(ISSN 1526-3096)

TURTLE AND TORTOISE NEWSLETTER

The Newsletter of Chelonian Conservationists and Biologists

Issue Number 3 *January 2001*

Incorporating
Newsletter of the IUCN Tortoise and Freshwater Turtle Specialist Group
Box Turtle Research and Conservation Newsletter

Published by
Chelonian Research Foundation

in association with
Conservation International, IUCN/SSC Tortoise and Freshwater Turtle Specialist Group,
Chelonian Research Institute, Wildlife Conservation Society, Chelonia Institute, AZA Chelonian Advisory Group,
and IUCN (The World Conservation Union) – Species Survival Commission

Turtle and Tortoise Newsletter

Turtle and Tortoise Newsletter (TTN) is also *available online* at the Chelonian Research Foundation Web Site <http://www.chelonian.org>

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.

TTN will be published approximately quarterly or periodically as the need arises by Chelonian Research Foundation with additional support provided by Conservation International. Institutional association also includes the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group, Chelonian Research Institute, Wildlife Conservation Society, Chelonia Institute, AZA Chelonian Advisory Group, and IUCN (The World Conservation Union) - Species Survival Commission. All opinions expressed are explicitly those of the authors and do not necessarily reflect those of the Editorial Staff or any of the Associated Institutions.

TURTLE AND TORTOISE NEWSLETTER is available in hardcopy by request from Chelonian Research Foundation, 168 Goodrich Street, Lunenburg, MA 01462 USA (Phone: 978-582-9668; Fax: 978-582-6279; E-mail: RhodinCRF@aol.com) and in electronic form online at the Chelonian Research Foundation Web Site (http://www.chelonian.org). Distribution of the newsletter is free of charge, but donations for financial support are gratefully accepted. A donation form appears on the back inside cover of the newsletter. Chelonian Research Foundation, founded in 1992, is a private, nonprofit tax-exempt organization under section 501(c)(3) of the Internal Revenue Code.

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The cover photo, by James Ford Parham, is of relatives of a turtle farmer holding intentionally produced *Cuora trifasciata* X *Mauremys mutica* hybrids that closely resemble the poorly understood *Mauremys iversoni.*

Publisher's Editorial: Making Progress in Freshwater Turtle and Tortoise Conservation

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It has been a year since we launched this newsletter (Rhodin, 2000a), a year during which there has been a continual upwelling of concern and increasing interest in the conservation plight of turtles, especially freshwater turtles and tortoises. Progress has been made on many fronts and there are small beginnings of optimism for change despite overwhelming continuing concern about future survival prospects. Two prominent issues that I'd like to address at this time are (1) significant and progressive developments concerning freshwater turtles in regards to CITES, and (2) the need for further synergy in the field of chelonian conservation and biology.

As many have reported (Lovich et al., 2000; Rhodin, 2000a; van Dijk et al., 2000), Asian freshwater turtles and tortoises are facing an unprecedented survival risk due to greatly expanded levels of trade in wild-collected animals from all over south and southeast Asia destined for markets in east Asia, primarily China, Hong Kong, and Taiwan. Though local consumption of turtles may have increased somewhat in some source regions, and many turtles enter the western international pet trade, the overwhelming majority of animals, on the order of 13,000 tons of live turtles per year, are exported to east Asian consumer centers for consumption as food and as ingredients for Traditional Chinese Medicine (van Dijk et al., 2000).

To begin to understand the levels of trade involved, a Workshop on Asian Turtle Trade was held in Phnom Penh, Cambodia, in December 1999, and the proceedings of that workshop published in August 2000 (van Dijk et al., 2000). One of the main recommendations coming out of that workshop was that all Asian species of freshwater turtles should be considered for listing on at least Appendix II of CITES (Convention on International Trade in Endangered Species of Fauna and Flora).

The reasons for considering such a generalized CITES listing are multiple and include the following salient points: (1) nearly 100% of Asian freshwater turtles and tortoises are affected by trade, (2) over 60% of those species are at least partially threatened by that trade, (3) about 75% of 80 native Asian freshwater turtles are listed as threatened by IUCN criteria, (4) over 50% of Asian freshwater turtles are listed as endangered by IUCN criteria, (5) only 24% (19 species) of Asian freshwater turtles are currently listed by CITES (with nearly half of those in the single genus *Cuora*, listed just this year at CITES CoP 11), (6) 100% of Asian tortoises and marine turtles are already listed by CITES, and (7) most official wildlife examiners and import/export enforcement personnel lack the necessary resources and skills to accurately identify turtle species in trade, leading to look-alike identification problems. If we are to bring Asian freshwater turtles to the levels of trade documentation and protection already afforded to tortoises and marine turtles, then we need to consider listing them all on at least CITES Appendix II.

Whether all (or most) Asian freshwater turtles can or should be listed on at least CITES II is certainly an open question which will require a lot of input and discussion from multiple viewpoints with evaluations on a species-by-species basis. To that end, it is extremely noteworthy and welcome that an initiative to review the trade in Asian turtles has now been launched within the official framework of CITES, and it is my pleasure to report on that progress here.

At CITES CoP 11 in April 2000, Resolution Conf. 11.9 called for efforts at multiple levels to urgently address the threats posed by the trade in freshwater turtles and tortoises. As part of that process, the CITES Secretariat was charged with convening a technical workshop in order to establish conservation priorities and actions, including considering the recommendations of the Asian Turtle Trade workshop held in Cambodia. In addition, the CITES Animals Committee was charged with investigating the trade in freshwater turtles and tortoises. To that end, at the 16th Meeting of the CITES Animals Committee in Shepherdstown, West Virginia, on 11–15 December 2000, the issue was specifically and officially addressed through the formation of a CITES Animals Committee Working Group on Freshwater Turtles and Tortoises.

The Working Group was constituted by the Animals Committee Chair, Marinus S. Hoogmoed, with the following membership: (1) Chair: Animals Committee Representative for Asia (Tonny Soehartono, Indonesia); (2) Animals Committee Representative for Africa (Kim Howell, Tanzania); (3) China (Zhou Zhihua and Phoebe Sze); (4) Germany (Harald Martens); (5) Indonesia (Samedi); (6) Tanzania (Juma A. Kayera); (7) USA (Bruce Weissgold); (8) Chelonian Research Foundation (Anders G.J. Rhodin, USA); (9) Conservation International (Kurt A. Buhlmann, USA); (10) International Wildlife Coalition (Ronald Orenstein, Canada); (11) Pro Wildlife (Daniela Freyer, Germany); (12) TRAFFIC (Craig Hoover, USA, and Peter Paul van Dijk, Malaysia); (13) Wildlife Conservation Society (John L. Behler, USA). The Working Group was designated as an intersessional standing committee to work until at least CITES CoP 12 in 2002 and mandated to investigate not only Asian turtle trade issues, but also global freshwater turtle and tortoise trade.

The Working Group identified three priority actions to be carried out within the framework of CITES: (1) assist the CITES Secretariat to convene a technical workshop on trade in freshwater turtles and tortoises in Asia, and to include more representation from the consumer side of the turtle trade as opposed to the Cambodia workshop which focused more on the supply side; (2) perform a review of currently unlisted Asian turtle species to determine if any of them would benefit from a future listing on the CITES Appendices; and (3) add the following turtle species to the CITES Review of Significant Trade process (for species already listed on Appendix II): *Cuora amboinensis*, *C. flavomarginata*, *C. galbinifrons*, *Lissemys punctata*, and the Madagascar tortoise, *Pyxis planicauda*.

All of these actions and developments are of the utmost importance, but none more so than the official and formal recognition by CITES that Asian freshwater turtles in particular, and turtles in general, are facing increasingly severe threats that need to be dealt with effectively if we are to harbor any hope that they will persist in the wild. The formation of this Working Group goes a long way towards helping identify how CITES can best participate in that process. The ultimate goal here is not immediate and total protection against all forms of utilization — the cultures of the world have long utilized turtles and will probably continue to do so for a long time — the goal needs to be to deflect unsustainable trade pressures away from wild populations of turtles and redirect them towards possibly sustainable alternatives, while hopefully slowly changing cultural preferences for turtles. The answers may lie in severely regulated, if not prohibited, trade in all wild turtles and turtle parts, but with encouragement and further development of largescale farming efforts and captive breeding facilities to meet the demands of the current marketplace, be it the consumptive food trade, the medicinal markets, or the pet trade.

Based on my personal involvement and experience so far in the CITES Working Group — where enthusiasm, insight, knowledge, and the desire to work together were shared by all the participants — I believe it has the potential to assist in effecting lasting change and a brightening outlook for the turtles of both Asia and the world.

It will take vision and insight from diverse participants at the global conservation table to help formulate a successful strategy that can turn the tide of the Asian turtle survival crisis and chelonian conservation priorities elsewhere. In addition to the CITES Working Group there are multiple other individuals and groups around the world who are working towards improved turtle conservation, and all need to communicate with each other in order to achieve viable and successful goals. This raises the second point that I wish to address.

Later in this newsletter FitzSimmons (2001) editorializes about the series of Powdermill Conferences on Freshwater Turtles and issues a welcome and valid challenge regarding the level of participation at those meetings. Please read that contribution. As recorded by Rhodin (2000b) in describing Powdermill IV, participation at the Powdermill Conferences has always been by invitation only, to keep them small and intimate, though participation has gradually expanded to about 60 over the four meetings held to date. Initially focusing on only ecology of freshwater turtles, the meetings have also gradually expanded to include tortoises and conservation. At Powdermill IV an open debate was held regarding whether or not to open future meetings to participation by request instead of by invitation. My personal view, which I presented at that time, and now repeat with even more conviction, is that the Powdermill Conferences stand at a threshold, capable of becoming the leading forum for the public exchange of information among people and organizations concerned with the biology and conservation of freshwater turtles and tortoises. However, in order to make the leap from a small specialized exclusive meeting to a powerful force in the world of chelonian conservation and biology, the conference must be allowed to evolve into an open public forum inclusive of all who wish to contribute. It can then achieve the outstanding level of success enjoyed by our counterpart in the world of marine turtles, the Sea Turtle Symposium, which has held 20 annual meetings since 1981, starting with just over 60 participants in the first year and gradually expanding to over 1000 last year. The interactions and synergy created by so many sea turtle researchers and conservationists coming together to discuss their data and their concerns, successes, and failures has created an ever-expanding global network of increasing participation at all levels of sea turtle biology and conservation. The field has been stimulated to grow partly through the shared excitement and friendships generated by these all-inclusive meetings. It is time that the world of freshwater turtle and tortoise biologists and conservationists create the same vehicle for communication, unity, and a sharing of our common goals and interests. I echo FitzSimmons' challenge and suggest that the Powdermill Conferences stand ready to begin to rise to that challenge.

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Preliminary Observations of a Large Turtle Farm in Hainan Province, People's Republic of China

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Most of the 90 freshwater turtles and tortoise species of Asia are threatened with extinction (Altherr and Freyer, 2000; van Dijk et al., 2000). While there are many reasons for this decline, the single overriding cause is a massive increase in demand for turtles in China generated by the unfortunate combination of ancient tradition and new found wealth (Behler, 1997). The intense harvesting of wild turtles is fueled by a price for wild-caught *Cuora trifasciata* that can exceed $1000 US/kg. The high value has earned *C. trifasciata* the common name of "coin turtle". Other wild-caught turtles can command a price of $5 to $60 US/kg. In a country, such as Vietnam, where the average annual income is approximately $200 US, this is sufficient to motivate intensive collecting effort.

The massive demand for and high prices attributed to turtles have also spurred the development of captive breeding facilities. As the demand for turtles increases inversely to their diminishing numbers in the wild, the number of turtle farms grows quietly. Although some data on the softshell industry exists (see Chen et al., 2000), data on the farming of hard-shelled chelonians are completely lacking. This is despite the fact that as far back as 1992, Zhou and Zhou claimed that *C. trifasciata* was being bred "everywhere". Furthermore, it is unclear whether the practice of farming turtles is beneficial or deleterious to the future of Asia's wild turtles. Van Dijk (2000) suggests a constant supply of farm-reared turtles might reduce the demand for wild turtles or, alternatively, create a climate in which wild turtles are even more valued by connoisseurs (the current case for *Pelodiscus sinensis*).

In light of the burgeoning business of breeding turtles, especially *Cuora trifasciata*, it is imperative that we understand the size, scope, and practices of Chinese turtle farms. The practices employed by the turtle farms, although primitive compared to standards of most zoos, might provide useful information for captive breeding. The authors (primarily through the efforts of HS) have been able to enter and survey a large breeding facility in Tunchang, Hainan Province P.R.C.. Haitao Shi has visited the Tunchang turtle farm seven times, one time with JFP. Our preliminary observations suggest that the number of captive reared turtles in Asia has been greatly underestimated.

The Tunchang turtle farm

The turtle farm in Tunchang was first established in 1983 based on dozens of *Cuora trifasciata*, *Mauremys mutica*, and *Ocadia sinensis* collected from the field in Hainan as well as animals from a previously established farm in Guangdong. Today, the owner of the turtle farm claims to have more than 50 species of turtles and 50,000 individuals (30,000 of which are *Pelodiscus sinensis*) in an eight hectare aquatic, outdoor enclosure (Fig. 1) and dozens of breeding pools in an indoor annex (Fig. 2a). Both the outdoor enclosure and indoor annex are under close supervision and guarded by about a dozen ferocious dogs (personal observation).

In the outdoor enclosure, the nesting sites are restricted to a raised dry area covered by a small cement building. In the indoor annex, small, cement breeding "ponds" are connected to sand-filled nesting rooms through a series of cement planks. Eggs are vigilantly harvested from the provided nesting areas, placed in a separate indoor hatching area, and incubated at the ambient temperature. Hatchlings are raised in plastic tubs (Fig. 2b). At roughly 8-12 cm CL, they are placed into raising ponds (Fig. 3). At no time are the turtles from the indoor annex exposed to natural light or even special lamps. In fact, most are kept in near darkness. The turtles are reared on a diet of fresh food (market fish and shrimp) and "coin turtle" brand commercial turtle food. We are told that the valuable *C. trifasciata* are given a higher quality diet than *M. mutica* (i.e., less commercial food and more fresh food). The turtles in the indoor raising ponds are raised to a sufficient selling size or eventually placed in a breeding pond. Most of the indoor breeding ponds are dominated by one species; however, all but the smallest *C. trifasciata* breeding ponds (e.g., Fig. 2) have multiple species. One indoor breeding pond with *C. trifasciata*, *M. mutica*, and *Chelydra serpentina* was observed while the large outdoor enclosure (Fig. 1) includes a hodgepodge of most species. Some information about some of these taxa is provided below.

Cuora trifasciata

The owner has had some of his *C. trifasciata* stolen in the past. Consequently, he was reluctant to discuss exact details of this species in his farm. Eventually, under the condition that we do not report our findings in Chinese, he volunteered that he has a population of at least 1,000 individuals (300 adults, 600 subadults, and 100 hatchlings). However, we suspect that he might have more. He keeps these turtles at extremely high densities in the indoor annex ($3/m^2$ for adults, $15\text{-}20/m^2$ for subadults, and $50\text{-}100/m^2$ for hatchlings; Fig 2).

According to the owner, female *C. trifasciata* begins reproduction at about .75-1.0 kg weight. The largest weight of a female is about 5 kg. Courtship occurs between August and October. When a female is ready to nest she selects a site that is soft and easily excavated. She digs a nest of about 10-12 cm depth. Nesting usually occurs in the evening hours of May through August. Only one clutch of five or six eggs is laid each year and they hatch in about 80-85 days. It only takes three years for them to reach 1 kg, and five years

Figure 1. A view from inside the 8 hectare, heavily guarded, outdoor breeding area. The man in the boat is sterilizing the water with lime, bleaching powder, or potassium permanganate. Photo by HS.

to reach 2 kg. The owner claims that the survival rate at each stage (incubation, hatchling, juvenile) is at least 95%.

Other turtles

The present captive population of *M. mutica* at the farm is approximately 7,000-8,000 (3,000 adults, 2,000 sub-adults, 2,000-3,000 hatchlings). *Mauremys mutica* is apparently much easier to keep and breed than *C. trifasciata*. The current estimate for *O. sinensis* is only 150, 50 of which are adults. *Ocadia sinensis* fetches a much lower price than either *M. mutica* or *C. trifasciata*. Therefore, for any given species, the number of turtles at the farm is not only correlated to its adaptability to captivity, but also its market value.

When the farm was first established, the owner acquired approximately 10 *Palea steindachneri* from the field in Hainan. The present population at the Tunchang turtle farm includes approximately 500 individuals (300 adults, 200 juveniles and hatchlings; Fig. 4). In 1996 this species was considered "near threatened", however, *P. steindachneri* is now considered endangered (van Dijk et al., 2000). Other species bred at the Tunchang turtle farm include the terrestrial *Pyxidea mouhotii* and *Cuora galbinifrons* as well as *Platysternon megacephalum*, *Chinemys reevesii*, *Sacalia quadriocellata*, *Macroclemmys temminkii* and *Chelydra serpentina* (multiple subspecies), and probably many others.

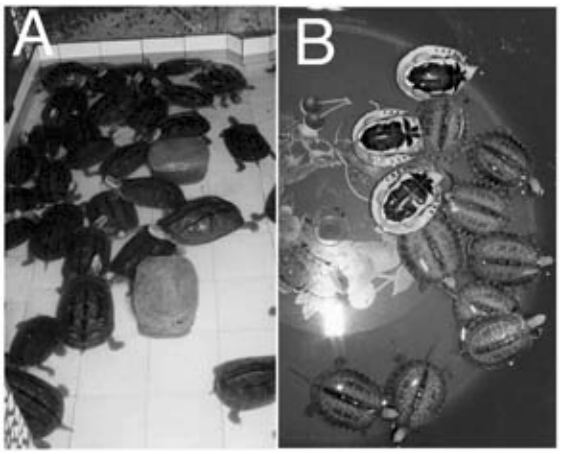

Figure 2. A) A small indoor breeding pond for *Cuora trifasciata*. B) *C. trifasciata* hatchlings. Photo by HS.

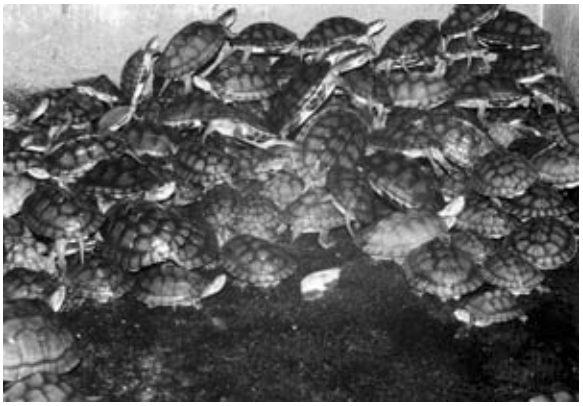

Figure 3. *Mauremys mutica* juveniles in an indoor raising pond. Photo by HS.

Hybrids

Finally, we address the matter of hybrid turtles. Van Dijk (2000) raises the possibility that many of the unusual turtles that appeared in the pet trade during the past twenty years, and then described as full species, might be turtle farm hybrids. Our observations of the Tunchang turtle farm suggest that this is probably the case for some of the taxa. The history of the Tunchang turtle farm has been one of progressive organization through trial and error. In the early years, the segregation of turtles was never practiced and all species of turtles were kept together. Even today, many species are kept together. We fully suspect that the conditions of the Tunchang turtle farm are representative of other turtle farms in China. Given the propensity of distantly related turtles to hybridize (Fritz and Baur, 1994; Fritz, 1995) combined with the high prices that new turtles fetch from hobbyists, the sudden appearance of turtles with unusual characters in the pet trade is to be expected. We agree with van Dijk (2000) that the status of the new species should be determined quickly because their conservation value is either extremely high or else zero.

According to the owner, in some cases the hybridization is infrequent and accidental, such as the crosses between *C. reevesii*, *M. mutica*, and *O. sinensis*. This could explain the small sample size for the new *Ocadia* species (*Ocadia philippeni* McCord and Iverson 1992, *Ocadia glyphistoma* McCord and Iverson 1994). Also, it is worth noting that *Mauremys pritchardi* McCord 1997 has been implicated as a possible hybrid between *C. reevesii* and *M. mutica* (Artner et al., 1998). In at least one instance, however, the hybridization is intentional. In November of 1999, the authors discovered *Mauremys iversoni*-like animals that turned out to be intentionally produced hybrids of *C. trifasciata* and *M. mutica* (Shi and Parham, in prep.). The owner of the turtle farm sells these hybrids as *C. trifasciata* to unsuspecting buyers (counterfeit "coin turtles"). He claims this is a common trick used by many Chinese turtle farmers.

Conclusions

Clearly the role and impact of Chinese turtle farms to the Asian turtle trade is greater than previously thought. However, the exact nature of its effect remains to be determined. In addition to being a possible source for the new and unusual pet trade "species", the turtle farms have inadvertently preserved large numbers of chelonians of valid species that are now extremely rare. How, or if, these turtles can be used for conservation purposes remains to be determined. Additional surveys of Tunchang and other Chinese turtle farms are being planned.

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Figure 4. *P. steindachneri* hatchlings and eggs. Photo by HS.

Conservation Concerns Facing the Inagua Slider

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The Inagua slider, *Trachemys stejnegeri malonei* (Fig. 1), is a subspecies of the Central Antillean Slider endemic to Great Inagua (southern Bahamas) (Fig. 2). This turtle was originally regarded as a distinct species. It was named for J.V. Malone a former commissioner for the island. The other two subspecies of *T. stejnegeri* occur on Puerto Rico and eastern Hispaniola. This turtle may have had a wider distribution on Great Inagua and in the southern Bahamas during the Pleistocene when sea levels were lower. A small population of what is believed to be *T. s. malonei* is present in a natural freshwater pond on Pine Cay in the Caicos Bank (1988 Lee, pers. obser.) It is not known if this is a relict occurrence or a recent introduction.

The Inagua slider arguably has the most restricted geographic range of any turtle. Inagua is the third largest island in the Bahamas (Fig. 3). Thus, while this turtle is confined to an island of 1,551 km^2, habitat limitations restrict it to the extreme eastern portion of the island. We would estimate that 95% of the total population lives in a 50 km^2 area. Here freshwater habitat is limited. Lake Windsor (saline) and salt evaporators of Morton's Bahama Salt Works (28,000 acres) occupy the majority of the land.

Additionally a network of old salt pans from a previous salt industry, the salt plant, pump stations and canals, 59 crystallizers covering 2,169 acres, an airport, Matthew Town, roads, natural brackish ponds, and coastal plant communities occur on this end of the island. The turtles occupy about 100 scattered pools covering less than 50 to 100 acres, with many pools being interconnected during periods of high water. At any given time many of these pools are dry, saline, or so shallow that they become too warm to support turtles. It appears that 10-20% of these pools are natural and the remainder are borrow-pits formed during the construction of the airport and the various roads and dikes which are prevalent on the west end of the island.

Figure 2. Inagua is an island in the Bahamas.

Figure 1. The Inagua slider endemic to Great Inagua, Bahamas.

On our visit to the Island (May 2000) many of the freshwater pools used by these turtles (50-60% of the ones containing water, ca. 30) were saline and were uninhabited by turtles (Fig. 4). It is not known if pools typically become saline during periods of drought, or if this is a result of salt intrusion from hurricane Floyd (fall of 1999).

Fresh water is at a premium on Inagua. Hurricanes are probably important in reviving freshwater systems. During years of drought it is assumed that the turtles remain inactive for long periods, finding shelter where they can on land. On rainy nights the turtles often walk around on land. The Oxford Expedition (Bostock 1988) found that only one of the dozen animals that they monitored traveled any significant distance from the point of capture (one male went 2 km). We found adult males to be much less common than females, as did the Oxford Expedition, and Hodson and Person (1943). Whether this is related to behavior or higher hatch rates of females caused by the high temperatures of the southern Bahama region and temperature dependant sex determination is unclear.

Figure 3. Map of Great Inagua. The black areas have populations of turtles.

Figure 4. An area flooded by brine discharge. Note the piles of salt in the background.

The Inagua slider's total population size is unknown, but believed to be small. We estimate that the total population is less than two thousand individuals, but it is more likely to be half that. For two months in 1988 four people from the Oxford Expedition collected only 102 turtles despite extensive field efforts. This yielded a maximum density of approximately one turtle per 20 acres. Unpublished mark-recapture data from their study indicated a total population of 492 turtles at the three most heavily populated sites. We saw about 50 individuals after examining all ponds of known occurrence during our 5 day visit. The turtle's habit of spending long periods of time on land makes surveys focused on freshwater sites difficult to evaluate.

Issues affecting population stability

These turtles are living on the edge. The continued existence of the Inagua slider is to some degree dependent on hurricanes and other major weather events, which bring freshwater to the island. The pools in which they live are constantly drying or becoming saturated with saline water. Many of the shallow pools become overheated during the day forcing the turtles to move onto land. Because of this the turtles are typically on land more than they are in the water and the locals refer to them as land turtles (in part this is to distinguish them from marine species). Under normal weather conditions the turtles must spend much of the year on land hiding in leaf litter and under rock ledges (Fig. 5). In drought years, and drought is not uncommon on Iguana, these turtles may have periods of aquatic activity which may last only for a few months of the year.

The majority of Great Inagua is protected within the boundaries of the Inagua National Park, but no turtle populations are known from within the park. The majority of sites where turtles occur is on the developed northwest portion of the island and is adjacent to the salt production area. Ownership of much of the lands occupied by the turtles is unclear. Despite being listed as endangered by the US Fish and Wildlife Service the Inagua slider is not protected by the Bahama government. There are no regulations against removing the turtles from the island and there are no current plans for long-term habitat protection. This turtle has not been considered as a species of conservation concern nor is its endemic status well known either in the Bahamas or on Inagua.

The movement of *Trachemys* from island to island has become a problem throughout the Bahamas. Visitors to the various outer islands often bring home cultural, geological or biological elements unique to particular islands as souvenirs. This has lead to hybridization of *Trachemys* on New Providence. A number of locality records for *Trachemys* on other islands which represent native species are actually stocks of questionable origin.

Electricity has been available to the public on the island for only a few decades. Prior to electric pumps groundwater was less accessible and its use was more conservative since it had to be pumped by hand. In addition

Figure 5. Turtles spend a large portion of the year hiding under limestone ledges like this one awaiting rain.

most residents relied on cistern systems to capture rainwater. To what extent the water table has been lowered, and how this effects the hydrology of the pools in which the turtles live is unknown. The recent drilling of one large well-field resulted in the invasion of seawater into the aquifer when the drilling went too deep. This well-field is centered in the area inhabited by the turtles. The long-term effect of this on the turtles is unknown.

Few natural pools now exist on the island. To what extent they were destroyed in the mid 1900s by the expanding salt industry is unknown, but the proximity of the salt works to the existing population suggests that the area developed was the former core of the turtle's distribution. Today, most occupied sites are freshwater pools formed by borrow pits associated with road, dike, and airstrip development. This places the majority of the population in areas that are vulnerable to brine overflow from the salt processing pools, and makes the turtles vulnerable to road traffic. The turtles commonly walk about on the roads on rainy nights and probably use the roads and dikes as nesting sites since other high ground is often limited. The good news is that a present there is extremely little vehicle traffic on Inagua.

Feral hogs occur throughout Great Inagua and have been present since at least the early 1900s. While we have no direct evidence of their impact on the turtles they almost certainly destroy nests and probably consume turtles they root out on land. Because of the scarcity of fresh surface water on Inagua the distribution of the feral hogs is concentrated around freshwater and contact with the turtles is assumed to be high.

Saltwater does intrude occupied sites. One of the major collecting sites described by the Oxford Expedition was highly saline during our visit. Connection to the sea was evident by the presence of tarpon in several of the occupied pools. How much of this is natural and how much is the result of massive landscape alteration around the salt works is unclear. Brine overflow from the salt evaporation ponds is a problem. The close proximity of the occupied sites suggests a potentially persistent problem and one site of more than 100 acres of natural vegetation and freshwater pools was saturated with salt when one of the discharge pumps was left unattended. Although it has been a decade since the accident, the site shows no sign of recovery.

Unlike Cat Island where another species of freshwater turtle occurs, no one on Inagua eats fresh water turtles.

The current conservation effort:

The Inagua slider population is vulnerable to any number of factors. We believe that a few simple remedies would provide reasonable buffers against unexpected events that could jeopardize the turtle's future. Research on the Inagua slider to understand the effects of shifting hydrology and varying salinities is needed for the creation of long-term management plans, but there are a number of conservation issues that can be addressed immediately. At the suggestion of The Tortoise Reserve, the Bahama government is now considering listing native freshwater turtles as a Crown-protected species. Local educational programs will be developed and posters can be placed at key sites, such as airports to the outer islands. Additionally, regulations are now being considered to ban the import of red-eared sliders (*T. scripta elegans*) for the pet trade. The release of these turtles on Inagua could genetically alter the indigenous *Trachemys* population. The key to conservation will rely on work done on Inagua itself. We propose the creation of additional artificial ponds, expansion of the Inagua National Park to include existing sites inhabited by the turtles, and an ongoing island educational effort to raise awareness about the endemic fauna of the island. A number of other reptiles and a subspecies of the Bahama woodstar are also Inagua endemics.

A small park in the middle of Mathewtown has been proposed and a number of the island's endemic species already live at this site. A large pool is already in place, and with minor fencing, a small number of turtles can be exhibited. Young hatched from this group can be used to help stock the proposed new ponds constructed in protected areas. This park would be created largely as a focused educational effort for the people of Inagua, in that tourism on Inagua is all but non existent. Additionally, a small breeding group of Inagua sliders has been established in the National Botanical Garden in Nassau. All the Inagua sliders exhibited have been marked for identification. The turtles are kept in an enclosed concrete pond in the public area. The endemic freshwater Bahama pupfish (*Cyprinodon laciniatus*) and a New Providence endemic race of the Caribbean gambusia (*Gambusia puncticulata manni*), Bahama pintails (*Anas bahamensis*) and the regionally endangered West Indian Whistling-Duck *(Dendrocygna rborea*) will also be exhibited (and bred) in the same exhibit. Educational signs explaining the importance of these animals to the country are being designed. The main purpose of the slider-breeding group is educational, but students at the College of the Bahamas will also use it for studies on the reproductive biology of the species. Offspring will be available for restocking ponds on Inagua, if that becomes necessary, and the turtles will serve as a backup stock of known genetic history if the wild populations become contaminated through introduction of exotic North American *Trachemys*.

We thank the staff of the Bahama National Trust for help with our field studies and for information provided.

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IUCN'S 2000 Red List of Threatened Species is Launched

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(The following article is reprinted from the IUCN webpage http://www.iucn.org/redlist/2000/news.html.)

The global extinction crisis is as bad or worse than believed, with dramatic declines in populations of many species, including reptiles and primates, according to the 2000 IUCN Red List of Threatened Species, released today.

Since the last assessment in 1996, Critically Endangered primates increased from 13 to 19, and the number of threatened albatross species has increased from three to 16 due to longline fisheries. Freshwater turtles, heavily exploited for food and medicinal use in Asia, went from 10 to 24 Critically Endangered species in just four years.

These are among the alarming facts announced by the world's largest international conservation organisation, with the publication of the Red List, the most authoritative and comprehensive status assessment of global biodiversity.

The release comes a week before the second World Conservation Congress in Amman, Jordan, where members of IUCN - The World Conservation Union will meet to define global conservation policy for the next four years, including ways of addressing the growing extinction crisis.

"The fact that the number of critically endangered species has increased - mammals from 169 to 180; birds from 168 to 182, was a jolting surprise, even to those already familiar with today's increasing threats to biodiversity. These findings should be taken very seriously by the global community," says Maritta von Bieberstein Koch-Weser, IUCN's Director General.

"The Red List is solid documentation of the global extinction crisis, and it reveals just the tip of the iceberg," says Russell A. Mittermeier, President of Conservation International and Chair of IUCN's Primate Specialist Group. "Many wonderful creatures will be lost in the first few decades of the 21st century unless we greatly increase levels of support, involvement and commitment to conservation."

Human and financial resources must be mobilised at between 10 and 100 times the current level to address this crisis, the Red List analysis report says. IUCN should join forces with a wide range of partners, continue to develop strong relationships with governments and local communities, and engage the private sector at a new level, it adds.

A total of 11,046 species of plants and animals are threatened, facing a high risk of extinction in the near future, in almost all cases as a result of human activities. This includes 24% (one in four) of mammal species and 12% (one in eight) of bird species. The total number of threatened animal species has increased from 5,205 to 5,435.

Indonesia, India, Brazil and China are among the countries with the most threatened mammals and birds, while plant species are declining rapidly in South and Central America, Central and West Africa, and Southeast Asia.

Habitat loss and degradation affect 89% of all threatened birds, 83% of mammals, and 91% of threatened plants assessed. Habitats with the highest number of threatened mammals and birds are lowland and mountain tropical rainforest. Freshwater habitats are extremely vulnerable with many threatened fish, reptile, amphibian and invertebrate species.

For the IUCN Red List system, scientific criteria are used to classify species into one of eight categories: Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable, Lower Risk, Data Deficient and Not Evaluated. A species is classed as threatened if it falls in the Critically Endangered, Endangered or Vulnerable categories.

While the overall percentage of threatened mammals and birds has not greatly changed in four years, the magnitude of risk, shown by movements to the higher risk categories, has increased. The 1996 IUCN Red List of Threatened Animals included 169 Critically Endangered and 315 Endangered mammals; the 2000 analysis now lists 180 Critically Endangered and 340 Endangered mammals. For birds, there is an increase from 168 to 182 Critically Endangered and from 235 to 321 Endangered species.

In the last 500 years, human activity has forced 816 species to extinction (or extinction in the wild). The increase in known bird extinctions is partly due to improved documentation and new knowledge, but 103 extinctions have occurred since 1800, indicating an extinction rate 50 times greater than the natural rate. Many species are lost before they are even discovered.

A total of 18,276 species and subspecies are included in the 2000 Red List. Approximately 25% of reptiles, 20% of amphibians and 30% of fishes (mainly freshwater) so far assessed are listed as threatened. Since only a small proportion of these groups has been assessed, the percentage of threatened species could be much higher.

As well as the animal species listed as threatened, 1,885 are classified as lower risk/near threatened - a category that has no specific criteria, and is used for species that come close to qualifying as Vulnerable. The majority of 'near threatened' animal species are mammals (602 - mainly bats and rodents) and birds (727).

A total of 5,611 threatened plants are listed, but as only app. 4% of the world's described plants have been evaluated, the true percentage of threatened plant species is much higher. With 16% of conifers (the most comprehensively assessed plant group), known to be threatened, the scale of threat for plants may be similar to that for some of the animals.

As well as classifying species according to their extinction risk, the Red List provides information on species range, population trends, main habitats, major threats and conservation measures, both already in place, and those needed. It allows better insight than ever before into the processes driving extinction.

The 2000 Red List provides the basic knowledge about the status of biodiversity that can be used by conservation planners and decision-makers around the world to establish priorities and take the necessary action.

The 2000 IUCN Red List has been produced for the first time on CD-ROM and is searchable on its own website at www.redlist.org. Press kits are available on the IUCN website at www.iucn.org with information in English, French, and Spanish.

A CLOSER LOOK AT THE TRENDS

With approximately 1.75 million known species, and many millions yet to be discovered, the IUCN Red List only scratches the surface in extinction risk assessments. Yet the 2000 Red List has made many significant advances.

Since 1996, all bird species have been reassessed by BirdLife International and its partners; all primates have been reassessed; many other mammals including antelopes, bats, cetaceans, otters, wild pigs, wild cattle, wild goats and some rodents have been reassessed; and there has been improved coverage of sharks, rays and sawfishes.

All Southeast Asian freshwater turtles have been assessed, and a number of new reptile and amphibian assessments from Brazil, the Philippines, and the former Soviet Union are included.

All assessments from The World List of Threatened Trees have been incorporated and updated. New assessments for plants from Cameroon, Galápagos, Mauritius and South Africa are included, along with comprehensive assessments for two carnivorous plant groups. For the first time, almost 100 moss assessments have been included...

THE STATUS OF ANIMALS

Mammals

The greatest change among the mammals is in the number of threatened primates, which increased from 96 to 116 species. This number is partly due to a revised taxonomy, but there are many changes caused by increased habitat loss and hunting, particularly the bush-meat trade. There was an increase from 13 to 19 Critically Endangered species and 29 to 46 Endangered.

Birds

Birds are by far the best-known group with a relative wealth of distribution and population data available allowing BirdLife International to produce a global status analysis that forms a major component of the Red List. The most significant changes have been in the albatrosses and petrels, with an increase from 32 to 55 threatened species. Sixteen albatross species are now threatened compared to only three in 1996, as a result of longline fishing. Of the remaining five albatross species, four are now near-threatened. Threatened penguin species have doubled from five to 10. These increases reflect the growing threats to the marine environment.

Doves, parrots and perching birds (passerines), especially those species in Southeast Asia, have also shown marked increases in threatened species due to the vast deforestation in countries such as the Philippines.

Reptiles, Amphibians and Fishes

The increase in the number of listed reptiles, from 253 threatened in 1996 to 291 in 2000, is mostly due to a focused analysis of the status of freshwater turtles and tortoises, especially freshwater turtles in Southeast Asia. The number of Critically Endangered species has increased from 10 to 24 and Endangered from 28 to 47 species.

The rapidly deteriorating status of tortoises and freshwater turtles in Southeast Asia is due to heavy exploitation for food and medicinal use. Hunting of these species is unregulated and unmanaged, and the harvest levels are far too high for the species to sustain. As populations disappear in Southeast Asia, there are disturbing signs that this trade is increasingly shifting to the Indian Subcontinent, and further afield to the Americas and Africa. Other Asian species, such as snakes and salamanders, are also heavily exploited for use in traditional Chinese medicine, but the effects of this and other pressures on most of these species have not yet been assessed.

Changes in the listings for fishes are largely due to improved coverage of the sharks and rays. The 1996 Red List included 32 species, while the 2000 edition includes assessments for 95 species, with increases from 7 to 19 listed as Vulnerable and 7 to 17 as Endangered. The coverage of marine species in the Red List is still limited, as there has been no systematic assessment, except for marine mammals, seabirds, marine turtles, and a few other groups of species.

However, assessments for sharks and rays, coral reef fishes, seahorses, and groupers and wrasses, have provided evidence of a number of inherent extinction risk factors. These include low reproductive potential and restricted range, and are added to threats such as over-exploitation, habitat destruction and degradation, and the effects of disease and invasive species. Increased efforts over the next few years to expand the Red List assessments to other groups of marine species are expected to confirm that extinction risk in the marine environment is increasing and that marine species share many of the threats that so seriously affect terrestrial and freshwater ecosystems.

A number of amphibian species have shown rapid and unexplained disappearances, for example in Australia, Costa Rica, Panama and Puerto Rico.

Although a systematic assessment has not been carried out, work undertaken by fish scientists, fisheries research agencies, and aquatic biologists around the world, point to an extremely serious deterioration in the status of river-dwelling species. This is largely due to water development projects and other habitat modification. One of the major threats to lake-dwelling species is introduced species. It is expected that the increased focus on these species over the next three years will provide further evidence of the world-wide crisis in freshwater biodiversity.

Invertebrates

Despite the large numbers of threatened invertebrates (1,928 species), this number is proportionally extremely low considering that 95% of all known animals are invertebrates. The majority of the assessments relate to better known regions such as the United States, Europe, and Australia. Groups with the most threatened species include inland water crustaceans (408), insects (555 - mainly butterflies, dragonflies and damselflies), and molluscs (938 - mostly terrestrial and freshwater species).

The status of plants

The IUCN Red List includes 5,611 species of threatened plants, many are trees, since these species have been relatively thoroughly assessed. The total number of globally threatened plant species is still small in relation to the total number of plant species, but this is because most plant species have still not been assessed for their level of threat. The only major plant group to have been comprehensively assessed is the conifers, of which 140 species (16% of the total) are threatened. Assessments undertaken by The Nature Conservancy (not yet incorporated in the Red List) indicate that one-third of the plant species in North America are threatened...

WHERE ARE THE THREATENED SPECIES?

Mammals

Madagascar has more Critically Endangered and Endangered primates than anywhere else in the world. Identified as a biodiversity "hotspot," Madagascar has extremely high levels of endemism (species that occur in only one location) but has already lost more than 90% of its original natural vegetation.

As in 1996, Indonesia harbours the highest number of threatened mammals (135 species). India (80 species) and Brazil (75 species) have moved ahead of China (72 species). Thailand (32 species) and the United States (29 species) are displaced from the "top 20" by Cameroon (38 species) and the Russian Federation (35 species). Tanzania (38 species) has also moved up from 20th to 14th position.

Twenty-five countries have more threatened species than scientists previously predicted. Of these, 19 are island states, including Australia. Species restricted to islands are generally more vulnerable to extinction.

Birds

The Philippines, another biodiversity hotspot, has lost 97% of its original vegetation and has more Critically Endangered birds than any other country.

Threatened birds are concentrated in tropical Central and South America, and Southeast Asia. Indonesia has the most threatened birds (115), followed by Brazil with 113 species. Colombia, China, Peru and India follow, with 78, 76, 75 and 74 species respectively. The overall results are similar to those for 1996 with all the same countries appearing prominent except for Papua New Guinea (32 species) which is now replaced by Tanzania (33 species). New Zealand and the Philippines have by far the highest percentage of threatened species with 42% and 35% respectively.

BirdLife International's distribution map of all threatened birds shows that globally they are unevenly distributed. They occur on more than 20% of the Earth's land surface but less than 5% of the land holds almost 75% of all threatened birds.

Plants

Based on data reviewed so far, the figures indicate that South and Central America, Central and West Africa and Southeast Asia have the highest number of threatened species.

Malaysia has by far the most threatened plant species - 681 – of which a large proportion are tropical timber trees. Indonesia, Brazil and Sri Lanka follow with 384, 338, and 280 threatened species respectively.

Reptiles, Amphibians, Fishes, and Invertebrates

These groups have not been comprehensively reviewed, therefore the current assessments reflect regional biases. For example, the United States emerges as having the most threatened species among fishes and invertebrates, partly because the status of inland water crustaceans and certain insect groups is well known there.

The number of threatened inland water species has increased in all groups except for the molluscs. A large proportion of these species is found in the United States, which has extremely rich freshwater biodiversity including 61% of the world's crayfish, 29% of freshwater mussels, 17% of freshwater snails and 10% of freshwater fishes. A large proportion of these is considered threatened. Freshwater habitats are extremely vulnerable and species occurring in them are likely to face a much higher risk of extinction than those in terrestrial and marine environments...

DISTRIBUTION OF BIRDS AND MAMMALS BY MAJOR HABITATS

The top two habitats for threatened birds and mammals are lowland and montane tropical rainforest. Grasslands, shrublands, tropical monsoon forest and dry forest are also important to both groups. A total of 883 bird species (74%) depend almost entirely on a single habitat type and of these, 75% depend on forests. More than 900 threatened bird species use tropical rainforests and 42% of these are found in lowland rainforest while 35% occur in montane rainforest. For mammals, 33% occur in lowland rainforest and 22% in montane rainforest.

Birds appear more adaptable and able to survive in transformed habitats such as plantations, agricultural lands and urban areas. Mammals appear to be far less tolerant of transformed habitats and disturbance.

Conservation of extensive areas of tropical rainforest is essential to prevent the loss of a large number of species, most of which depend entirely on this habitat for survival. Grasslands, shrub lands and savannahs should also be prioritised for mammal and bird conservation...

AN OVERVIEW OF THE MAJOR THREATS

Habitat Loss and Degradation

The most pervasive threat to birds, mammals and plants, is habitat loss and degradation, affecting 89% of all threatened birds, 83% of the threatened mammals assessed and 91% of the threatened plants. Agricultural activities (including crop and livestock farming, and timber plantations), extraction activities (mining, fisheries, logging, and harvesting), and development (human settlements, industry and associated infrastructure) are the three main causes of habitat loss. Agricultural activities affect 827 threatened bird species (70% of all), 1,121 plant species (49% of all) but surprisingly, only 92 (13%) of the threatened mammals. Extraction activities had the most impact on plants with 1,365 threatened species being affected (60% of all) and 622 threatened birds (53% of all).

Exploitation

Exploitation, including hunting, collecting, fisheries and fisheries by-catch, and the impacts of trade in species and species' parts, constitutes a major threat for birds (37% of all), mammals (34% of all), plants (8% of those assessed), reptiles and marine fishes. Figures show that 338 threatened bird species (28% of all), 212 mammals (29% of all), and 169 plants (7% of all) are impacted by hunting and collecting. Trade affects 13% of both threatened birds and mammals.

Alien Invasive Species

Alien invasive species (species that invade or are introduced to an area or habitat where they do not naturally occur) are a significant threat, affecting 350 (30%) of all threatened birds, and 361 threatened plant species (15%). The commonest cause of extinction of bird species since 1800, especially those on islands, is the introduction of alien invasive species such as the black rat...

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Scientists Say Half of Asia's Turtles Endangered

TRAFFIC Press Release

Kuala Lumpur, MALAYSIA — The number of critically endangered freshwater turtles has more than doubled in just the last four years, according to a report released today by TRAFFIC, Wildlife Conservation Society (WCS), Worldwide Fund For Nature (WWF), and other conservation groups. With three-fourths of Asia's freshwater turtles now listed as threatened, and over half considered endangered, scientists and conservationists are calling for far more effective measures to protect these animals, which are heavily exploited in the region primarily for food and traditional medicine.

According to TRAFFIC Southeast Asia Senior Programme Officer Peter Paul van Dijk, softshell turtles are especially popular as a luxury food, fetching prices which may be six times the price of lamb or chicken. "In addition, turtle shell is traded to supply the traditional Chinese medicine industry, which uses it in a variety of applications. The turtle jelly made from the shell is claimed to have cancer-curing properties, and is consumed as a general health tonic. Imports of turtle shells into Taiwan alone comprise, on average, over 30 metric tons per year, and the total trade may add up to several times this amount."

The report, consisting of proceedings from The Workshop on Trade in Tortoises and Freshwater Turtles in Asia, held last year in Phnom Penh, Cambodia, documents the threats facing the species and recommends actions to address the growing crisis. Organized by TRAFFIC, WCS and WWF, the workshop, brought together over 40 regional turtle experts from 16 countries, primarily within East, South and Southeast Asia.

According to the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group, as well as the Asian Turtle Trade Working Group, of the 90 species of Asian freshwater turtles and tortoises, 74% are considered threatened. Over half of Asian freshwater turtle and tortoise species are endangered, including 18 critically endangered species, and one that is already extinct: the Yunnan box turtle *Cuora yunnanensis*. According to scientists, this animal probably vanished decades ago but has only now been formally declared extinct.

The workshop participants urged that all currently recognized turtle species native to Asia be listed in Appendix II of CITES (Convention on International Trade of Endangered Species) and that some species be transferred to Appendix I of CITES, which would prohibit all international trade in the species.

A proposal to regulate the trade in all nine species of Asian box turtles under Appendix II of CITES was adopted at the recent meeting of the Conference of the Parties to CITES, held last April. Appendix II listing of a species requires that international trade be regulated through a system of permits.

In addition, a resolution was adopted recognizing that an increasing number of freshwater turtle and tortoise species are threatened by trade, especially in Asia. The resolution called for increased efforts to work cooperatively to control illegal trade and take steps to ensure the trade is sustainable. The resolution also called on the CITES Secretariat to host a workshop to further explore the threats posed by trade and work towards solutions that ensure the conservation of the species.

The IUCN Red List of Threatened Species released last week listed 24 turtle species worldwide as critically endangered, compared to ten species in the last assessment in 1996. "With the number of critically endangered species more than doubling in just the last four years, it is evident that the situation is deteriorating rapidly," van Dijk said.

The workshop and proceedings present information on the status of more than 80 individual species at national levels; map trade routes and types of demand; analyze legislative and enforcement frameworks protecting turtles; and assess national and regional threats to turtle populations posed by the trade. Among the recommendations found in the proceedings is a thorough review and improvement of national legislation for effective protection of turtles in the region as well as for prompt enforcement of all local, state and national regulations and legislation concerning the conservation of turtles. The participants also urged that more research be done on the trade and greater public awareness efforts be made to highlight the threats facing these species.

"Several organisations and individuals are involved in practical conservation action," van Dijk said. "However, overall, tortoises and freshwater turtles do not yet receive the support and recognition that marine turtles receive even though their conservation situation is, in many ways, much more serious. Without immediate action, we face the likelihood of losing some of these species forever."

For more media information, please contact Sabri Zain at TRAFFIC International (United Kingdom) by tel. +44 1223 277427 or E-mail: sabri.zain@trafficint.org.

"Asian Turtle Trade: Proceedings of a Workshop on Conservation and Trade of Freshwater Turtles and Tortoises in Asia" (Chelonian Research Monographs, Number 2, 2000) is published by the Chelonian Research Foundation, in association with WCS, TRAFFIC, WWF, Kadoorie Farm and Botanic Gardens and the US Fish and Wildlife Service.

Observations in the Qing Ping Free Market, Guangzhou, China, November 2000

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Qing Ping Free Market is the largest market in China selling live turtles. We visited the market four to five times a day (early and late morning, early and late afternoon and the evening) between November 6 and 9, 2000. The main exporting countries (according to the tags on the shipping containers and from numerous interviews with traders) were Myanmar, Malaysia, Indonesia (mainly Sumatra), and Vietnam. Here is a short survey of what could be found in just a 4-day period:

1. Hundreds of adult *Morenia ocellata* (CITES I) females and a couple of juveniles (maybe some males).

2. Appr. 25 *Geochelone platynota* (CITES II) behind the scenes.

3. *Chitra chitra* from Myanmar!

4. Few *Callagur borneoensis* (CITES II, appr. 15), no *Batagur baska* (contrary to May 2000 !)

5. More *Cuora amboinensis* than ever (thousands). Listing in App. II totally in vain (as we always feared).

6. *Cuora trifasciata* (adult, CITES II) sold for Y 9000.- (per head, not per pound; under the table, of course)

7. Relatively few (app. 20) *Cuora galbinifrons* (CITES II) and *Cuora flavomarginata* (CITES II), maybe due to season?

8. Hundreds of *Heosemys grandis, Heosemys spinosa* (from Sumatra), *Cyclemys dentata, Orlitia borneensis, Indotestudo elongata, Pyxidea mouhotii* (both subspecies), *Siebenrockiella crassicollis* (from Sumatra), *Ocadia sinensis* (Taiwan form, all sizes), *Amyda cartilaginea, Trachemys scripta elegans.*

9. Also present: *Cyclemys pulchristriata, Cyclemys tcheponensis, Melanochelys trijuga edeniana, Platysternon megacephalum, Chinemys reevesii, Mauremys mutica, Mauremys annamensis, Chinemys nigricans* (1), *Palea steindachneri* (1), *Dogania subplana* (2), *Nilssonia formosa* (quite a few), *Lissemys scutata, Geoemyda spengleri, Macroclemys temmincki,* and *Sacalia quadriocellata.*

10. Hundreds of *Hieremys annandalei* (shipped in by Malaysia and Singapore Airlines), *Malayemys subtrijuga* and *Notochelys platynota* (Sumatra).

11. Millions of *Pelodiscus* from Thailand & Hainan Dao.

12. No Indian, African or South American species!

13. This time (contrary to prior visits in 1999 and 2000) no *Manouria impressa* (CITES II) were seen.

An Examination of the Concept of "Commercial Extinction"

Allen Salzberg

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A commonly used phrase by conservationists is "commercial extinction." This is when commercial collectors stop collecting an organism because the population level of that species has been reduced to a point that it's no longer worth the time, effort or physical risk, for the amount of money they would be paid for the species in the open market. In other words, further attempts by the collector to find that species have become uneconomical. The collectors then move on to another species that they can collect more of in less time, thus earning them a greater profit.

Conservationists have long assumed that when professional collectors, the people who can quickly and efficiently do the most damage, quit the field they inevitably leave enough specimens available for conservationists to save, and hopefully, enough to help grow the population to pre-exploitation levels.

Or if the pressure of the hunters, helped or caused the species rarity, the species has received a temporary pardon, providing conservationists and scientists some additional time to think about the problem, to study it, and to develop the right recovery plan.

I believe the concept of "commercial extinction" is meaningless.

The assumption that drives the concept of "commercial extinction," is that when the professionals leave the field, to find a more profitable resource to exploit, no one replaces them. Unfortunately in underdeveloped countries this is not true and probably never was.

When a commercial collector leaves the field they are immediately replaced by a new set of collectors. Collectors who have all the time in the world to invest, collectors who will go to great lengths and take great risks to find or catch the plant or animal -- especially if the demand for the species has increased the price.

Some of these collectors are usually "in-transit" or refugees. They could have come from within the same or another country. The collectors also consist of people who live in the area and are so poor they barely survive.

Using the same formulae used to determine commercial extinction, you can also prove the term's own invalidity. If the collector is a refuge, they spend most of their time sitting in refugee camps. Time is the only thing they have to invest.

A starving local farmer who can barely feed their family can be easily pushed to take great risks to supplement their incomes. Anyone, in any country, would.

So with all these new reserves of time and risk to invest, versus the potential return -- it is almost guaranteed that these new collectors will be out in the field until they are absolutely sure they've found the last one.

How much of a return can these collectors expect? Reportedly the market for the Asian box turtle *Cuora trifasciata* is so lucrative that a collector can earn up to $375.00 U.S. for a specimen up to 700 grams. A collector in Vietnam can earn up to $1,000US/kg in a country where the average yearly income is $200 US (Shi and Parham, 2001).

Conclusion? Once a market has been established for a plant or an animal, conservationists should not pause to act. "Commercial extinction" does not exist, it doesn't provide a pause on the organisms's march to extinction, and so does not give anyone more time to act, or create peer reviewed, scientific sound "recovery plans."

Or as John Muir stated, ""If it's a race between the market and nature, the market always wins."

Literature Cited

Shi, H. and J.F. Parham. 2001. Preliminary Observations of a Large Turtle Farm in Hainan Province, People's Republic of China. TTN 3: 4-6.

Environmental Education Kiosks Feature Multi-Media Programming for Mojave Desert Visitors

Michael J. Connor

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The Desert Tortoise Preserve Committee, Inc., a nonprofit environmental organization based in Riverside, California, has launched a Mojave Desert-wide outreach program called the Mojave Desert Discovery Centers. The Discovery Centers feature an interactive CD-Rom web site, videotape presentations about the desert and its wildlife, and customized maps and brochures to guide visitors to featured desert attractions.

The first phase of this innovative approach to environmental education involves locating Discovery Center kiosks at three Mojave Desert locations:

- California Welcome Center, Barstow, California
- Joshua Tree National Park, Cottonwood Visitor Center, California
- Nevada State Museum, Las Vegas, Nevada

"The Mojave Desert Discovery Centers offer a unique way for the Committee to fulfill one of its major goals: to provide information and education to the public on the threatened tortoise and its habitat, and on the associated plants and animals that share its desert ecosystem," says executive director, Michael Connor.

"The Desert Tortoise Preserve Committee has leveraged technology to reach out to diverse audiences throughout the Mojave Desert," says project manager Jun Y. Lee. "Unlike traditional visitor center concepts, the Discovery Centers are mobile and can be deployed in areas where recreational visitors congregate."

"We estimate that more than 500,000 people per year will interact with the Discovery Centers at the initial three locations," says Min Yang, AIA of the design firm Project: Architecture.

The Mojave Desert Discovery Center program was made possible by a significant contribution from the late Joan Leslie Dotzenrod and the generous support of members of the Desert Tortoise Preserve Committee, Inc.

Additional information about the Desert Tortoise Preserve Committee, Inc. and its programs may be found at its website, www.tortoise-tracks.org.

Continuous Temperature Measurements in Reptile Enclosures, Using Simple Electronic Equipment and a Standard Personal Computer

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Increasing survival pressures on turtles worldwide emphasize the need to develop successful husbandry and breeding protocols. In conjunction with wildlife management plans, these may increase survival chances for many species. Although a growing number of species is reported to propagate successfully in captivity, detailed descriptions allowing others to reproduce the suitable husbandry practices, often lack. Sometimes this is caused by restraints to publish gathered data, but at other times data sets simply are insufficient.

In this article, I describe a relatively easy method to continuously monitor the temperature in reptile enclosures, by means of simple electronics and a standard personal computer. This offers the possibility to make (and eventually publish) detailed temperature measurements, at reasonable costs and time-investment. While temperature is important, I realize that it is only one factor involved with successful husbandry and breeding.

Hardware

The electronic device consists of a microchip, generating a pulse in a circuit with a capacitor, a resistor and a temperature-dependent resistor (KTY10). The frequency of the pulse is the product of the temperature-dependent resistor and the (stable) capacity of the capacitor, and thus is dependent on the temperature. When the temperature increases, the resistance of the temperature-dependent resistor will increase, decreasing the frequency of the pulse. Measurement of the time one pulse takes (and thus temperature) is effected via the serial port of a personal computer (3.86- or 4.86-laptop computers are ideal, as they save energy and are usually very silent). A maximum of 4 circuits can be connected to a computer via one serial plug.

The components of one circuit are:

- Microchip timer TLC555
- Stable capacitor 1 uF
- Resistor 2kOhm
- Temperature dependent resistor KTY10 (± 2 kOhm)
- Circuit board
- Serial port plug (female)
- Power supply 6 V, 200 mA

The circuitry schematic is shown in Fig. 1.

The pins of the serial plug are numbered 1-9. Pin number 5 (GND) is the ground (-). Pins number 1 (DCD), 6 (DSR), 8 (CTS) and 9 (RI) can be used to send signals from four circuits to the computer (+).

In order to protect the KTY10-sensor when placed into a terrarium, it can be covered by a small watertight test tube.

Software

The pulse generated by the circuit can be 'listened to' by the connected computer, using a few lines-program in Turbo Pascal. It records the amount of time (L) needed for a single pulse, using the 1 Mhz clock (8253) in the computer.

This program (Program 1) only measures and displays the amount of time one pulse takes (for each sensor, every minute), without translating it to temperature. In order to translate the time to temperature, the circuitries need calibration. I have found that this can best be carried out after complete installation of the hardware (including the KTY10 sensors in the terrariums). Theoretically (and apparently in some cases experimentally), calibration can also be accomplished by establishing (for each circuit) the function between R and L, by temporarily connecting a stable 2 kOhm resistor, and after that a stable 1.5 kOhm resistor, instead of the KTY10 resistors. After reading of L from the computer screen, the function between L and R should be linear (R = aL + b). Next, R can be translated to temperature, by establishing the resistance of each of the KTY10 resistors at a known temperature range (fridge, freezer, room temperature, et cetera) by means of a multimeter. The function (theoretically also a straight line for the temperature range usually prevailing in reptile enclosures) found should be included in the computer program to display temperature instead of L or R.

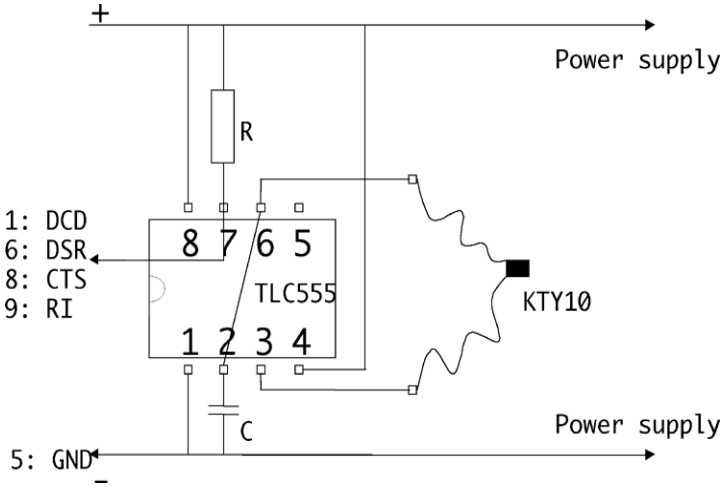

Figure 1. Circuitry schematic

Since the method described above did not yield satisfying results for my circuits, I have chosen to establish a direct function between L and the temperature. In order to do so, I have installed all hardware, and placed calibrated thermometers touching the KTY10 sensors in all four enclosures. For each 0.5°C in an appropriate temperature range I have recorded L. This yielded 3rd degree polynomial functions for each of the circuits. These were implemented in the computer program, by adding lines 'T:= $a+bL+cL^2+dL^3$;' after the Measurepulsetime-procedure for each of the circuits, as well as a declaration for T (real type) and changes from L to T in 'str(L:1:0,S1); outtextxy(451,90,'CTS: '+S1);'.

Enlarging the program

The program outlined until now only displays temperatures for four KTY10 sensors. Next, the program can be enlarged, for example to measure temperature every few minutes, saving data once in a while, and showing a graphic on the computer screen. This can be a very time-consuming process, and considerable knowledge on Turbo Pascal, or a friend or collegue who has this knowledge, is required. As an example, below are a few procedures that could be used. A copy of the full program currently in use by the author may be obtained digitally via E-mail as an example.

Drawing of a graphic

The chart axes and a grid can be created by means of the procedures 'line' and 'rectangle'. Axes labels (and grid lines) can be added using the operator 'mod', or by putting the numbers and texts separately using procedure 'outtextxy' (as was used in the program shown above).

The easiest way to draw temperature lines, is to put a pixel in the graph for every measurement (calculate how many pixels will be put in for instance 24 hours, and adjust the size of the chart (axes) to that). This can be done by means of procedure 'putpixel'. The software I currently use, draws 4 stacked charts in one screen, one for each of the 4 temperature sensors in use.

Saving data on disk

Temperatures can first be transformed to numbers with a size of one byte (0-255), using a suitable function (for measurements within a temperature range of 15-40.5°C

Program 1. This program measures and displays the amount of time one pulse takes (for each sensor, every minute), without translating it to temperature.

```
Program Temp;
{In no event shall the author be liable for any damages whatsoever,
     caused by running this software}
Uses Crt,Dos,Graph;
const Ba=$3F8; {COM1}
CTS=16; DSR=32; RI=64; DCD=128; {4 connections to computer}
var  Inlet, Highbyte, Lowbyte     : byte;
     L                            : real;
     Graphdriver, Graphmode       : integer;
     Time                         : longint;
     Interval, H, M, S, S100, N   : word;
     S1                           : string;

procedure  Measurepulsetime(Pin:integer);
     begin
     {First wait until connection >0 and next =0, then run until connection >0}
     Inline($FA); {switch off computer timer}
     repeat Inlet:= Port[Ba+6] and Pin until Inlet>0;
     repeat Inlet:= Port[Ba+6] and Pin until Inlet=0;
     Port[$43]:= $34; Port[$40]:= 0; Port[$40]:= 0; {Timer 0, mode 2, L/H reset}
     repeat Inlet:= Port[Ba+6] and Pin until Inlet >0;
     Port[$43]:= $04; Lowbyte:= Port[$40]; Highbyte:= Port[$40]; {Freeze/read}
     Port[$43]:= $36; Port[$40]:= 0; Port[$40]:= 0; {Reset 253 to original mode}
     Inline($FB);} {Switch on computer timer}
     L:= round((65535 - (Lowbyte + 256 * Highbyte))/1.193);
     end;

procedure Timer; {Timer between measurements in minutes}
     begin
     repeat GetTime(H,M,S,S100) until (M mod Time=0) and (S=0);
     delay(45000) {To prevent multiple measurements each measurement}
     end;

begin {Start program}
     repeat GetTime(H,M,S,S100) until (S=0) and (S100<10);
     writeln('Waiting for starting time S=0...');
     repeat
          Time:=1;
          Graphdriver:=Detect;  initgraph(Graphdriver,Graphmode,'');
          cleardevice;
          SetTextStyle(defaultfont,horizdir,1);
          Measurepulsetime(CTS);
          str(L:1:0,S1); outtextxy(50,90,'CTS: '+S1);
          Measurepulsetime(DSR);
          str(L:1:0,S1); outtextxy(50,170,'DSR: '+S1);
          Measurepulsetime(RI);
          str(L:1:0,S1); outtextxy(50,250,'RI: '+S1);
          Measurepulsetime(DCD);
          str(L:1:0,S1); outtextxy(50,330,'DCD: '+S1);
          Timer;
     until keypressed;
end.
```

this could be (temperature*10)-150). The total file size then will be the number of measurements per hour * 24 hours * the number of sensors used. The file size can be used to loop the program, for measurement cycles of 24 hours.

A name for the file can be generated from the current date and time (using procedures 'getdate' and 'gettime'), changed into strings. This prevents that files overwrite each other, when the same names are used.

Files are saved at the end of each loop, using procedures 'assign', 're-write' and 'blockwrite'.

Adjusting computer clock

Note that for each temperature recording, the computer clock is stopped temporarily! When the course of the temperature in the software is recorded as a function of time, a procedure to adjust the clock is necessary. This can be done for instance every 24 hours, using procedures 'gettime' and 'settime', to add the time that has been lost during the measurements.

Data processing

Before the saved data can be used in a spreadsheet program like MS Excel, it needs to be converted to a compatible format. I use Program 2 to convert the saved data to *.txt files. The calculation to transform bytes to temperature should be changed in case another function is used in the main program.

Initial results

In addition to the Turbo Pascal software, I have created a macro in MS Excel/Visual Basic, to automate data processing. It calculates averages and standard deviations for maximum temperature, minimum temperature, increase of temperature in the morning, and decrease of temperature in the evening, per sensor and per month. Figures 2 and 3 show some very limited preliminary results for two of the four enclosures.

Although significant knowledge of Turbo Pascal is required to develop extended temperature monitoring software, the basics of the methods described here are simple, and hardware parts are cheap and usually readily available. The device described may yield valuable information, contributing to the development of successful husbandry and breeding protocols.

Program 2. This program is used to convert the data into a format compatible with Microsoft Excel. It saves file in a * .txt format.

```
Program Excelconverter:
    {In no event shall the author be liable for any damages whatsoever,
    caused by running this software}
uses Crt;
var     F                                                   : file of byte;
        G                                                   : text;
        B                                                   : byte;
        I, J, Rl                                            : longint;
        R                                                   : real;
        S, A, Sourcefilenm, Excelfilenm0, Excelfilenm       : string;

begin
    repeat
        clrscr;
        write('Type name source file on A:\: ');Readln(Sourcefilenm);
        write('Type name converted file on A:\ (extension will be .txt): ');
        readln(Excelfilenm0);
        Excelfilenm:=Excelfilenm0+'.txt';
        Rl:=4;
        assign(F,'A:\'+Sourcefilenm);
        assign(G,'A:\'+Excelfilenm);
        Reset(F);
        Rewrite(G);
        I:=0;
        J:=0;
        While not eof(F) do
            begin
            read(F,B); R:=(B+150)/10;
            str(R:2:1,S);while pos('.',S)>0 do S[pos('.',S)]:=',';write(S,chr(32));
            write(G,S,chr(9));
            I:=I+1; J:=J+1;
            if (J=Rl) and (Rl<>0) then
            begin writeln; writeln(G); J:=0 end;
            end;
        writeln(G);
        close(F);
        close(G);
        writeln(chr(13),chr(10),chr(10),chr(7),'- ',I,' bytes read and converted.');
        writeln('- ',I*5+2,' is the file size ',Excelfilenm,'.');
        write('- Convert another file? ');readln(A)  {If yes? j Enter}
    until A<>'j'
end.
```

Acknowledgement

Being primarily an ecologist, my knowledge on electronics and Turbo Pascal is limited. Neither the device described here, nor this article could have been produced without the great help of my collegue Ton van der Heiden.

In no event shall the author be liable for any damages whatsoever, caused by practising the methods described in this article.

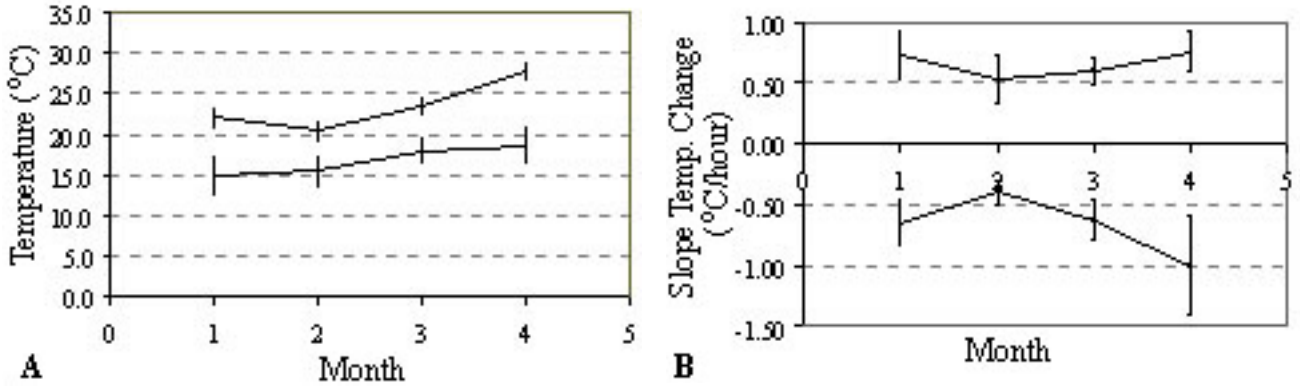

Figure 2. A. Average maximum and minimum temperatures and B. Average temperature change in enclosure 1.

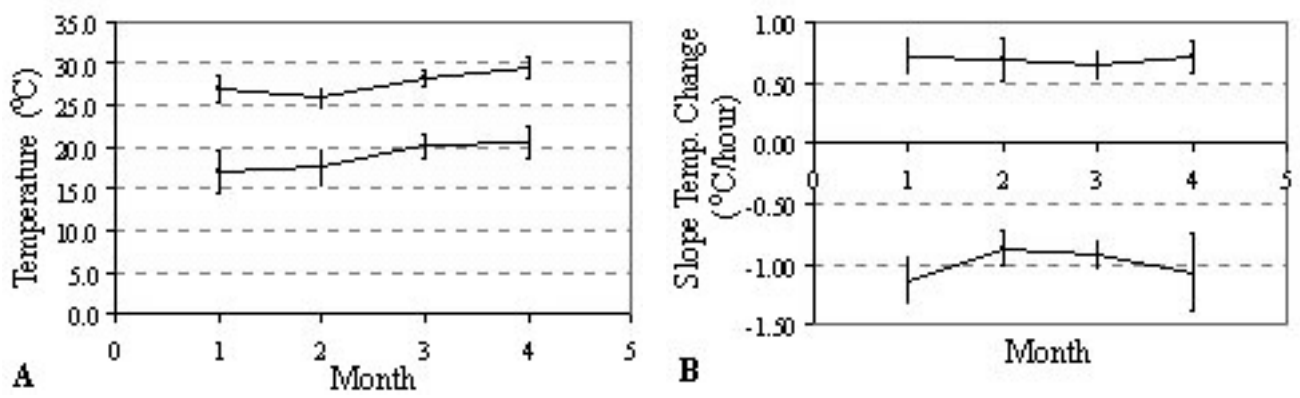

Figure 3. A. Average maximum and minimum temperatures and B. Average temperature change in enclosure 2.

World Experts Attend International Conference "Relocation of Turtles and Tortoises - Animals in Crisis"

Ray Ashton

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The tortoise not "the mouse" was the featured attraction for world chelonian experts that came together for 3 days in September at the Radisson Orlando Airport to share information, debate policy, and create a protocol on the fate of the world's populations of turtles and tortoises and how they are affected by relocations (release into the wild of individuals or populations from another location). Some world turtle or tortoise populations are in crisis. At this working meeting scientists, zoo officials, conservation organizations, and turtle and tortoise enthusiasts worked to produce an INTERNATIONAL PROTOCOL that will assist governments and decision makers worldwide deal with turtle and tortoise relocation issues. The publication of this protocol is scheduled for 2001.

Turtles and Tortoises Worldwide Headed for Disaster.

As people take over more and more natural habitat throughout the world, many species of wildlife, including tortoises and turtles are being displaced. Many of these species are rare or endangered and the loss of these animals as land use changes occur, may prove disastrous. Releases into the wild or relocations sometimes are made by the owners of unwanted pet turtles and tortoises or by animals care facilities in lieu of euthanizing the pet turtles and tortoises. Such unplanned relocations of turtles and tortoises may well add insult to injury to wild chelonian populations. Apparently humane efforts by well-meaning persons or organizations to turn the animals back to their homes may spread disease, disrupt the genetics, and stress native populations causing more animals to die off. However, well-planned and organized relocations can be an important conservation tool.

World Authority Living in Florida Gives Keynote Address.

The Key Note Address was given by international turtle expert and author Dr. Peter Pritchard who heads the Chelonian Institute located in Oviedo, Florida. The overall meeting was planned and chaired by herpetologist Ray

Ashton, President of Ashton Biodiversity Research & Preservation Institute and series editor of the Rare and Endangered Biota of Florida. Scientists, zoo officials, conservation organizations, and others from around the world came together to develop procedures to help direct relocation and other efforts to save many of the endangered and threatened turtles and tortoises around the world. Topics such as ethics, spread of disease, genetics, environmental concerns, and management of habitat were discussed and the best management protocol was developed. The meeting was designed in a "Roundtable" format allowing participation and active discussion on topics such as "Chelonian Assurance Colonies" or, collections maintained by individuals, governments, zoos and others around the world to produce future stock of turtles that could be released back into their habitat in the future.

Development Crowds Out Tortoise Habitat in Florida

There are no easy answers regarding such problems as are found in Florida where the Gopher Tortoise is relatively common in its native uplands habitat. However these upland habitats are now the target of massive development for the rapidly growing human population in the state and tortoise populations are being destroyed. Meanwhile in areas such as state parks and other government owned refuges, the tortoises are dying of Upper Respiratory Tract Disease (URTD). This is a disease of tortoises and does not affect humans or other animals. The Florida Fish and Wildlife Conservation Commission has been unsuccessful in trying to come up with solutions to these problems for many years.

Relocations can Spread Disease that Threatens Tortoise and Turtle Populations

The desert tortoise found in the western United States is having problems similar to those of the Gopher Tortoise, loss of habitat due to development and spreading of URTD. Relocations without following a protocol that tests for diseases can compound the problems. In France and other European countries many pet tortoises and turtles are being released for "humanitarian" reasons and these releases impact the natural environments and potentially spread disease to other turtles. Impacts to the environment can include: crowding out of native species when non-native turtles or tortoises are released or when groups of native chelonians from another location are placed into an already existing population, interrupting the natural food chain in a habitat, introduction of diseases, physical changes to the habitat by the actions of the introduced animal or by increased wastes produced by the un-natural increase in animals, etc.

Roundtable Consensus Demands Well-Planned Relocations

The consensus of expert opinions created by the Roundtable can be summarized by saying that relocation must be well planned and studied before it is attempted and that agencies must require thorough investigations into the potential impacts of relocations before they allow them to take place. Relocations should have a clear, measurable goal based on a strong conservation purpose that is centered on benefits for the species and the habitat where the relocation will take place. Landowners and communities should be involved and it is extremely important to monitor the impacts of the relocation after it has taken place to determine impacts.

Asian Chelonian Crisis due to Demand in China for Food and Medicinal Products

A major worldwide crisis has developed because of the recent surge in the demand for turtles and tortoises in the food and medicinal markets of China. Hundreds of thousands of turtles are imported into China daily for consumption and because certain species are prized over others (as attested to in recent articles on Chinese Olympians drinking turtle blood for strength and vitality) many have been recently added to the list of highly endangered species by CITES. Since the market for these is so great, local villagers can essentially double their annual income by seeking out and selling certain turtles in Southeast Asia. The International Roundtable, as a method to save some of these animals for the future, has created the Chelonian Assurance Colonies.

Chelonian Assurance Colonies Bank Turtle and Tortoise Species for the Future

Chelonian Assurance Colonies are actually many collections of live turtles and tortoises whose managers are cooperating with each other and the countries involved to maintain thousands of animals whose offspring may someday restock the wild once the current crises are over. This may take several human and turtle generations before conservation efforts come to grip with the real problems of habitat loss and over consumption. This effort is unique in that it brings together the traditional collections often found in zoos with those of private collectors and professional turtle and tortoise breeders who happen to be breeding these once common, now endangered species for the multi-billion dollar reptile pet trade. The Roundtable brought in some of the top veterinarians, geneticists and research biologists to layout the methods that must be used if these collections are to work for the preservation of chelonian species.

The work of the International Roundtable on Chelonian Relocation and Assurance Colonies will be published in a simple Protocol that will hopefully help governmental agencies, conservation organizations and others in the proper development of relocation efforts around the world. This book is expected to be available in 2001.

Preliminary Comments on Building Chelonian Libraries

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Books, periodicals and other assorted publications on turtles, turtle literature if you will, have always been of major interest to those who work with chelonians on a regular basis. Although the same is undoubtedly true in many other areas of study as well, "turtle people" overall, whether hobbyist, wildlife manager, conservationist or academic researcher, to a greater or lesser extent almost invariably all build some sort of reference library. While some will be content with a few select titles of rather narrow taxonomic scope, many more ardent "chelonian bibliophiles" (this author included) can amass truly prodigious selections of somehow relevant titles.

Regardless of library scope or size, everyone interested in turtles and tortoises likewise seems to be actively searching for at least one more publication to add to their bookshelves. Trouble is, with few notable exceptions, much of what has been written on turtles including a fair number of relatively recently released titles can prove to be somewhat difficult to find at best.

Naturally, a number of factors are at least partially responsible for the overall lack of readily available turtle publications. Targeting an obviously somewhat limited audience, for example, means that most books on turtles are produced in very small press runs to begin with and small press runs in turn translates into limited quantities. While some of the most popular titles have been reprinted multiple times and/or in differing formats (i.e. Pope's Turtles of the United States and Canada, Carr's Handbook of Turtles, Pritchard's Encyclopedia of Turtles, Ernst and Barbour's Turtles of the World), most volumes on turtles are printed only once and when all copies have been sold such titles are basically gone.

While also typically printed in small numbers, turtle publications produced outside of the United States, including a substantial number of important English language references of value to those interested in species found outside of North America, present the additional problem of relative obscurity as well. More simply put, before one realizes such publications even exist they are often nearly if not already completely out-of-print. This, in combination with all too common difficulties in dealing with many foreign publishers and the obvious competition from other overseas purchasers, results in only a tiny fraction of the copies produced ever entering the U.S. marketplace.

Similar problems likewise effect the availability of smaller publications on turtles appearing in the notes, transactions and proceedings produced by museums both here in the U.S. and overseas. Factor in the very real tendency of herpetologists in general, and of turtle people in particular to retain rather than recycle relevant references as needed and it becomes clearer as to why many turtle publications are so difficult find. In fact, in the case of some rarer chelonian titles, one basically has to wait until some colleague dies (obviously not high on anybody's list of things to wish for) and their library dissolved before a single copy is again available for purchase.

Obviously, basic economic principals related to the "law of supply and demand" will largely determine just how much one has to pay in order to obtain the references needed. Generally speaking older titles, subjected as they are to the loss and destruction naturally associated with the processes of aging, will be proportional more expensive than more recently released publications. This is particularly true of important early references such as Hay's Fossil Turtles of North America (1908), Garman's The Galapagos Tortoises (1917), Günther's The Gigantic Land Tortoises (Living and Extinct) in the Collection of the British Museum (1877), as well as numerous other older titles on chelonians, which routinely sell for several hundred dollars per copy or more. Really rare titles, original editions of Anatome Testudinis Europaeae by Bojanus (1819-1821) or Thomas Bell's A Monograph of the Testudinata (1832-1842) for example, can be substantially more expensive indeed, with copies (if available at all) commanding prices exceeding those of many brand new automobiles.

A number of more recently out-of-print but nevertheless still highly sought after turtle publications, while proportionally less expensive than those mentioned above, may likewise easily cost two to three times more now than they did when originally released. Volumes like Cann's Tortoises of Australia (1978), Frieberg's Turtles of South America (1981), Pritchard's The Alligator Snapping Turtle (1989), and even the 1971 Dover Publications reprint of Babcock's classic review of New England's turtles certainly all must be included in this category. Virtually any out-of-print title on turtles, however, will only increase in value as time passes.

Everything considered, this all means that it is far better to add wanted items to one's collection sooner rather than later. Based on the author's experiences as both chelonian library builder and as a natural history book dealer, doing so requires some degree of patience, a little luck, and a fair amount of work. At the same time, experience has also taught me that the rewards associated with thumbing through the pages of some long coveted volume, or with finally adding that last essential reference needed to complete the perfect turtle library, makes all the effort worthwhile. Until next time, "Nuff Said" .

Editors' Note: Starting in the next issue, John Levell will be doing a regular column on book reviews.

Turtles for Sale

Allen Salzberg

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The following is a list of freshwater and semi-aquatic turtle retail prices that I found on the web on December 9, 2000. It is, of course, not a complete list of what is currently available on the web or at other retailers and conventions in the United States. The Turtle & Tortoise Newsletter is printing this information to supply more details on the pet trade, one of the many factors effecting turtle conservation.

This list is organized by alphabetical order using the scientific name supplied by the retailer. Though some dealers post on their website photos of the animal, I can't guarantee that every name describing the turtle or tortoise is accurate. There is also no guarantee that the description of the individual turtle as captive bred, breeders, already eating is also accurate. Price is per turtle unless noted.

Freshwater and Semi-Aquatic Turtles (Retail)

Apalone ferox, (Florida softshell) juvenile $10.00
Apalone spinifera spinifera (eastern spiny softshell) $9.00
Apalone spinifera guadalupensis (Guadalupe spiny softshell) $15.00
Chelodina parkeri (Parker's snakeneck) adults $749.88
Chelydra serpentina (common snapper) yearlings $12.00
Chrysemys picta bellii (western painted turtle) and *C. picta dorsalis* (southern painted turtle) $20.00
Chrysemys picta picta (hatchlings) $13.00
Clemmys guttata (spotted turtles), adults.....$250.00; females.....$300.00
Clemmys insculpta (N. American wood turtles), adult.....$250.00; babies, born last year $125.00
Clemmys muhlenbergii (bog turtle) captive bred in 1999 ..... $995.00
Cuora amboinensis (Malayan box) $20.00
Cuora galbinifrons (flower-backed box) $70.00
Deirochelys reticularia chrysea (Florida chicken) $25.00
Elseya novaeguineae (New Guinea sideneck) juvenile $65.00
Emydura albertisii (red-bellied sideneck) wild caught $95.00
Emys orbicularis (European pond) wild caught adult. Nice color $125.00
Graptemys kohnii (Mississippi map) juvenile ..... $ 10.00
Graptemys pseudogeographica (false map turtle) juvenile $12.00
Heosemys grandis (giant Asian wood turtle) $55.00
Heosemys spinosa (spiny turtle) $85.00
Kinosternon bauri (striped mud) $5.00
Kinosternon flavescens (yellow mud) juvenile and adults $10.00
Kinosternon subrubrum steindachneri (Florida mud) $20.00
Kinosternon scorpioides (scorpion mud) 4" - 6" $25.00
K. scorpioides cruentatum (red-cheeked mud) adult $30.00
Macroclemys temminckii (alligator snapper) captive bred.....$25.00; Buy 10, price for each one $20.00
Macroclemys temminckii (Alligator Snappers - 3"-4") $50.00
Malaclemys sp. (diamondback terrapin) ..... Inquire for Price
Ocadia sinensis (golden thread turtle) captive bred in 1995 ..... $55.00
Phrynops gibbus (Gibba sideneck turtle) adult $55.00
Platysternon megacephalum (bigheaded turtle $75.00
Pseudemys floridana, (Florida cooter) juvenile -5" $8.00
Pseudemys nelsoni, (Florida red-bellied turtles) juvenile $10.00
Pseudemys floridana peninsularis (peninsula cooters) hatchlings $9.00
Pyxidea mouhotii (keeled box turtle) $40.00
Rhinoclemmys pulcherrima incisa (Central American wood turtles) $40.00
R. pulcherrima (Central American wood turtle) $45.00
R. pulcherrima manni (ornate wood turtle), captive bred in the year 2000 ..... $55.00
Staurotypus salvinii (giant musk turtle) ..... $ 175 and up
Sternotherus carinatus (razorbacked musk) adults..... $15.00; hatchlings $20.00
Sternotherus odoratus (common musk) $5.00
Trachemys scripta elegans (red-eared sliders) - 4-5" $10.95
T. s. elegans (red-eared sliders) albino.....Inquire for price; *T. s. elegans* pastel .....Price depends on color
T. s. scripta (yellow bellied slider) juvenile $8.00
Trionyx cartilagineus (Southeast Asian softshell) wild caught, 5' $65.00

By advertising what turtles a dealer is breeding, a customer can reserve the turtle with a down payment. These are some of the turtles listed: *Graptemys barbouri*, *Graptemys gibbons*, *Graptemys nigrinoda delticola, Rhinoclemmys areolata, Geochelone carbonaria* island form, and *Geochelone pardalis* high white form.

UPDATES AND LETTERS

Beyond Powdermill: New Grist for the Mill

Nancy N. FitzSimmons
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E-mail:fitzsimm@aerg.canberra.edu.au

The first issue of this Newsletter featured two articles (Rhodin, 2000; Lovich et al., 2000) concerning the Powdermill IV International Conference held in August 1999. As stated on the website <http://www.werc.usgs.gov/powdermill/index.html#links> of the USGS Western Ecological Research Center, Powdermill is "the ultimate freshwater turtle conference" and that "over 60 of the finest freshwater turtle researchers on the planet were invited to participate in this important forum". For those who were not invited, questions arise: what is the purpose and function of the Powdermill Conferences and are these aims best served by the present format? This commentary is an outsider's view, meant to be constructive, and written with all due respect for the Powdermill participants.

Rhodin (2000) mentions the gradual evolution of the Powdermill Conferences from a small seminar-type gathering of freshwater turtle ecologists in 1980, to a somewhat broader collection of turtle specialists including some students, always by invitation only. At the fourth Conference "a recurrent theme" was the perceived need for more synergy between various turtle researchers and organizations and the need for partnering and working together through links with other organizations and individuals to help overcome the threats, both biological and organizational, faced by turtles all over the world" (Rhodin 2000). The accompanying press release (see Lovich et al., 2000) emphasized that a "turtle survival crisis" was uppermost on the minds of the participants.

Given these concerns, I submit that having a prestigious international conference (Lovich et al., 2000) by invitation only is not the most productive approach towards addressing the needs stated above. In terms of its international profile, only two participants listed addresses as outside of North America and no one from SE Asia was listed as attending. Despite the recognition that the conservation plight of freshwater turtles in SE Asia is particularly dire. It appears the time is right for some punctuated evolution in Powdermill, to create a 'powderkeg' of explosive interest, a radiation of diversity and an increased professional effectiveness. The Powdermill forum for exchange of ideas can evolve into something more inclusive and thus ultimately more effective in advancing the understanding and conservation of turtles.

Certainly the Powdermill Conferences have served a vital function in exchanging ideas, building networks, and giving an identity to freshwater turtle biologists. Nevertheless, the continuation of an invitation-only event encourages an elitism we can no longer afford given that the situation for freshwater turtles requires urgent attention and cooperation. We need the broadest sharing of interests in addressing all aspects of turtle biology and conservation for this group of species that faces the greatest survival threat of any vertebrate taxon (Behler, 2000).

How to change? We can encourage the Powdermill participants to demonstrate their leadership and foresight by reinventing Powdermill V, as planned for 2002 in Brazil, as an annual or biennial symposia (with published abstracts) open to all who wish to participate. Establish the Powdermill group as the agents of change and the creators of an important, and no doubt, long-lasting run of symposia. It would be an excellent start, showing a real commitment for international exchange and cooperation.

Several conferences have demonstrated the growing interest in international conferences on non-marine turtles. As examples, take the 1993 International Conference on Conservation, Restoration, and Management of Tortoises and Turtles in New York, the 1995 International Congress of Chelonian Conservation in Gonfaron, France, the 1998 International Conference on Turtles and Tortoises in California, and the 2001 International Congress on the genus *Testudo* in Hyeres, France. What is now needed is an internationally recognized group to take the lead in coordinating these various efforts to bring together turtle researchers and organizations throughout the world in the form of an annual or biennial symposium.

It appears the time is right for change. Are we in the midst of a turtle survival crisis? Would the advancement of turtle biology and conservation benefit from a regular series of international symposia that are open to all? There is no question that there is a need for new interdisciplinary perspectives. Would our shared aims and concerns for turtles be better served by a more representative exchange of intellect and enthusiasm? Will Powdermill take the lead on this and truly provide "the ultimate freshwater turtle conference" from an international perspective?

Literature Cited

Behler, J. 2000. Letter from the IUCN Tortoise and Freshwater Turtle Specialist Group. TTN 1:4-5.

Lovich, J.E., Mittermeier, R.A., Pritchard, P.C.H., Rhodin A.G.J., and Gibbons, J.W. 2000. Powdermill Conference: Trouble for the world's turtles. TTN 1:16-17.

Rhodin, A.G.J. 2000. Powdermill IV: International Freshwater Turtle Conference. TTN 1:15.

Revised CITES Export Quotas for Chelonians 2000

CITES Secretariat Notification to the Parties No. 2000/053, 31 Aug. 2000

The following are the 2000 export quotas for turtles listed on appendix II and III of CITES. They are arranged first by country of export and then by Appendix listing.

Arranged by exporting country

Benin		
Geochelone sulcata (II)	30	ranched
Kinixys belliana (II)	2500	ranched
Kinixys homeana (II)	2000	ranched
Trionyx triunguis (III)	65	ranched
Pelusios niger (III)	375	ranched
Pelomedusa subrufa (III)	750	ranched
Ghana		
Geochelone sulcata (II)	750	ranched
Kinixys belliana (II)	140	live animals
Kinixys erosa (II)	120	live animals
Kinixys homeana (II)	340	live animals
Guyana		
Geochelone carbonaria (II)	704	live animals
Geochelone denticulata (II)	704	live animals
Podocnemis erythrocephala (II)	50	live animals
Podocnemis unifilis (II)	0	live animals
Indonesia		
Callagur borneoensis (II)	180	live animals
Cuora amboinensis (II)	6,000	live animals
Indotestudo forstenii (II)	450	live animals
Manouria emys (II)	450	live animals
Kazakhstan		
Testudo horsfieldii (II)	39,000	live animals
Madagascar		
Pyxis arachnoides (II)	1,000	live animals (1)
Pyxis planicauda (II)	800	live animals (1)
Erymnochelys madagascariensis (II)	25	live animals
Malaysia		
Indotestudo elongata (II)	500	live animals
Manouria emys (II)	200	live animals
Mozambique		
Kinixys belliana (II)	7,000	live wild-taken
Kinixys belliana (II)	3,000	ranched
Malacochersus tornieri (II)	0	to be determined
Trionyx triunguis (III)	200	live animals
Pelomedusa subrufa (III)	10,000	live animals
Pelusios castaneus (III)	7,000	live animals *
Pelusios gabonensis (III)	10,000	live animals **
Seychelles		
Geochelone gigantea (II)	50	live juveniles
Geochelone gigantea (II)	30	live adults
Suriname		
Geochelone carbonaria (II)	630	live animals
Geochelone denticulata (II)	692	live animals
Podocnemis unifilis (II)	630	live animals
Togo		
Kinixys belliana (II)	700	live wild-taken
Kinixys belliana (II)	3,000	ranched
Kinixys erosa (II)	1,500	ranched
Kinixys homeana (II)	500	live wild-taken
Kinixys homeana (II)	2,500	ranched
Geochelone sulcata (II)	??	ranched (2)
Pelomedusa subrufa (III)	500	live wild-taken
Pelomedusa subrufa (III)	2,500	ranched
Pelusios niger (III)	500	live wild-taken
Pelusios niger (III)	2,500	ranched
Tanzania		
Geochelone gigantea (II)	100	F1 specimens
Geochelone pardalis (II)	1,892	only F1 w/ CL 8 cm or less
Kinixys belliana (II)	450	F1 specimens
Malacochersus tornieri (II)	719	only F1 w/ CL 8 cm or less
Uzbekistan		
Testudo horsfieldii (II)	35,000	live animals

Arranged by Appendix Listing

Appendix II species		
Geochelone carbonaria		
Guyana	704	live animals
Suriname	630	live animals
Geochelone denticulata		
Guyana	704	live animals
Suriname	692	live animals
Geochelone gigantea		
Seychelles	50	live juveniles
Seychelles	30	live adults
Tanzania	100	F1 specimens
Geochelone pardalis		
Tanzania	1,892	only F1 w/ CL 8 cm or less
Geochelone sulcata		
Benin	30	ranched
Ghana	750	ranched
Togo	??	ranched specimens (2)
Indotestudo elongata		
Malaysia	500	live animals
Indotestudo forstenii		
Indonesia	450	live animals
Kinixys belliana		
Benin	2,500	ranched
Ghana	140	live animals
Mozambique	7,000	live wild-taken
Mozambique	3,000	ranched
Togo	700	live wild-taken
Togo	3,000	ranched
Tanzania	450	F1 specimens

Kinixys erosa		
Ghana	120	live animals
Togo	1,500	ranched
Kinixys homeana		
Benin	2000	ranched
Ghana	340	live animals
Togo	500	live wild-taken
Togo	2,500	ranched
Malacochersus tornieri		
Mozambique	0	to be determined
Tanzania	719	only F1 w/ CL of 8 cm or less
Manouria emys		
Indonesia	450	live animals
Malaysia	200	live animals
Pyxis arachnoides		
Madagascar	1,000	live animals (1)
Pyxis planicauda		
Madagascar	800	live animals (1)
Testudo horsfieldii		
Kazakhstan	39,000	live animals
Uzbekistan	35,000	live animals
Callagur borneoensis		
Indonesia	180	live animals
Cuora amboinensis		
Indonesia	6,000	live animals
Podocnemis erythrocephala		
Guyana	50	live animals
Podocnemis unifilis		
Guyana	0	live animals
Suriname	630	live animals
Erymnochelys madagascariensis		
Madagascar	25	live animals
Appendix III species:		
Trionyx triunguis		
Benin	65	ranched
Mozambique	200	live animals
Pelomedusa subrufa		
Benin	750	ranched
Mozambique	10,000	live animals
Togo	500	live wild-taken
Togo	2,500	ranched
Pelusios castaneus		
Mozambique	7,000	live animals *
Pelusios gabonensis		
Mozambique	10,000	live animals **
Pelusios niger		
Benin	375	ranched
Togo	500	live wild-taken
Togo	2,500	ranched

* Presumably refers to *Pelusios castanoides*.
** Listed that *Pelusios subniger* is a synonym ?!

1 – Increased from quota of 25 in CITES Notification 2000/035, 15 June 2000.

2 – Togo listed a quota of 500 ranched specimens in CITES Notification 2000/035, 15 June 2000.

NB: several CITES parties do not set annual quotas but permit exports based on non-detriment findings which may be made on a case by-case basis. Thus, the absence of an export quota does not mean that a country can not or will not export a species.

THESES, DISSERTATIONS, ABSTRACT TITLES AND UNUSUAL REFERENCES

Siart, Leeanne. 1999. An investigation of wood turtle (*Clemmys insculpta*) nest success in Southwestern Massachusetts. MS Thesis, Antioch University-New England, Keene, NH. 75. pp. Major advisor: Dr. Rick Van de Poll

The following papers, presented at the Mid-Atlantic Turtle Conference in October, 1999, were omitted from the list of presentations in the second issue of TTN. The Proceedings from that conference should be available soon. For information contact Chris Swarth at Jugbay@clark.net.

Nest Predation and Ecology of Diamondback Terrapins, (*Malaclemys terrapin*) at Gateway National Recreation Area. Jeremy Feinberg.

Accuracy in Finding Turtles and Other Herps: What Biological Difference Does Accuracy Make? Eugene R. Meyer.

Natural History and Breeding Biology of Red-bellied Turtles (*Pseudemys rubriventris*) on the Tidal Pautuxent River, Maryland. Christopher W. Swarth.

Habitat use and Movement Patterns of Eastern Box turtles (*Terrapene carolina*) at the Jug Bay Wetlands Sanctuary, Maryland. Michael Marchand, Mike Quinlan and Christopher W. Swarth.

Habitat Use, Home Range and Movement of Eastern Box Turtles in Northern Delaware. Holly Niederriter.

ORGANIZATIONS

Organizational Profile – Tortoise Trust USA

Darrell Senneke
Director – Tortoise Trust USA, 4N710 Sawmill Trail, Saint Charles, Illinois 60174
E-mail: rednine@earthlink.net

The Tortoise Trust USA was founded in 1998 as a spin off from Tortoise Trust International headquartered in the U.K. The reasons for this were to better serve the rapidly expanding North American membership base and to better focus on issues of regional interest. The relationship between the two organizations is an interesting one. While independent, they still share a web site, a newsletter and a close working relationship. The Tortoise Trust USA is a 501c3 non-profit organization. The Board of Trustees is composed of people with expertise from the husbandry, research, veterinary and legal arenas. As an indication of our intention to be global in scope while also being directly involved and responsive to regional issues the 13 Trustees hail from nine states and three countries.

We are actively pursuing partnerships with herpetological societies and turtle clubs across the United States, offering our expertise and support in the ongoing effort to protect and succor chelonians in both in-situ and ex-situ efforts in North America and elsewhere. We will continue to forge alliances in the area of turtle and tortoise rehabilitation; actively seeking qualified groups and individuals in the interest of joint effort. TTUSA is working with these people as a networking facilitator, knowledge resource and, in some circumstances, sponsor.

In the area of education we offer our experience and materials to further the care of chelonians in captivity and the preservation of wild populations. A small part of this is by participation at educational poster shows as well as the distribution of free care sheets at major reptile shows across the United States. Often at these shows we share tables with other organizations to promote our shared areas of interest. The shared web site has a large volume of care sheets and articles free for viewing or download by anyone regardless of membership status.

We see a bright future of cooperation ahead and wish to encourage contacts from all interested parties. A basic membership in the Tortoise Trust USA is 20$/year. Members receive the international quarterly newsletter as well as the TTUSA insert of approximately the same size. In addition to this we offer our members husbandry information, the opportunity to participate in field trips, seminars and workshops. Those wishing memberships may join on-line at http://www.tortoisetrust.org via credit card or by use of a printable form.

ANNOUNCEMENTS AND CONFERENCES

Desert Tortoise Council's 26th Annual Symposium to be held on March 16-19, 2001 at the InnSuites Hotel and Resort in Tucson, Arizona. This annual symposium brings together scientists, managers, and concerned people to share the latest information available on the desert tortoise and its management. Paper and poster sessions include Reproduction and Physiology, International Issues, Foraging and Nutrition, Techniques for Sampling Desert Tortoise Populations, and Health and Diseases of Tortoises. For registration information visit the Desert Tortoise Council web site at www.deserttortoise.org/.

Society for the Study of Amphibians & Reptiles and the Herpetologists' League 2001 Annual Joint Meeting will be held on 27-31 July 2001 at Indiana University Purdue University in Indianapolis. The meeting site is at the University Place Conference Center and Hotel, 850 West Michigan St., Indianapolis, Indiana 46202-5198. Reservations can be made on line or by calling 1-800-627-2700 OR 317-269-9000.

The keynote address will be given by George B. Rabb and there will be a 1-day symposium on Herpetological Research in Zoos: The Academic Connection, organized by John D. Groves and Hugh R. Quinn. This Symposium is Dedicated to the Memory of Sherman A. Minton, M.D.

Registration costs (before/after 30 May 2001) are the following: Regular member $240/295 US (per person), Graduate student $175/200, Accompanying person $120/145 (non-participating in the scientific program).

For further information about the meeting, please visit www.ukans.edu/~ssar/ind.html or contact Henry R. Mushinsky, Dept. of Biology, Univ. of South Florida, Tampa, Florida 33620 at MUSHINSK@CHUMA1.CAS.USF.EDU or call him at 813-974-5218.

Call for Papers for the Association of Reptilian and Amphibian Veterinarians (ARAV) 8th Annual Conference, to be held in conjunction with the American Association of Zoo Veterinarians, on September 19-23, 2001 in Orlando, Florida. Titles due by February 1, 2001 and completed papers due by April 1, 2001.

Herpetologists, veterinarians, herpetoculturists, veterinary technicians, and students are encouraged to attend. Scientific papers are being solicited for presentation and

printed proceedings. Papers addressing medically important aspects of herpetological physiology, anatomy, ecology, and husbandry are of particular interest; as well as papers addressing herpetopathology, surgery, anesthesia, parasitology, pharmacology, clinical techniques, and illustrative clinical case reports. Complete, concise papers are preferred to abstracts.

For more information, authors should contact Program Chair, Charles J. Innis, VMD, VCA Westboro Animal Hospital, 155 Turnpike Rd., Westboro, MA 01581; Phone 508-366-1444; Fax 508-634-6997; E-mail: clemmys@aol.com

First Announcement and Call for Abstracts for the Big European Turtle and Tortoise Symposium to be held in Vienna on Jan. 17-20, 2002. Each day will focus on captive and conservation breeding of a different regions' turtles and tortoises (Africa/Madagascar, the Americas, Europe and the Mediterranean, and Asia/Australia). On Sunday afternoon there will be space for general papers focusing on conservation projects, common projects of the participating turtle clubs, etc. The conference will be in English and German with simultaneous translations. Costs are not currently finalized.

A detailed proceedings will be published to summarize the results of the symposium. Speakers must submit a short abstract of their lecture to the editors of EMYS no later than June 30th, 2001. Only then a lecture can be accepted and published in the final program.

If you are interested in giving a lecture, please do not hesitate and send a letter, fax or email to: Dr. Harald Artner, Maria Ponsee 32, A-3454 Sitzenberg-Reidling; Fax: +43-2276-6140; Email: 113142.3232@compuserve.com

Brett Stearns Award for Chelonian Research at the California Academy of Sciences (CAS). The Dept. of Herpetology is pleased to provide limited financial aid-mostly to cover round-trip transportation and limited per diem expenses-to researchers who wish to visit our collections to support their work in chelonian biology. Preference will be given to graduate students. The CAS chelonian holdings are included in the herpetology database: http://research.calacademy.org/herpetology/catalog/.

Proposals are due 15 March 2001; notification will be made by 1 May 2001. Awardees are expected to complete their Academy visit by 1 May 2002. Proposals should include a short, one page description of the research project and a budget. In the case of graduate students, a letter of support from the student's faculty advisor is required. Please call (415) 750-7039 for further information.

Proposals should be sent to: Herpetology Research Grants, Dept. of Herpetology, California Acad. of Sciences, Golden Gate Park, San Francisco, CA 94118-4599, USA.

Information about the ETI "Turtles of the World" CD-ROM and some general turtle information (handy for people unacquainted with turtles) are available at http://www.eti.uva.nl/Turtles/Turtles.html

The **2nd International Symposium on *Emys orbicularis*** took place in Le Blanc, France on June 25-27 1999. Proceedings are now available by ordering from the SOPTOM website, www.tortues.com. Individual copies are $20, postpaid. An international bank draft is the preferred method of payment.

This 143 pp. soft-bound document contains 28 papers on the ecology, conservation, reproduction, reintroduction, and taxonomy of the European pond turtle. Exactly 2/3 of the papers are in English, the remainder in French. The opening and closing remarks are provided in both languages.

Asian turtle you can't identify - please send a picture to Darrell Senneke at rednine@earthlink.net. He is the moderator of the Asian Turtle Crisis discussion group which has a bulletin board where they post pictures of turtles for other members to ID.

The children's book TURTLES by Anita Baskin-Salzberg & Allen Salzberg is now available in paperback for $7.00 plus $1.50 postage per book. Send a check made out to Allen Salzberg and mail it to Allen Salzberg, 67-87 Booth St. #5B/Forest Hills, NY 11375. ALL PROFITS GO TO KEEP HERPDIGEST ALIVE. If you have any questions E-mail asalzberg@nyc.rr.com.

Herpdigest and the New York Turtle & Tortoise Society Jointly Sponsor the 2001 Poster Contest Highlighting Conservation of the World's Turtles. Of the world's over 270 turtle species, almost 150 are either threatened or endangered. According to Lorri Cramer, the contest's creator and organizer, "The poster should focus on one particular species and why it is threatened. Some examples might include, but are not limited to excessive hunting for food and pets, pollution, road kills, loss of habitat and boat hits."

Posters should be submitted on a heavy weight poster board and can measure either 12" x 18" or 18" x 24" in size. Entries will be grouped according to age & grade level. Mediums suggested are paint, magic marker, inks or collage. Name, address, phone number, age, grade and name of school should be clearly printed on the back of the poster.

All entries will be judged by a panel of conservationists, artists and teachers on the following criteria: content, originality and artistic merit. Prizes will include official Turtle Society t-shirts, books, and a one-year membership to the New York Turtle & Tortoise Society. Winning posters will be exhibited at the 27th Annual Turtle & Tortoise Show in New York City during June 2001.

All entries must be post-marked by May 15, 2001. Mail entries to Poster Contest, New York Turtle & Tortoise Society, c/o Lorri Cramer, 750 Columbus Ave., Suite 4W, N.Y., N.Y. 10025.

If you have any questions on subject matter and rules, please contact Ms. Cramer at lcramer@nytts.org. Please no phone calls. All posters will become the property of The New York Turtle & Tortoise Society.

REQUESTS FOR INFORMATION

Information sought on marking and tagging techniques for terrapins and other small aquatic species. Also who is using visible tags and what do you prefer? The Maryland program is in the second year of a terrapin hibernaculum study and we have three other terrapin population studies underway. We use a three phase marking system: an approved non-vascular notching system, magnetic tags from Northwest Marine Technologies of Shaw Island, Washington, and visible tagging. Our previous visible tagging system is proving to be less than successful with a majority of the recaptures coming back without their pink Floy tags. We have opted for a sea turtle type tag (the smallest monel) attached to the rear marginal scute through a 3/32" engraving bit hole on the non-vascular edge. Blood letting is forbidden in our study. If the procedure draws blood or if the shell material begins to look pinkish we stop. The visible tag is essential as we receive valuable data from the public, particularly commercial watermen and waterfront dwellers. The magnetic tags, which are placed in an undisclosed spot, will prove useful in enforcement cases, i.e. if we discover Chesapeake terrapins in out-of-state food markets, over or undersized terrapins, or terrapins out of season. Notching is good for individual identification. Also, Northwest Marine Technologies, Inc. has donated additional equipment and materials to our program which will allow us to test a subcutaneous fluorescent tagging system. Any thoughts on this technique would be appreciated. Marguerite Whilden, Fisheries Service. mwhilden@dnr.state.md.us

Information needed on *Clemmys marmorata*. As this information is scarce and mostly in gray lit, I would appreciate any help in finding information or papers related to this subject. If you can help please do so by sending the info to jonstonge@purpleturtle.com or snail mail to Jon St. Onge, 202 Cooper Rd., Santa Barbara, CA 93109, USA

Request for information on indoor turtle and tortoise enclosures for possible publication. My book "Housing Your Turtles and Tortoises Outdoors" (illustrated guide to outside enclosures from Alaska to Florida, 122 pages, 17 in full color, many black and white illustrations, ISBN 1-888089-49-0 $39.00) is now available through Green Nature Books at http://www.greennaturebooks.com. I want to thank everyone who contributed information, though not every contributor's data could be included.

I am now working on a book on indoor enclosures for turtles and tortoises. If you would like to contribute information, your help would be greatly appreciated. I need data and photos of the finished pens, any pictures of its construction (if available), a description of the design, dimensions, types of turtles/tortoises housed, and any other relevant information. Please indicate where you live, if the animals are housed outside seasonally, and any notes on how you acclimate your animals when changing locations from inside to outside. I would also need permission to use your information. Though, I can not offer financial compensation, you will be credited for your contributions. I am hoping that this project will result in a publication that will be valuable to others keeping chelonians outdoors.

Please do not submit information on outdoor enclosures. However, if you keep your specimens in greenhouses, or inside "sheds," for all or part of a year, these setups may be used in a separate chapter (section) of the book. Due to space limitations, I cannot promise every picture or contribution will be used in its entirety (or even be appropriate to include at all), but I want to make this project as comprehensive as possible. I also reserve the right to edit material to best fit the text.

If interested, please contact me, Wayne Labenda, at E-mail: labendwa@crusoe.net . Thanks again for your help!

WE WOULD LIKE TO THANK THE FOLLOWING INDIVIDUALS AND ORGANIZATIONS FOR FINANCIALLY SUPPORTING THE TURTLE AND TORTOISE NEWSLETTER

Douglass M. Allen, Linda G. Baldauski, Marvin H. Bennett, Jr., Scott Bollinger, Jürgen Gad, Guido Gerosa, René E. Honegger, Island Foundation, Stephen R. Johnson, Gretchen E. Kaufman, Jennifer Kureen, Jeffrey W. Lang, Louis J. Laux, Thomas R. Leach, Leslie M. Levine, Monitor International, Steven Myers, Glynnis L. Nakai, Steven G. Platt, Alan M. Richmond, Donald N. Riemer, Michael Rudolphi, Tonia S. Schwartz, C. Robert Shoop, Michael A. Smith, John K. Tucker, Turtle and Tortoise Society of Charleston, Jon M. Vanderhorst, and Colleen M. Young

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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