clemmys muhlenbergii* at the SHI wetland in Maryland. Steve A. Dinkelacker, James H. Howard, and Thomas P. Wilson.

The Impact of Terrapin Excluders on Commercial Crab Catches. Renae Held and Caralyn Zehnder.

Diamondback Terrapin (*Malaclemys terrapin*) Head-Starting Project in Southern New Jersey. Rosalind Herlands, Roger Wood, Jennifer Pritchard, Heather Clapp and Norman Le Furge.

A Metapopulation Approach to Conservation of Bog Turtles (*C. muhlenbergii*) in Maryland. James H. Howard, Scott A. Smith, Thomas P. Wilson, and William L. Branch.

Wood Turtle Movements & Habitat Use in Channelized and Undisturbed Sections of a Riverine Corridor in Central Pennsylvania. Joseph Hummer and Teresa Morrison.

Gender Determination of Juvenile Wood Turtles (*Clemmys insculpta*) - Is It Possible? Todd Hunsinger.

Eastern Box Turtles Benefit from a High Diversity Environment. Michael Marchand, Mike Quinlan and Christopher W. Swarth.

Habitat Restoration for Blanding's Turtle in New York. Erik Kiviat, Stacey Thew, Robert Brauman, Gretchen Stevens, Sven Heoger, Peter Petokas and Krista Munger.

Proposed Biogeographic History of the Bog Turtle. David S. Lee.

A Comparative Toxicological Analysis of Two New Jersey Diamondback Terrapin Populations. Catherine McIntyre.

Translocation, Rehabilitation and Headstarting of Wood Turtles (*C. insculpta*) in New York State. Kathy and Rob Michell.

Terrapins and Tires: Road Kill Mortality on the Cape May Peninsula of Southern New Jersey. Caren Mintz.

Status of the Wood Turtle (*C. insculpta*) on the Coastal Plain of Harford County, Maryland. Kelly Profitt.

Ecological Consequences of Temperature-dependent Sex Determination: Implications for Management and Conservation of the Terrapin (*M. terrapin*). Willem M. Roosenburg.

Impact of a By-Catch Reduction Device on Terrapin (*M. terrapin*) and Crab (*Callinectes sapidus*) Capture in Crab Pots. Willem M. Roosenburg and J. P. Green.

Status and Conservation of the Bog Turtle (*C. muhlenbergii*) in Maryland. Scott A. Smith.

Determination of the Essential Nutritional Requirements of the American Red-bellied Turtle (*Pseudemys rubriventris*) during Hatchling Development. Mark Teece, Christopher Swarth, Noreen Tuross, and Marilyn Fogel.

Diet of the Northern Diamondback Terrapin (*M. terrapin terrapin*). Donna Wilson.

Status and Conservation of the genus *Clemmys* in Virginia: Prospects for the Future. Thomas P. Wilson, Thomas S. Akre, and Joseph C. Mitchell.

Diamondback Terrapins in New Jersey: A Case Study in the Politics of Conservation. Roger Wood.

Hatching Success of Bog Turtle (*C. muhlenbergii*) Eggs in Five Pennsylvania Populations under Natural and Laboratory Conditions. Robert T. Zappalorti, Peggy J. Drake, Stephen A. Sykes and Michael E. Torocco.

Two Year Survey of Box Turtles in Lake Needwood Park. Tom Busby.

Microsatellite Marker Development and Applications for Bog Turtle (*C. muhlenbergii*) Conservation. James H. Howard, Tim L. King, and Scott A. Smith.

Characteristics of a High-Density Eastern Box Turtle Population on Maryland's Coastal Plain. Mike Quinlan and Christopher Swarth.

Nesting and Nest Site Selection in a Maryland *C. muhlenbergii* Metapopulation. Thomas P. Wilson, Steve A. Dinkelacker, and James H. Howard.

Habitat Change Detection Analysis and Spatial Ecology of *Clemmys guttata* in an Isolated Fairfax County Population. Thomas P. Wilson.

Tortoise Trust Global Emergency Fund

ANDY C. HIGHFIELD

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Tortoise Trust UK/International is launching a totally new initiative to deal with the increasing demands on resources resulting from international animal seizures, crisis situations and global emergencies. This new initiative, called the Tortoise Trust Global Emergency Fund, has the following objectives:

1. To maintain a list of volunteer experts who are prepared to assist in emergency field projects whenever or wherever the need arises. Qualified persons include veterinarians, vet techs, zoo personnel or others with related or relevant experience, including construction workers/carpenters (provision of housing) *etc.*;

2. To maintain an emergency fund to provide immediate help for confiscated animals;

3. To provide immediate technical support and advice in the event of emergency/rescue situations.

We are seeking volunteers in different geographical zones to take on the tasks of raising funds, coordinating efforts to obtain corporate sponsorship and donations, maintaining the register of active specialized assistance, and acting regional monitors/contact persons.

Specific roles for which help is sought include: 1) establishing the database of expert resources; 2) raising corporate sponsorship-airlines, vet supply companies, *etc.*; 3) general fund raising activities; and 4) recruitment of a panel of specialist advisors.

Please contact us if you are interested in any of these roles at ttrust@globalnet.co.uk.

A Communication Tool for Turtle and Tortoise Owners

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For those of you with Internet access, a wonderful tool for communicating with others who share our interests is a list serve community.

After joining one of these communities, you will receive E-mail messages from other community members with interests in common. All E-mail messages sent to the list address are sent to all subscribers and all replies are sent to everyone as well. This develops into a near real-time forum for information exchange.

There is a vast array of list serve communities on the Internet. Some are very focused, while others are devoted to more general subject matter. I will discuss a few of them here.

The oldest of the lot, and still one of the very best dedicated to husbandry, is the Turtle Discussion list. One can subscribe to it at www.icomm.ca/reptile/turtlist.htm.

A list serve dedicated to box turtles can be joined by following the instructions at Tess Cook's very fine Box Turtle Care and Conservation Web Page at www.geocities.com/RainForest/Vines/5504/index.html.

In addition to the above two lists, an incredible assortment of subjects can be found on eGroups at www.egroups.com. To join the eGroups communities, you must register on their site. This registration is free. You are then eligible to join any of their lists that allow open subscription. After subscribing to eGroups you can search for "turtle," "tortoise," or other keywords, and be given an overview and the option of subscribing to quite a few fine list serves. Simply follow instructions to subscribe. It is here that the Tortoise Trust list serve makes its home—just search for "tortoisetrust".

Lists found on the eGroups hub include Manouria (focused on that genus), Turtle_Tort_Adoption (the Turtle Homes adoption list), Asian-Turtle-Crises (devoted to the present crises facing Asian chelonians), Slowcoach (*Testudo* species), ChineseBoxTurtle (*Cuora flavomarginata*), Flowerbackboxturtles (*C. galbinifrons*), Clemmys (the genus), Redfoot (*G. carbonaria*), Sulcata (*G. sulcata*), Kleinmanni (*T. kleinmanni*) and many more.

Other lists on eGroups include redearedsliders, SeaTurtleNews, turtlefacts, Gopherus, ChicagoTurtleClub, TheUtahTurtleSociety, testudo, caribbean-biodiversity, STAR_tortoise, Chaco, and SulcataStuff. While most of the above are devoted to the pets, there are a few that cover conservation issues as well.

The traffic on the above lists can vary from just a few E-mail postings a week for the focused lists to 50 or more a day for the more general ones. Some have as few as 10 or 20 subscribers; the Tortoise Trust list has almost 500.

Regardless of your degree of involvement, list serves offer a great opportunity to learn from others who share our interests, worries and goals.

Editors' note: If you subscribe to one or more of the more active list serves, we recommend that you set up a separate E-mail account to handle just that mail. This will help you avoid the tedium of sorting through large numbers of additional messages in your personal account.

UPDATES AND LETTERS

New Efforts for Turtle Conservation—Conservation International (CI)

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I recently joined the staff of Conservation International (CI), where I will be serving as Coordinator for Amphibian and Chelonian Conservation. CI is an international conservation organization with offices in 20 countries that focuses its conservation efforts primarily on biodiversity hotspots around the world. I will also be serving as the Program Officer for the IUCN's SSC Freshwater Turtle and Tortoise Specialist Group. For the present, I will be working out of an office provided by the University of Georgia's Savannah River Ecology Laboratory (SREL) but will also be spending one week per month at CI's headquarters in Washington, D.C.

My prior conservation experience includes work as a field zoologist for the Virginia Natural Heritage Program and The Nature Conservancy. I completed my Ph.D. at the University of Georgia in 1998 under the direction of Dr. Whit Gibbons, where I investigated the use of critical upland habitats and terrestrial corridors by turtles that inhabit seasonal wetlands. During that period I learned some fascinating things about the unique life history strategy of the chicken turtle, *Deirochelys reticularia*. Since that time, I have held a postdoctoral research position at SREL working with Dr. Gibbons and have also taught a herpetology course at Evergreen State College in Olympia, Washington.

One of my on-going projects with Conservation International includes the design of a landscape-level conservation strategy for amphibians that CI will be able to incorporate into existing conservation initiatives in various regions of the world. In December I traveled to Cambodia to attend the Workshop on Trade in Tortoises and Freshwater Turtles in Asia. It is a depressing situation for Asian turtles, but if we work together, it is hoped that we can hopefully prevent the extinction of these species. CI is committed to designing collaborative plans with other organizations and is seeking funds to establish a viable Asian turtle conservation strategy. A multi-faceted plan to insure the survival of Asia's turtles will include the establishment of in-country conservation centers as well as ex situ insurance colonies. Field surveys will be important to document the habitat and basic ecology of many of these poorly known species. The range countries need support and encouragement to enforce legislation, to establish environmental education programs, and to protect natural areas. These plans will require a substantial fundraising effort. The crisis currently faced by Asian turtles provides an unprecedented opportunity for zoos, aquariums, university research scientists, government agencies, conservation organizations, private turtle hobbyists, and concerned individuals to form partnerships to prevent the loss of more than one-third of the world's chelonians.

I will periodically provide the turtle community with updates through *TTN* as the project begins to take form. I look forward to hearing from anyone who wants to put effort into reptile and amphibian conservation initiatives.

PARC Update

WHIT GIBBONS

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PARC Mission: To conserve amphibians, reptiles and their habitats as integral parts of our ecosystem and culture through proactive and coordinated public/private partnerships.

PARC is still in its first year if we view the starting point as the first national meeting in Atlanta in June 1999. Since that time, a variety of regional meetings have been held to determine the most effective means to accomplish the PARC goals of conservation of amphibians and reptiles. Turtles and tortoises are, of course, a major component of this effort.

The first meeting of the Southeastern Working Group of PARC, held 21-23 February 2000, was hosted by the Joseph W. Jones Ecological Research Center in southern Georgia (the mission of the JWJERC is to provide a program of excellence in ecology and natural resource management that includes integrated research, education, and conservation goals).

John Jensen, Georgia DNR and Co-Chair of SE PARC Working Group, organized the meeting with help in coordination from Joe Mitchell, University of Richmond, and Henry Mushinsky, University of South Florida, who also served as facilitator.

The southeastern region, as defined by the USFWS, was well represented at the meeting by all states except Kentucky and Louisiana. Individuals from these states had

planned to come, but circumstances prevented their attendance. A wide range of partners were present, however, including representatives from state and federal agencies, the timber industry, the pet trade, universities, and conservation organizations. Many other individuals had expressed interest in attending the meeting, but to ensure that this was an effective working meeting, and due to space limitations at the JWJERC, attendance was limited in an attempt to accommodate as broad a representation as possible. One goal of the meeting, as will be true for all PARC meetings, was to determine how to get everyone involved who wants to be involved. Thus, attendees were viewed as representives not only from their own organizations but also of all the others who would like to have been involved but were unable to attend.

Regional PARC meetings are an excellent forum for information exchange for everyone with an agenda that in some way involves reptiles and amphibians. Among the discussions at the Southeast PARC meeting was an update by Kurt Buhlmann, Conservation International, of the Asian turtle crisis and of discussions underway to develop temporary holding facilities for confiscated animals. The southeastern United States is clearly a region where such a program could be carried out with the support and cooperation of various facilities.

It was also noted in the general discussions that funding to accomplish PARC goals is becoming increasingly available through the National Fish and Wildlife Foundation (NFWF) and federal agencies, and that great expectations for herpetology are anticipated with Conservation and Reinvestment Act (CARA) funding through various states once the process is complete. Conservation of southeastern turtles was continually a topic through many of the discussions during the three-day meeting. The full details and minutes of the Southeast PARC meeting can be viewed on the PARC Web site (www.parcplace.org).

Update on CITES
(Convention on International Trade in Endangered Species of Wild Fauna and Flora)

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CITES is the only international treaty focused on the conservation of wildlife through monitoring and regulation of international trade. This treaty, established in 1975, currently has 150 member countries. Species believed to be affected by international trade are placed in one of three appendices. International commercial trade is forbidden for species listed in Appendix I. Species listed in Appendix II are not yet threatened with extinction but may become so if international trade is not regulated. Species may also be listed in Appendix II if they physically resemble species that are being affected by trade. Trade in Appendix II listed species may occur, but the proper permits are required. Species listed in Appendix III are done so by individual member countries wishing to protect and monitor trade in native species. Listing in one of the appendices does not indicate an endangered or threatened status nor does it affect domestic trade.

Every two years member countries and non-voting NGOs (non-governmental organization) gather for a Conference of the Parties (COP). During this meeting, the treaty and policies are reviewed and the Appendix listings are updated. In April 2000, the 11th COP was held in Nairobi, Kenya. Four proposals concerning freshwater turtles and tortoises were presented; of the four, two were accepted. One proposal concerning trade in hawksbill tortoiseshell by Cuba was presented and rejected.

All Asian box turtles (genus *Cuora*) were added to Appendix II. *Cuora amboinensis* (Malaysian box turtle), *C. flavomarginata* (Chinese box turtle), *C. galbinifrons* (Flowerback box turtle), and *C. trifasciata* (three-striped box turtle) were added because of low population levels. The remaining five species, *C. aurocapitata* (golden-headed box turtle), *C. mccordi* (McCord's box turtle), *C. pani* (Pan's box turtle), *C. yunnanensis* (Yunnan box turtle) and *C. zhoui* (Zhou's box turtle) were listed because of similarity of appearance with the first four species.

France proposed to upgrade the listing of the Africa spurred or sulcata tortoise (*Geochelone sulcata*) from Appendix II to Appendix I. Insufficient information was available to justify this move, so the proposal was modified to leave the species in Appendix II but to have a zero quota. The modified proposal was accepted.

The proposal to include the spotted turtle (*Clemmys guttata*) in Appendix II was rejected by a vote of 38 to 36 with 31 abstentions. According to Susan Lieberman, Chief of the Office of Scientific Authority, U.S. Fish and Wildlife Serve, "We were very disappointed that the listing of the spotted turtle in Appendix II was not approved by the CITES Parties… The decision was blocked by the European Union; had the EU supported the proposal, it would have passed. The States spoke articulately in support of the listing, as did Canada. We will evaluate in the near future whether to consider including the species in Appendix III, although we remain convinced that the species qualifies for Appendix II." Reasons for the rejection included insufficient information on population size, area of distribution, or rates of decline and the relatively few wild-caught individuals in the international pet trade. Thus, it was determined that international trade is only a "minor" threat and inclusion in Appendix II would not benefit this species.

A proposal to transfer the pancake tortoise (*Malacochersus tornieri*) from Appendix II to I was submitted by Kenya

and the United States but was withdrawn after discussions with Tanzania, which agreed to stop exports of wild-caught individuals. This species was initially listed on Appendix II in 1975. In 1982 Kenya completely banned its trade.

Further information on CITES and these proposals can be obtained from the CITES website (www.wcmc.org.uk/cites/eng/index.shtml) and the U.S. Fish & Wildlife website (international.fws.gov/global/cites.html).

LEGAL ISSUES

The Box Turtle Coalition of the Northeast Urges a Halt to Recreational Collecting in Pennsylvania

CHERYL LECHTANSKI

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We, the Box Turtle Coalition of the Northeast, urge the PA Fish & Boat Commission to close the season on RECREATIONAL (commercial harvesting is already banned) box turtle collecting in Pennsylvania for the following reasons:

1) There is abundant, reliable anecdotal evidence (plus longitudinal studies of 10-50 years' duration revealing the decline and disappearances of box turtle populations.

2) All species of this genus have been afforded strict international protections by the 1994 CITES treaty

3) Border states, NY & NJ, have long prohibited box turtle collecting (NY since 1905; NJ since 1978). Ohio listed this turtle a species of special concern and banned collecting in 1997.

4) Box turtles have small home ranges. Research indicates that they can not detect potential mates at a distance. They rely on high population densities in small areas for the incidental encounters needed to sustain their populations. Populations with densities approximating 10/acre have been found to be too unstable to avoid decline to extinction. Census studies find that most populations' densities are now far below that.

5) Because box turtles can live to 100 years, reproductively dead, depleted populations outlive the humans who misinterpret the presence of those remnant individuals as a viable population.

6) The geriatric, relict status of many populations (thought to be stable) goes unrecognized without lengthy study on age & density characteristics. The long time needed for such studies means that, even as the studies are being conducted, populations are slipping below a density threshold from which they can not recover.

7) Unlike fish, birds, mammals, *etc*, box turtles don't emigrate in sufficient numbers to replenish habitats which have lost them (especially when their populations are already in decline).

8) Attempts in PA & NY to artificially repopulate former habitat reveal the impracticality (and probable impossibility) of recovering destabilized and extirpated box turtle populations. Efforts to undo the consequences of lax protection can not remedy failures to aggressively conserve this species.

9) Captured box turtles often die in captivity. Their homing instinct propels dispersal from unfamiliar habitat if they are released after collection. During dispersal after release, they usually die from increased energy use, highway exposure, and unfamiliarity with new foraging & hibernating sites.

10) Dispersal of box turtles after collection can also spread disease. A new disease that was spread through gopher & desert tortoise populations by released pet tortoises in the 1970's now threatens those species with extinction. In 1998 the same disease organism was found, for the first time, in a box turtle.

Given the array of ecological damage fomented by current PA policy, we urge the PA Fish & Boat Commission to revoke its permission for citizens to collect box turtles.

Please help us encourage a ban on recreational box turtle collecting in Pennsylvania by writing, as soon as possible, to

1) Delano Graff, Director, PA Fish & Boat Commission, 450 Robinson Ln., Bellefonte, PA 16823-9620; E-mail: dgraff@fish.state.pa.us

2) Andrew Shiels, Endangered Species Unit, address same as #1; E-mail: ashiels@fish.state.pa.us and

3) Peter Colangelo, Executive Director PA Fish & Boat Commission, 3532 Walnut St., P.O. Box 67000, Harrisburg, PA 17106-7000; E-mail: pcolangelo@fish.state.pa.us.

In addition, please contact Governor Tom Ridge, 225 Main Capitol, Harrisburg, PA 17120, tel 717-787-2500 and your legislators who can be found at www.capweb.net.

Since turtle populations extend across state lines, supporting comments from out-of-state turtle researchers and conservationists would provide helpful testimony to that coming from PA citizens. Continued legal collection in Pennsylvania will also encourage illegal poaching in neighboring states. For more information contact the author or Bill Belzer (billbelzer@hotmail.com).

In particular, we need more support from the research community with solid examples of the damage recreational collecting can inflict on turtle populations. Please help.

Editors' note: The following two websites have information on this topic:www.suite101.com/article.cfm/127/38437 and www.herpconservation.org/btcne/

Proposal to Place a Moratorium on All Fisheries Affecting the Diamondback Terrapin

Gregory Pokrywka MD (President, Mid-Atlantic Turtle and Tortoise Society, Inc.) and the MATTS Board

2914 E. Joppa Rd. #103, Baltimore, MD 21234-3031; E-mail:gpokmd@bigfoot.com

Please support the following proposal to place a moratorium on the northern diamondback terrapin fishery in Maryland until the health, or lack thereof, of the population can be assessed and the illegal aspects of the fishery can be studied and properly regulated. Please send letters of support to the following two individuals:

1) Parris N. Glendening, Governor, State House, Annapolis, MD 21401; (410) 974-3901, 1-800-811-8336 (toll free,Maryland); Fax: (410) 974-3275; E-mail: governor@gov.state.md.us
2) Sarah J. Taylor-Rogers, Secretary of Natural Resources, Office of Secretary, M.D.N.R., Tawes State Office Bldg., 580 Taylor Ave., Annapolis, MD 21401-2397; (410)260-8101; Fax:(410)260-8111; E-mail:staylor-rogers@dnr.state.md.us

The Mid-Atlantic Turtle and Tortoise Society, Inc. (MATTS), representing over 100 concerned citizens, scientists and reptile hobbyists, would like to make the following statements and proposals:

Whereas the northern diamondback terrapin *Malaclemys terrapin terrapin* is a unique and beautiful part of Maryland's fauna, being the only North American turtle specifically adapted for a brackish (part saltwater and part freshwater) environment;

Whereas the northern diamondback terrapin has long been recognized as one of the traditional symbols of Chesapeake Bay and Maryland, and currently reigns as the Official State Reptile and mascot of the Univ. of Maryland;

Whereas turtles in general have recently been found to be disappearing globally at an alarming rate, due to overconsumption as food items and due to loss of habitat;

Whereas MATTS has obtained confirmed reports that, in addition to Maryland's regulated fishery, there exists a substantial unregulated fishery consisting of illegal removal of unknown numbers of terrapins from the Chesapeake Bay and transported across state lines for resale in the urban Asian seafood markets of the Northeastern U.S., chiefly New York City;

Whereas such illegal interstate transportation is a certain violation of the Federal Lacey Act;

Whereas growth of the U.S. urban Asian market consumption of turtles is on the rise and expected to accelerate in the near future (as has already happened in Southeast Asia);

Whereas detailed studies of terrapin populations have determined that small changes in adult survivorship, considerably less than those imposed by a commercial harvest, will rapidly result in dramatic population declines;

Whereas, at several localities outside of Maryland apparently healthy populations of terrapins have entirely disappeared in the last two decades;

Whereas there is no mechanism in place currently to determine the health of the Chesapeake Bay's population of northern diamondback terrapin, nor to study and quantify the illegal aspects of this fishery;

MATTS would like to propose a moratorium on all fisheries of northern diamondback terrapins until the health, or lack thereof, of the populations can be assessed, and the illegal aspects of the fishery can be studied and properly regulated.

Thank you for your assistance in preserving this important part of Chesapeake Bay's and Maryland's heritage!

ORGANIZATIONS

Terrapin Research Consortium (www.whitehallbay.org)

Marguerite Whilden

Maryland Dept. of Natural Resources, Fisheries Service, 580 Taylor Ave, Annapolis, MD 21401; E-mail:Terrapin@whitehallbay.org

A research advisory group has been convened independent of political, academic, and government organizations to develop sound research, management, and educational standards and to share information in the interest of the diamondback terrapin. Our participants, who come from various disciplines, have a wide range of credentials and are identified by their integrity, dedication, experience, and expertise. The prospect of combining the energies of dedicated individuals has enormous potential, not only for the diamondback terrapin, but also for the larger environmental restoration mission. If we cannot address the smaller, less complicated ecological issues, can we expect the populace to support and finance the larger restoration schemes? The diamondback terrapin can be restored to its historical range and abundance with minor effort if actions are taken now.

The Terrapin Institute and Terrapin Research Consortium are subsidized by the Whitehall Bay Institute, the Tortoise Reserve, and the following individual supporters: Wayne Gilchrest, Member of Congress, Maryland's First District; Tom Horton, author, *The Baltimore Sun*; Bill Boyd, exotics vet., advisor to NAIB; David Lee, researcher,

Tortoise Reserve International; Robert Evans, waterman, biologist, retailer/wholesaler; Tony Young, waterman, captain; James Sullivan, oceanographer, Agency for International Development; Marguerite Whilden, outreach, resource manager; Roger Wood, Wetland Institute, Stockton College, professor; Kevin Smith, land management, habitat restoration; J. Whit Gibbons, researcher, author, professor; Willem M. Roosenburg, researcher, Ohio University, professor; and Kristen Marie Hart, researcher, Duke University.

The Terrapin Institute and Terrapin Research Consortium Mission Statement

The Terrapin Institute is a consortium of scientists, resource managers, educators, and concerned citizens dedicated to the understanding, persistence, and recovery of diamondback terrapins and other turtles through effective management, thorough research, and public outreach.

Recommendations for Conservation and Management

1) Protect the adult population;

2) Limit the use of shoreline stabilization techniques including bulkheads, rip-rap, and beach grass planting;

3) Promote owner stewardship of nesting sites, and purchase and protect nesting sites with high nesting densities; and

4) Establish education and outreach programs using turtles to teach environmental stewardship and the importance of biodiversity.

Recommendations for Research and Investigation

1) Develop a thorough understanding of population numbers and trends throughout the terrapins' range, including demographic studies that investigate variation in reproductive rates and survivorship in new areas.

2) Investigate the impact of commercial and recreational fishing practices on terrapin populations, focusing on crab pots, eel pots, and other gear that remains submerged, and evaluate mechanisms to prevent turtle mortality.

3) Identify primary nesting habitat and key physical features of nesting areas that influence the survivorship and sex ratio of developing embryos and hatchlings.

4) Use mathematical modeling to simulate current population trends and the effects of changing birth and death rates within populations.

5) Undertake molecular genetic studies to identify distinct terrapin populations throughout their range.

6) Study the ecology of hatchling and juvenile terrapins, particularly during the first two years of their life, to determine factors that may increase survivorship and to identify the need for habitat protection.

Recommendations for Teaching and Outreach

1) Initiate an education program to promote the use of bycatch reduction devices (BRDs) in both recreational and commercial crab pots—through presentations, displays in public venues, and contact with individuals.

2) Conduct outreach activities for students of all ages using the terrapin and other turtles to teach biodiversity, natural history, and ecology

3) Develop a public facility to promote the research, conservation, and management of terrapins.

4) Train students and researchers in research methods of studying terrapin populations through direct participation in terrapin research.

Further Information

Abstracts of terrapin research, management, and conservation measures will be posted on the Terrapin Institute Web site (www.whitehallbay.org). Please notify the author of your activities. Membership opportunities will be available soon, and additional recommendations are welcome.

Tortoise Consortium

Michael J. Connor

Desert Tortoise Preserve Committee, 4067 Mission Inn Ave, Riverside, CA 92501; E-mail: dtpc@pacbell.net

In January 1999, members of the Desert Tortoise Preserve Committee (www.tortoise-tracks.org), Desert Tortoise Council (www.deserttortoise.org), and the California Turtle and Tortoise Club (www.tortoise.org) met with representatives from other interest groups, such as California Native Plants Society, Desert Protective League, and the Sierra Club, to strategize ways of propelling implementation of the 1994 Desert Tortoise (Mojave Population) Recovery Plan in California. Management of the desert tortoise remains piecemeal and despite being listed under the Endangered Species Act over 11 years ago, the tortoise continues to decline and is now widely recognized to be at risk of extinction over much of its former range in California.

The western populations of the desert tortoise, *Gopherus agassizii*, were given an emergency listing as "endangered" under the federal Endangered Species Act in 1989 and a final ruling of "threatened" was published in 1990. Following a lawsuit compelling the Secretary of the Interior to act, Critical Habitat was designated for the species in February 1994. In June 1994, the USFWS published the Desert Tortoise (Mojave Population) Recovery Plan. At that time most of the desert tortoise Critical Habitat in California was under the jurisdiction of the Bureau of Land Management (BLM). Implementation of the Recovery Plan was expected to occur through three BLM-led regional desert conservation planning efforts that

were underway. These were known as the West Mojave (WMP), Northern and Eastern Colorado (NECO), and Northern and Eastern Mojave (NEMO) Coordinated Management Plans. However, the planning efforts have bogged down in sundry political quagmires and none of the regional plans are yet complete.

The three tortoise groups formed an alliance—the Tortoise Consortium—to support a representative to participate in the various planning efforts that are under way, to provide information and analysis, and to act as a watchdog on other unfolding issues such as the proposed southwestern expansion of Fort Irwin which now threatens 182 square miles of designated Critical Habitat and 15%-20% of the West Mojave Desert's tortoises. The tortoise groups chose as their representative Michael J. Connor, the Desert Tortoise Preserve Committee's Executive Director.

The Consortium maintains an E-mail list that provides updates on the planning efforts and developments that impact on the tortoise, as well as notices on related legal and political events. To receive the mailings send your name and E-mail address to dtpc@pacbell.net. Background documents on the West Mojave plan and on the proposed southwestern expansion of Fort Irwin can be found at http://www.tortoise.org/wmp/wmp.html.

Michigan Turtle Conservation Organization (MTCO)

Excerpts from A Letter by Thomas Nichols, President MTCO

2260 Josephine, Muskegon, MI 49444; phone (231) 739-5958

MTCO is a newly formed, Non-Profit organization incorporated. The rehabilitation of injured or sick turtles, turtle studies and public education are currently our primary activities. I recently obtained a permit from the Dept. of Natural Resources to take in turtles and hatch eggs...

The first study I became personally involved with was assisting road-hit turtles and in fatal cases extracting eggs for artificial incubation. I continue this with great passion.

It would be greatly appreciated if you would add MTCO to your mailing list for turtle studies, findings, papers, *etc*.

The Missouri Turtle and Tortoise Society (MTTS)

James Mapes

408 W. Benton St., Carrollton, Missouri 64633

MTTS is a new organization that promotes conservation and education about turtles and encourages members to seek out as much information as they can. Please write to the author if you or a friend would be interested in joining. We are also seeking submissions for our newsletter and would like to exchange newsletters with other organizations. Please contact us at the author's address.

The Dallas-Fort Worth (Texas) Herpetological Society

Michael Smith

7111 Layla Rd., Arlington, TX 76016 USA; E-mail: masmith51@earthlink.net

The DFW Herpetological Society was formed in December 1999 to meet the needs of people interested in the natural history and conservation of reptiles and amphibians as well as in captive husbandry. The mission of the society is to promote understanding, appreciation, and conservation of reptiles and amphibians; to encourage respect for their habitats; and to foster responsible captive care. The initial programs have featured talks about reptile rescue, the natural history of garter and water snakes, Asian rat snakes, the north Texas amphibian monitoring program, and field research in Central and South America.

The monthly newsletter includes original articles by members covering wide territory, all the way from humorous stories and anecdotes to conservation issues regarding turtles and amphibian declines. The newsletter, *The Cross Timbers Herpetologist*, also has a section for reporting field data on sightings of reptiles and amphibians. For many of us, herping shares a lot in common with birding, including field observations and trying to contribute to what we know about the status of wild populations.

We have a website at www.kingsnake.com/dfwherp/ and future plans include an online guide to the reptiles and amphibians of Dallas and Tarrant Counties. We are also exploring the possibility of providing a brochure on box turtle natural history and conservation issues, to be made available at exhibits and educational presentations. In addition, we are looking for ways to provide effective education and advocacy regarding the problem of rattlesnake roundups.

The DFW Herp Society has provided educational presentations at schools and has had displays at each of the Texas Reptile Expos held in Arlington, TX. The group has also provided assistance to a rural community following a recent incident in which a toddler was bitten by a western diamondback rattlesnake. We would love to hear from anyone interested in the Society and its aims. Contact information for the officers can be found at the website.

THESES, DISSERTATIONS, AND UNUSUAL REFERENCES

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Major advisor: C. Kenneth Dodd, Jr.

Chelonian Articles Published in the *Bulletin of the Association of Reptilian and Amphibian Veterinarians (ARAV)*

http://www.arav.org

The Bulletin of the Association of Reptilian and Amphibian Veterinarians is designed to be a source of information for veterinarians involved in public and private practice on reptiles and amphibians. The Bulletin is interested in all aspects of care for these species including natural history and maintenance in captivity as well as particular medical and surgical problems. To request articles, please contact the Bulletin editor, Thomas H. Boyer, DVM at 3454 Chasewood Dr., San Diego, CA 92111; Phone 619-484-3490; Fax 619-541-2075; E-mail terrapins@msn.com.

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NEWSNOTES AND ANNOUNCEMENTS

Head Herpetology Zookeeper position available at the Detroit Zoo. It is assigned to the National Amphibian Conservation Center and requires a four-year degree in biological sciences; preferably academic training in reptiles exhibition of a variety of reptiles and amphibians including supervision of zookeeper staff. Successful candidate will have experience with the managed husbandry and reproduction of amphibians. Send letter/resumes to Terrence DeRosa, Director of Conservation and Animal Welfare, Detroit Zoological Institute, PO Box 39, Royal Oak, MI 48068-0039; Fax (248) 691-4194; E-mail: tderosa@detroitzoo.org.

Turtles of the World CD-ROM now available for PC users! ETI, the Expert Center for Taxonomic Identification, has just released Turtles of the World 1.2 for Windows. The cost is 99.95 Euro (1 Euro=0.94$ US). For Macintosh users, a free v1.2 update is available for download from the ETI web site (http://www.eti.uva.nl), so that the contents on both platforms are completely identical. Compared to the original Mac v1.0 CD, new features include: a key down to the level of subspecies, full compatibility with Mac OS 8 and 9, updated keys and accounts for several species, and a lot of new pictures. This summer, new taxa described or resurrected between December 1997 and April 2000 (mainly SE Asian and Australian taxa) will be added. An update to the CD-ROM with these taxa will be made available on the ETI web site.

The University of Colorado Museum Herp Collection encourages use of its 60,000 specimens, with particularly strong representation of the southwestern U.S and Mexico. The collections database is fully computerized; thus requests for specimen information can be answered quickly. The numbers of specimens of each species are available on-line at the California Academy of Sciences Combined Index to Herpetology Collections website (http://research.calacademy.org/herpetology/Comb_Herp_Index.html).

Loans or other requests can be submitted by regular mail or E-mail to the author (address below) or to Rosanne Humphrey (Rosanne.Humphrey@colorado.edu), Collections Manager, at the same address. Researchers and students are also encouraged to visit the collections. Additional information can be found at http://www.colorado.edu/CUMUSEUM/research/zoology/zoology.html. Alan de Queiroz, Curator of Vertebrates, Univ. of Colorado Museum, Campus Box 334, Boulder, CO 80309-0334; Phone 303-492-4206; FAX 303-492-8699; E-mail: dequeiro@stripe.colorado.edu

Free Database for registering private reptile collections. In order to promote sound registration and gathering of data in (private) reptile collections, I have created a database that runs under Microsoft Access97 (version 8.0) or Access2000. The database features tools to register and/or link to all kinds of information (growth, breeding, diet, et cetera) per specimen, thus optimizing possibilities for managing (and eventually sharing) this information. Furthermore, a sound registration of specimens and information about ancestors can be considered important in order to be able to form (genetically) healthy captive populations. The database can be downloaded from http://members.tripod.com/homopus/download.htm.Victor Loehr, Nipkowplein 24, 3402 EC IJsselstein, Netherlands; E-mail: loehr@homopus.org.

Hofstra University Diamondback Volunteer Project. Volunteers are needed to help with a local diamondback terrapin conservation project this spring and summer. Students can receive credit for their participation in this program. You can get a fantastic tan while helping out a species in trouble, get valuable experience with wildlife, and do something for the natural world! Volunteers must have their own transportation to Jamaica Bay Wildlife Refuge in Gateway National Recreational Area (Brooklyn and Queens). For more information contact Dr. Russell Burke, Dept. Biology, Hofstra Univ.; Phone (516) 463-5521; E-mail:biorlb@hofstra.edu.

A New Partnership. It is an honor and a pleasure to announce the initiation of an education and research partnership between the prestigious Academy of Natural Sciences of Philadelphia and the Terrapin Station. The Academy of Natural Sciences is a private, non-profit organization located in Philadelphia, Pennsylvania. Founded in 1812, the Academy is the oldest science research institution in the Western Hemisphere. In 1967 the Academy established the Estuarine Research Center (www.anserc.org) on the Patuxent River in Benedict, Maryland. The Center now occupies a 23,000 square foot, state-of-the-art facility in St. Leonard, Maryland, on the grounds of Jefferson Patterson Park and Museum.

Our first order will be with terrapin conservation and public awareness in the area of the Academy's Esturarian Research Center in St. Leonard's, Maryland on the Patuxent River. The Academy has a long history of conducting fisheries management research and conservation. This cooperation will be a great help to terrapin conservation. We thank Candace Morrell, Erin Strickland, and George Abbe for facilitating our partnership and look forward to many years of collaboration. Marguerite Whilden, Maryland Dept. of Natural Resources, Fisheries Conservation and Stewardship; Phone (410) 260-8269; and E-mail: mwhilden@dnr.state.md.us.

U.S. Dept. of Agriculture Prohibits the importation and, until further notice, the interstate movement of all species of leopard tortoise (*Geochelone pardalis*), African spurred tortoise (*Geochelone sulcata*), and Bell's hingeback tortoise (*Kinixys belliana*). These actions are necessary to prevent the introduction and spread of exotic ticks known to be vectors of heartwater disease, an acute infectious disease of ruminants, both domestic and wild. The interim rule is effective March 22, 2000. For further information contact Dr. D. D.Wilson, Senior Staff Entomologist, Emergency Programs, VS, APHIS, 4700 River Rd., Unit 41, Riverdale, MD 20737-1231; Phone (301) 734-8073.

MANOURIA is a French language publication for chelonian researchers, managers, vets, breeders, students, and enthusiasts from around the world. Manouria offers a wide variety of articles to educate the audience on chelonian features in nature and captivity. It is the first time a French review offers in each issue a collection of general information, public education and scientific articles. Four issues with color pictures are published each year. All original papers are welcome and should be written either in French with a short English abstract or in English and the editorial board will insure the translation. For information or to subscribe, please contact Fabienne Doswald, Clos des Ecornaches 9, CH-1226 Thonex, Switzerland; pho/Fax:+41/22.348.56.53; E-mail: df.doswald@bluewin.ch or visit the Website (mypage.bluewin.ch/tortue/manouria/manouria.htm).

The Tortoise Reserve will sponsor a ghost crab pot cleanup this summer (date not yet set) around Ocracoke Is., NC. The plan is to make this a community effort. The watermen will help with the cleanup and the pots will be fitted with excluders and given back to local watermen. I will try to document numbers of terrapins (parts) recovered from the pots. At this time information on by-catch, excluders, crab catch in ghost pots, *etc*. from other regions would be most welcome. This will take some set up time and we need to provide the watermen with real facts. Appropriate reprints would be great. See article "Terrapin Conservation Efforts" on pg. 9. Dave Lee, The Tortoise Reserve, Inc., P.O. Box 7082, White Lake, NC 28337; E-mail: TorResInc@aol.com.

Pennsylvania's Dept. of Transportation helps out map turtles. In March last year, hundreds of female map turtles were killed as they emerged to nest along a newly opened stretch of Route 522/DiCosimo Bypass along the Juniata River in Huntingdon County, Pennsylvania. This year the Pennsylvania Dept. of Transportation is spending $58,000 to make sure this doesn't happen again. An artificial nesting area has been constructed, a three ft. high, three-quarters of a mile long turtle fence has been erected, and two interns are patrolling the roadside and protecting the nests. Summarized from the POST-GAZETTE (Pittsburgh) 17 May 2000.

New book available: Turtles of Borneo and Peninsular Malaysia by Lim Boo Liat and Indraniel Das, 1999. (ISBN 983-812-039-1) xii + 151 pages. Hardbound. 16 x 22.5 cm.

The Turtles of Borneo and Peninsular Malaysia provides an account of the turtles of a tropical region known for its rich biodiversity. In all, 25 species are described and illustrated with color photographs, including two exotics that are now established. The introductory chapters include an identification key to the turtles of the region. For each species, there is a section on identification, its global and local distribution, notes on natural history, and conservation status. A glossary of technical terms and a list of references are appended to the back. This book will be of interest to tourists, biologists, park managers, conservationists or those simply curious about the wildlife and wilderness areas of Southeast Asia.

The cost is US$ 37.00 or Sterling Pounds 22.00 (inclusive of air parcel postage). To order contact: Natural History Publications (Borneo) Sdn. Bhd., A913, 9th Floor, Wisma Merdeka, P.O. Box 13908, 88846 Kota Kinabalu, Sabah, Malaysia; Tel: 6088-233098; Fax: 6088-240768; E-mail: chewlun@tm.net.my.

Martha Messenger and George Patton receive Louisiana Award. At the recent Louisiana Wildlife Federation Banquet, George Patton & Martha Messinger received the Governor's Award for outstanding Conservationist of the Year. This is the state's highest conservation award. Senator Robert Barham received the Legislative Conservationist Award of the Year. The awards were presented on behalf of their work on the box turtle legislation that stopped all commercial harvesting of box turtles in the state of Louisiana.

Tortoise theft. In March my seven year-old perfect Aldabran, bearing a yellow paint number 15 (probably very worn) on its carapace was stolen from Robert-Is-Here, 19200 SW Palm Dr., Florida City, FL, USA. This tortoise weighed about 50 pounds, had a concave rear carapace profile, and measured nearly two feet. It was probably a female. A week later, four or five sulcata tortoises were also taken. The largest was a 40 pound four year old, a beautiful immature male. He bore a yellow horizontal "W" painted on his first vertebral scute. Another, smaller bore a vertical "B" on its carapacial dome. The thieves took advantage of fence construction that had temporarily reduced the range of the dogs. The situation has been corrected and security has been enhanced. Still, I would like to warn others and would appreciate any help. I shall not pay any ransom and I will ask questions. Richard Cary Paull, Green Nature Books, 16021 SW 284 St., Homestead, FL 33033 USA; E-mail: RCPAULL@webtv.net.

Turtle Torture 101. Live turtles continue to be subjected to painful physiology experiments at the Univ. of Houston. The outdated experiments include drilling a hole into the turtle's shell, pumping the creature full of stimulants, and then watching the heart's reaction. The majority of medical schools in the US have opted for more humane alternatives through high-tech computer programs, videos, or simulators. The chairperson of the Biology and Biochemistry Dept. is currently reviewing alternatives to live turtles, but has not committed to any changes within the physiology lab. Letters of protest can be sent to Arthur K. Smith, President, Univ. of Houston, 4800 Colhoun, Houston, TX 77204-2162. This was first published in the March/April 2000 issue of Animals Agenda.

CONFERENCES

8th Annual Summer Workshops for Teachers, Environmental Educators, and Conservationists on the Natural History and Conservation of Florida Turtles will be held June 13-16,2000, at Boyd Hill Nature Park, St. Petersburg, FL or June 27-30, 2000, at Apalachicola National Estuarine Research Reserve, Apalachicola, FL. Registration is limited to 10 people and is $125. For further information contact George L. Heinrich at (727)893-7328 or by E-mail at highpine@gte.net

PARC Research Symposium, June 16, 2000, will be held in association with the American Society of Ichthyologists and Herpetologists (ASIH) Meeting June 14-20 in La Paz, Mexico. A brief summary of the PARC Symposium can be found on the symposia web page located at the ASIH meeting web site (www.uabcs.mx/asih/symposia.htm). Speakers were selected to address the following areas of concern: habitat loss, environmental pollution, global climate change, disease and parasites, unsustainable use, and invasive species. If you have any questions regarding the PARC symposium or the Research Working Group in general, please contact the following individuals:

Henry Mushinsky, Dept. Biology, Univ. South Florida, Tampa, FL 33620-5150; Phone (813) 974-5218; E-mail: mushinsk@chumal.cas.usf.edu

Laura Herbeck, North Central Research Station, U.S. Forest Service, 202 Natural Resource Building, Univ. Missouri, Columbia, Missouri 65211-7260; Phone (573) 875-5341 ext.227; E-mail: lherbeck@fs.fed.us

Cynthia Carey, Dept. EPO Biology, Univ. Colorado, Boulder, CO 80309-0334; Phone (303)492-6014; E-mail: careyc@spot.colorado.edu.

American Society of Ichthyologists and Herpetologists will meet June 14-20, 2000, in La Paz, Baja California Sur, Mexico. For more information, visit www.utexas.edu/depts/asih/meetings/2000/prelim.html.

4th Asian Herpetological Conference will be held July 16-20, 2000, in Chengdu, Sichuan Province, China. This conference is hosted by the Chinese Society for the Study of Amphibians and Reptiles and is co-sponsored by SSAR. For more information contact Prof. Zhao Ermi, Chengdu Institute of Biology, P.O. Box 416, Chengdu, Sichuan, China; E-mail: zhaoermi@mail.sc.cninfo.net.

24th Annual Meeting of the International Herpetological Symposium will be held July 19-22, 2000, at the Radisson Hotel, New Orleans, LA. The theme will be Old World Herpetofauna. Registration ($150 full, $50 spouse) is due by June 30. Send payment to David Hulmes, 361 Van Winkle Ave., Hawthorne, NJ 07506; phone (973) 427-0768. For hotel reservations, contact the Radisson at (504) 522-4500 or (800) 333-3333.

SE PARC Education/Outreach Sub-working Group will meet Aug. 17-19, 2000, in Covington, Georgia. This working meeting will focus on education needs/projects in the southeastern United States. Potential field trips are being developed for the Saturday the 19th. All interested parties are encouraged to contact George L. Heinrich, Phone (727) 893-7328; E-mail highpine@gte.net or Erin Clark, phone (706) 613-9493, ext. 23; E-mail Erin_Clark@fws.gov.

1st International Scientific Meeting on the Biology and Ecology of Alpine Amphibians and Reptiles will be held Sept. 1-3, 2000, in Nazarje, Slovenia. Deadline for abstracts, hotel reservation and registration payments is June 15. Registration is 65 Euro (1 Euro=0.94 $US), which includes the program, proceedings, welcome party, refreshments and a meeting excursion. After the deadline, the fee is 85 EURO.

Nazarje, a small town situated in Upper Savinja valley, is located about 100 km from the international airport of Ljubljana (Slovenia) near Mozirje. Nazarje can be reached easily by bus or car from Ljubljana or from Austria through Maribor and Celje. The meeting will be held in castle Vrbovec in the centre of Nazarje. Accommodations will be at the Hotel torman in Nazarje. Please send details for which days you will need accommodations and with whom you will be sharing a room.

For further information and to register visit the website www.york.biosis.org/zrdocs/confs/conf2000/alpine.htm or contact Nu√a Vogrin, Zg. Hajdina 83c, SI-2288 Hajdina, Slovenia; E-mail: milan.vogrin@guest.arnes.si.

American Association of Zoo Veterinarians and International Association of Aquatic Animal Medicine (AAZV/IAAAM) Joint Conference will be held Sept. 17-21, 2000, in New Orleans, Louisiana. One session focuses on herps. Contact the conference co-chairs for more information:

Scott B. Citino, 904-225-3387, Fax: 904-225-3337; E-mail: scottc@wo.gilman.com and

Suzanne Kennedy-Stoskopf, 919-515-8111, Fax 919-515-4237; E-mail: Suzanne_Stoskopf@ncsu.edu.

International Roundtable to Develop A Protocol on Chelonian Relocation and Heritage Collections will occur Sept. 26-28, 2000, (with special workshops on Sep. 25) at the Radisson Hotel Orlando Airport, Orlando, Florida, USA. This working meeting will result in published guidelines to assist managers of relocation and captive-breeding programs. Seven areas will be addressed: ethics, disease, genetic and systematic issues, environmental issues, socioeconomic considerations, intraspecific impacts, and heritage collections. Prior to the roundtable two workshops will be held. One will cover chelonian education issues and successful interpretive methods, while the other will feature tortoise field studies and heritage collection methods.

For information on registration contact Ray Ashton or Ghislaine Guyot at Ashton Biodiversity Research & Preservation Institute, 5745 SW 75th St. #331, Gainesville, FL 32608; E-mail Tortfarm2@aol.com; Phone (352) 495-7449; Fax (352) 495-7433; or website http://www.geocities.com/ashtonbiodiversity/Home.html. For hotel reservations call (407) 856-0100 or visit http://www.radisson.com.

7th Annual Conference for the Association of Reptilian and Amphibian Veterinarians will occur Oct. 18-22, 2000, in Reno, Nevada, USA. Get the latest information on nutrition; basic veterinary care & husbandry; case reports; chelonia, lizard, and snake medicine and surgery; and therapeutics and diagnostics. Get hands on experience in anesthesia & critical care, diagnostic endoscopy, husbandry, medicine & surgery of chelonia, diagnostic imaging, and clinical conference.

For information and registration visit www.arav.org or contact Mark A. Mitchell, Louisiana State Univ., School of Vet. Med., Vet. Clinical Sciences, South Stadium Dr., Baton Rouge, LA 70803 USA; Phone 225-346-3333; Fax 225-346-5748; E-mail: mitchell@vetmed.lsu.edu.

All Ohio Herpetology Conference will occur Oct. 21-22, 2000 at the Cleveland Airport Marriott, Cleveland, Ohio. The keynote speaker will be Bill Love giving a slide show entitled "Splendid Isolation: Herping Across Madagascar." Contact Kevin Acuff to register at (440) 237-9067 or E-mail reefmasters@hotmail.com.

The International Congress on the genus *Testudo* will be held March 7-10, 2001, in Casino-Forum, Hyères, France. The goal of this conference is to update our knowledge on the systematics, genetics, ecological inter-relationships, pathological risks, and threats to the future of these species and to facilitate Conservation programs for them. This congress is being organized by SOPTOM (Gonfaron-France). Submitted papers (English and French) will be reviewed during early autumn 2000 for acceptance.

For information contact SOPTOM, BP 24, 83590 Gonfaron, France; phone (33) 494 78 26 41; Fax (33) 494 78 24 27; E-mail soptom@compuserve.com; or on the Internet at http://www.tortues.com/testudo.htm.

The Fourth World Congress of Herpetology will be held August 1-8, 2001, at the Bandaranaike Memorial International Conference Hall, Colombo, Sri Lanka. Held every four years, the congress attracts leading professional and non-professional herpetologists from around the world. The Colombo congress of 2001 follows on Canterbury (1990), Adelaide (1993) and Prague (1997). The Congress Director is Anslem de Silva, Faculty of Medicine, Univ. of Peradeniya, Peradeniya, Sri Lanka; Tel: (+94 8) 388130; (+94 8) 350998; Fax: (+94 8) 389106; E-mail: anslem@4wch.com. The Associate Director is Rohan Pethiyagoda, Wildlife Heritage trust, 95 Cotta Rd., Colombo 8, Sri Lanka; Tel: (+94 1) 699219; Fax: (+94 75) 338131; E-mail: rohan@4wch.com.

To learn more and to pre-register visit the homepage at http://www.4wch.com/

INTERNET SITES OF INTEREST

A Chelonian Calendar of Events can now be found at the Turtle and Tortoise Website (www.chelonian.org/TTN). This sight is maintained by Tess Cook. In order to make it as inclusive as possible, we ask that you add Tess to you newsletter mailing lists and E-mail her any special event announcements. She can be contacted at 3605 E. Robin Rd., Bloomington, IN 47401, USA; E-mail: tjcbox@ix.netcom.com

The Conference Calendar for Zoology (www.york.biosis.org/free_resources/conf_cal.html) is maintained by the compilers of *Zoological Record*, the index to world zoological literature published by BIOSIS and the Zoological Society of London. Conference organizers who would like links to their web sites, or information on their conferences, posted on this site, should contact webmaster@york.biosis.org.

A Working Guide to the Literature on Box Turtles (*Terrapene*): Life History, Evolution, Fossil Record, External Morphology, and Conservation. Compiled by: C. Kenneth Dodd, Jr., Florida Caribbean Science Center, U.S.G.S., 7920 N.W. 71st St., Gainesville, FL 32653. Now available at www.fcsc.usgs.gov/Amphibians_and_Reptiles/Amphibians_and_Reptiles_Resear/box_turtle_bib1/box_turtle_bib1.html

The Association of Reptile and Amphibian Veterinarians (ARAV) sight lists announcements for veterinarian conferences, related job and grant opportunities, and veterinarian articles. Visit www.arav.org/

Website for the Studbook Breeding Program *Homopus* (www.homopus.org). This site presents information on species of the genus *Homopus*. Much of this has been gathered within the studbook. The site also offers a listing of all references on *Homopus*, tables on the composition of, and breeding within the studbook population. Furthermore brief descriptions of research projects in which the Studbook Breeding Program *Homopus* is involved, general (organizational) information on European private studbooks and downloadable annual studbook reports. Victor Loehr, Nipkowplein 24, 3402 EC IJsselstein, Netherlands; E-mail: loehr@homopus.org

Herp. database available on-line at www.abi.org/. This summer we will be posting to our web site information on taxonomy, nomenclature, ecology, status, distribution, habitat, reproduction, phenology, food habits, *etc*. (e.g., detailed management information on selected species) for ALL North American reptiles and amphibian species. These databases have been 15 years in the making and are finally being made public. Over time we will be adding pictures, Latin American and Caribbean data, *etc*. Currently, the site (under Information Resources) only has a listing of U.S. and Canadian species of amphibian and reptiles. Larry Master, The Association for Biodiversity Information and The Nature Conservancy, 201 Devonshire St., 5th Floor, Boston, MA 02110, ph: 617-542-1908,x230; E-mail: lmaster@tnc.org.

Field guide database at www.enature.com/. This new nature portal offers on-line searchable field guides to over 4,800 plant and animal species. Derived from 35 different Audubon Society Field Guides, Regional Guides, and Nature Guides, the database is keyword-searchable by group (mammals, amphibians, fishes, trees, etc.) or browseable within subheadings for each group. Users can also conduct an advanced search by size, color, habitat, region, and other options within each group. Registered members (its free) can add selected plants or animals to their "Life List," which is saved at the site, along with notes or comments. While the field guides alone make the site worth a visit, there is more, including an Ask an Expert message board, Habitat Guides, news features, tips for teachers, and in the future, a comprehensive Outdoor Planner. **Editors' note**: Only 26 species of turtles are shown.

Website of the Alliance for the Conservation of Reptiles and Amphibians at www.herpconservation.org/. We'd like to invite all of you who are involved in reptile or amphibian conservation efforts to submit the URLs of your web pages for inclusion on our "links" page. Please also send us a graphic to include with your link, such as a jpeg photo of the species with which you work, if this is available.

Visit Terrapin Station at www.dnr.state.md.us/terrapin

Turtle Homes is a rescue and adoption operation bringing together turtle and tortoise organizations worldwide. We are not an individual club or society, but rather a cooperative effort between many clubs, societies, organizations and wildlife rehabilitation centers with similar rescue and care goals. Our primary focus is welfare and conservation. Turtle Homes helps place animals that cannot be returned to the wild with individuals and institutions willing to provide species-specific care. Visit the site at www.geocities.com/turtlehomes/.

INFORMATION AND ASSISTANCE NEEDED

Request for Assistance with Spotted Turtle, *Clemmys guttata,* Study, Richard H. Legere, 3 San Fernando Blvd., Savannah, Georgia 31419; Phone (912)927-4823; E-mail: vrylngmane@aol.com

Since 1982, I, with the assistance of David Holland*, conducted a spotted turtle (*Clemmys guttata*) study in northeastern Maryland. The original objective was to examine the home range size of adult *C. guttata* living in a dense population within a single wetland. It was soon discovered that the turtles were migrating overland to nearby wetland areas. The objectives and scope of the study continued to evolve in response to early findings, ultimately generating a wealth of data on sex ratio and trapping bias, overland migration, population estimates, seasonal activity differences, and hibernaculum site fidelity. We also collected more limited data on growth rates, interspecific competition, and temperatures of active *C. guttata* and their habitats. The most promising preliminary findings indicate that a marked bias in the sex ratio can be induced by sampling methods, and that *C. guttata* migrate extensively between isolated wetlands separated by upland habitats.

Intensive data collection ended in 1992 with an apparent loss of much of the *C. guttata* population, and the discovery that unknown individuals were setting turtle traps in some of study areas. However, infrequent collecting of limited data on *C. guttata* within the study area continues. To date, our research has involved thousands of hours in the field, and some 10,000 visits to approximately 40 different wetlands. We have marked over 400 adult and subadult *C. guttata* and have 4,500 to 5,000 recaptures.

For all practical purposes, the data remain unanalyzed and in a variety of formats, ranging from the original hand written field notes to partial summarization in tables and graphs. Due to time constraints and lack of assistance, essentially none of the data is in electronic format. The current condition and volume of the data make its analysis and ultimate publication a formidable task. I am requesting assistance with data entry, data analysis, methods, and hypothesis testing with the ultimate goal being publication of one or more peer-reviewed articles.

The most immediate need is to develop a general strategy for handling the large amounts of data involved. I am looking for advice on how to best organize the data and for suggestions on the most appropriate software to use (keeping in mind future compatibility issues with popular statistical and graphics software). I would also appreciate being informed of potential problems and difficulties that other researchers have encountered with electronic data entry. Unless advised otherwise, I would prefer to use a single large Microsoft Excel spreadsheet.

With a general strategy outlined, the next step would be to get the data into an electronic format where it can be manipulated and examined. Unfortunately, the data is not in a condition where it can simply be forwarded to someone for computer data entry and analysis. I will need to work closely with anyone willing to provide assistance with, therefore it would be helpful if such assistance could be obtained within the southeastern region (i.e., Georgia and adjacent states) where I currently reside.

The study area remains essentially intact with the exception of several *C. guttata* habitats that were cleared for a power line right of way. Thus, there is an opportunity for further on-site work, such as a description of *C. guttata* habitat preferences, and mapping of the wetlands. Graduate students in search of a thesis project could combine some of my existing data with new investigations of long term growth, the effect of collecting on population structure, *etc*. Off-site work could include using resources such as infrared aerial photography, U.S. Department of the Interior National Wetland Inventory Maps, and U.S. Department of Agriculture Soil Surveys to further characterize the study area.

Please be advised that I currently have no source of funding for this effort, nor am I aware of any funding that could readily be obtained. Any assistance, advice or suggestions provided would be on a volunteer basis, with the reward being the satisfaction that important data needed to support conservation of *C. guttata* would be made available in the peer-reviewed literature. There is also a possibility of co-authorship on any research papers that may be generated as a result of this effort.

If you are interested in assisting with this data, please contact Richard Legere.

* Not to be confused with the well-known *Clemmys marmorata* researcher of the same name.

Inofrmation needed on Transport Mortality for CITES Listed Species. Our company, the Hydrosphaere GbR, is conducting a study on transport mortality during the shipment of CITES-listed species. The sponsors for this study are the German Federal Agency for Nature Conservation and the German CITES Management Authority represented by Dr. Irina Sprotte. We are trying to obtain import and transport mortality data from the CITES Management Authorities of the different import countries but not all countries are able to provide such information. To use every possible source of data, we are publishing a call for information.

The kind of data needed is scientific name and number of transported species, number of species “dead on arrival” and “dead in quarantine”, origin and destination of the shipment, transport company (airlines), and kind of transport boxes (IATA-code).

Any kind of data or document will be helpful. If there are any questions about our study or the kind of data needed please contact me, Dr. Cornelia Schuetz, Hydrosphaere GbR, Hinterstr.12a, D-35633 Lahnau; Tel/Fax 0049-6441-63753; E-mail: hyroshpaere@bigfoot.de.

Alien Turtles. Suwanee cooters in Central Park, red-eared sliders in Thailand, the common snapping turtle in the United Kingdom, we've all heard about them. I'm creating a database of such sightings and need your help. Please supply me with as much detail as possible: Species? Number? Specific location? Behavior? Breeding? What could it be eating? How long do you think it has been there? How do you think it got there? Photos of the turtles would be appreciated, as well as any other sort of documentation, such as a poster I have of the "Turtles of Thailand," which include the red-eared slider. If you didn't see the turtle but heard about it, tell me and who told you. Articles from journals to newspapers about such sightings are also welcome. Send information and materials to Allen Salzberg, 67-87 Booth St-5B, Forest Hills, NY 11375.

Turtles for Sale. We grew up with them, we bought them, we have seen them in stores, and at shows; turtles of every kind and species. I would like to put together a master species and price list of every species of turtles that has have ever been for sale in the United States and abroad. If you have any documentation, like a price list, please send me a copy. If you remember how much a star tortoise sold for in 1970 please write me. If you want to send me recent price lists, or go to a herp show and record the prices the turtles were being sold for, please feel free. Include as much detail as possible: size, sex, where they were sold, if they were sold as a pair, age, wholesale or retail, condition, and, of course, when. Send to Allen Salzberg, 67-87 Booth St-5B, Forest Hills, NY 11375.

Canadian goose predation on herps. Please send any information you may have, particularly on predation to Blanding's turtles and massasauga rattlesnakes, to James Burnham, P.O. Box 616, Madison, WI 53701; Phone: (608) 266-5244; E-mail: moocow@ITIS.COM

Information needed on Turtle Care Websites. Presently, there are several websites that offer information on the care and maintenance of turtles and tortoises. New websites appear every day. Some are excellent while others provide harmful or incomplete advice. I would like information from devoted hobbyists on which of these sites they think are the best, which are the worst, and why.

As editor of this newsletter and the Box Turtle Newsletter, I get a lot of requests for information on turtle care. Not being an avid hobbyist, I have looked through the information available and can see why it can be overwhelming to new turtle owners. I will list the top ranked care sheets in the next issue. For those webpages that get negative feedback, I will send them the summarized comments (keeping you anonymous) and I will not list them in the newsletter. Please send your comments to me at HJKalbTTN@aol.com with the subject line “care sheets” or mail them to me at my snail mail address given inside the front cover. Thank you, Heather Kalb.

We would like to thank the following individuals and organizations for financially supporting the Turtle and Tortoise Newsletter

Roy C. Averill-Murray, Sandra Barnett, Barbara A. Bell, William R. Belzer, Neil P. Bernstein, Madeline L. Bonanno, I. Lehr Brisbin, Brian D. Duracka, Mark L. Feldman, Michael L. Hine, Constance B. Katzenbach, Cheryl L. Lechtanski, Robert C. Lee, Stuart Jay Levine, Justin C. McCann, Robin McNeal, Joseph C. Mitchell, Robert Prescott, James H. Rea, John J. Ryan, Rosa Solé Ariza, Ann B. Somers, St. Louis Herpetological Society, Richard E. Staedtler, Robert W. Taylor, Linda M. Wachsberg, and Joseph P. Ward.

The editors would like to thank Jim Van Abbema for his assistance, time, and coaching throughout the editorial process.

INSTRUCTIONS FOR CONTRIBUTORS

Submissions will NOT be peer-reviewed, but may be edited. Submissions should be sent to the editors and NOT the editorial board.

Text: To ensure a swift turnaround of articles, we ask that, where possible, all submissions be in electronic format either as an attached E-mail file or on disc. If compatible computer facilities are not available, hard copies of the article can be sent to the editors by mail or fax. Scientific names should be italicized and given in full in their first appearance. Citations in the text should take the form of (Kuchling, 1989), (Martin and Bateson, 1986), (Ernst *et al*., 1994). All articles need to be accompanied by the name of the author and a complete hard copy mailing address. If you wish your E-mail address, phone or fax number included please include them in your address.

Table/Figures/Illustrations: Each figure should be stored as a separate document in Word, Wordperfect, Excel, .bmp, .tif or .jpeg file. The editors will scan figures, slides or photos for authors who do not have access to such facilities. Tables and Figures should be given in Arabic numerals. Photographs will be considered for inclusion.

References: Citation format for different styles of references should be as follows:
a. For an article in a journal: Gaffney, E.S. 1979. Comparative cranial morphology of recent and fossil turtles. Bull. Amer. Mus. Nat. Hist. 164:65-376.
b. For a book: Cogger, H.G. 1975. Reptiles and Amphibians of Australia. Sydney: A.H. and A.W. Reed, 660 pp.
c. For an article in an edited volume: Pritchard, P.C.H. 1979. Taxonomy, evolution, and zoogeography. In: Harless, M., and Morlock, H. (Eds.). Turtles: Perspectives and Research. New York: John Wiley and Sons, pp. 1-42.
d. Citations with two or more authors have all authors listed last name first and separated by commas: Dodd, C.K., Jr., Franz, R., and Smith, L.L. 1994. Title. Reference.

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