

TSA

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Preserving Options for the
Recovery of Wild Populations

AUGUST 2003

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TURTLE SURVIVAL ALLIANCE

An IUCN Partnership Network for Sustainable Captive Management of Freshwater Turtles and Tortoises



First captive breeding of the Sulawesi forest turtle, *Leucocephalon yuwonoi*, by Dr Charlie Innis. See story inside.

The mission of TSA is to develop and maintain an inclusive, broad-based global network of collections of living tortoises and freshwater turtles with the primary goal of maintaining chelonian species over the long term to provide maximum future options for the recovery of wild populations.

**In memory of Dr. Barbara Bonner
1957-2003**

This issue is dedicated to Barb Bonner whose tireless commitment to turtle welfare was unmatched and whose dedication to turtle conservation unwavering. Her contributions to chelonian medicine were pioneering and the void she leaves in our ranks is vast.

The turtle world has lost one of its most ardent supporters and passionate advocates. She will be sorely missed.

Turtle Conservation Fund (TCF) Species Recovery Plans - Integrating Field and Captive Management Plans: The *Batagur* model



Conservation team member repairing protective cage for *Batagur* nest, Sre Ambel River, Cambodia



Educational programming for children living near a Cambodian *Batagur* site.

TCF Species Recovery Plans contain two integrated components. The Captive Management Plan is dedicated to maintaining assurance colonies, and is coordinated by the Turtle Survival Alliance (TSA). With the ultimate goal of reintroduction, it produces animals that the field component utilizes in investigating methods to re-establish natural populations. The Field Action Plan, in turn, defines the conservation research needs for the species in nature and focuses on range country capacity building as it pertains to field conservation efforts and formation of assurance colonies in range countries.

The Species Recovery Plan for the river terrapin, *Batagur baska*, illustrates how captive management plans and field action plans are integrated. Both components embrace zoos, private individuals, government organizations, non-government organizations (NGOs) and other entities worldwide that maintain *Batagur*. Future partners, to be added as the plan progresses, may include such facilities as existing Asian government hatcheries and head start facilities for *Batagur*.

The Captive Management Plan's purpose is to produce animals for reintroduction. However, releases may not be feasible at many sites for years to come until both the cause of decline has been rectified and successful release techniques are developed. As a result, assurance colonies must be sustained through time. For *Batagur*, the genetic goal of the captive population is to retain 90% of gene diversity over 100 years. To facilitate this, appropriate husbandry and veterinary care programs must be developed at

certain facilities. In Asia, where information that may be important to long term captive management may not have reached all facilities, courses in turtle husbandry and veterinary care will be taught in 2003 and 2004. The actual number of captive animals in Asia is not known, so a census with on-the-ground inspection of facilities is important. In addition, reproductive techniques need to be developed, especially in North American facilities where *Batagur* has only successfully reproduced at one institution. Similarly, research is needed in temperature dependent sex determination (TSD) for this species, yielding critical information for egg incubation protocols.

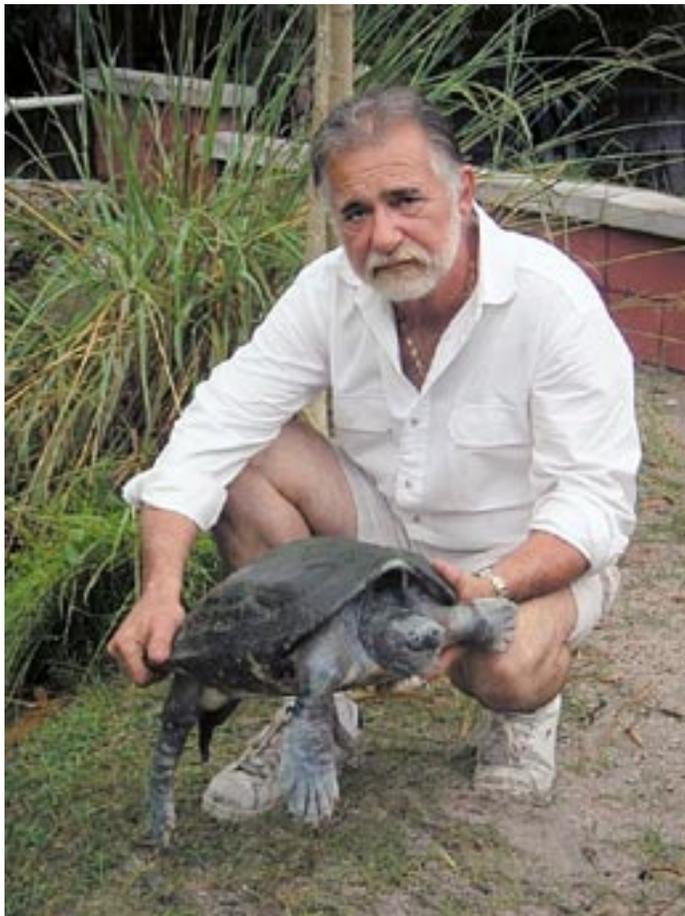
The Field Action Plan addresses key conservation issues resulting in the decline of *Batagur* in the wild. Primary threats include the removal of animals and eggs from the wild for human consumption, destruction of nesting beaches by sand mining, and the loss of mangrove forests that provide prime foraging habitat for this species. Dam construction is another major threat in that they alter downstream water levels, destroy nesting beaches, and block migration routes. Conservation initiatives for *Batagur* should address these issues and enforce existing protective measures for the species including; establishing reserves that contain contiguous foraging and nesting areas; conducting public education programming in and around such reserves and in non-protected areas where *Batagur* populations exist and re-establishing selected extirpated populations. Nesting beach restoration/protection should also be an integral, emphasized part of protected areas.



Additional aspects of the *Batagur* program illustrate the interdependence of the captive and field components of the Species Recovery Plan. For example, genetic research is needed to answer systematic questions: the northern populations (India and Bangladesh) may be highly distinct from the others, and the eastern and western Malay populations may be, to a lesser degree, differentiated. If it is determined that genetic differences exist among natural populations, it may be important to manage these populations separately in captivity. In addition, it has recently been noticed that one of the Malaysian hatcheries is producing a preponderance of female *Batagur*. Results of TDS research may show that hatcheries are producing a female biased population, and adjustments in incubation temperatures may have a profound impact on the field component's efforts in re-establishing natural populations.

Equally important and interdependent, the two components of a Species Recovery Plan are designed to bring together specialists from many disciplines and parts of the world to ensure the survival of these magnificent animals. It is only through the integrated actions of many individuals across a wide range of disciplines that the Species Recovery Plan for *Batagur*, or any species of turtle, can truly be effective.

For detailed information, please contact the *Batagur* Species Recovery Plan authors Hugh Quinn, Ph.D. (hrq@clevelandmetroparks.com) and John Behler (jbehler@wcs.org).



TSA partner Bill Ninesling with a male *Batagur* he received from the Bronx Zoo to pair with his female.

TURTLE CONSERVATION FUND
Species Recovery Plan
(Taxon Captive Management Plan and Field Action Plan)

Prepared by Hugh Quinn, Ph.D., Cleveland Metroparks Zoo, Cleveland, Ohio USA, and John Behler, Wildlife Conservation Society-Bronx Zoo, Bronx, New York, USA
16 December 2002

Species:
Batagur baska, River Terrapin.



Distribution: Eastern India and Bangladesh through Myanmar (Burma), Thailand, Cambodia, southern Vietnam and peninsular Malaysia to Sumatra, Indonesia.

Habitat: Total areas of meanders of large rivers, and during the nesting season (late December to early March), ranges far upstream in these rivers.

Veterinary Training Workshop in Thailand



In the summer of 2002, the TSA received a request from Jonathan Murray of the Dusit Zoo in Bangkok for medical assistance with a large number of Burmese star tortoises, *Geochelone platynota*, that had recently been confiscated. The 70+ tortoises had been distributed throughout the five zoos in the Thai zoo system and, due to high morbidity and mortality, required medical treatment. He also requested a workshop on reptile medicine for the zoo and wildlife staff and local university personnel. Recognizing the importance of this group of star tortoises and the potential for building capacity in Thailand that this training opportunity presented, the TSA sent Dr. Chris Tabaka to Thailand in August 2002. Chris is one of the founding members of the TSA and one of the group's strongest supporters.

In addition to performing evaluations on all the *platynota*, Chris conducted a series of lectures and hands-on workshops on chelonian medicine for curators, vets and university personnel, covering a wide range of topics. Chris found the students to be extremely talented and enthusiastically tackled this new aspect of medicine and preventative care.

The other focus of this trip involved a visit to the *Chitra chitra* (striped narrow-headed softshell turtle) breeding center. This facility was very progressively managed and impressive in the fact that just under 300 babies had hatched that year and were being successfully raised. This project is managed by the Thai Fisheries Department, a government-run program designed to bolster the numbers of this depleted species. In-range or near-range efforts such as the Thailand *Chitra* facility and the local zoos working with the Burmese star tortoises are a large part of the solution for preventing the extinction of a number of Southeast Asian species. Both of these species are ranked as Critical by the IUCN and in danger of extinction in nature. The Turtle Survival Alliance is uniquely positioned to be able to offer technical assistance and support for such efforts thus helping all of us achieve our common goal of chelonian species preservation.





Tewksbury Institute of Herpetology

As all Turtle Survival Alliance partners are aware, turtle and tortoise populations around the world are in crisis due to unsustainable collection for food markets and habitat loss. Without the establishment of *ex situ* captive colonies, and *in situ* conservation efforts, some of the world's chelonians may be extinct within a few years. Many of the critically endangered and threatened chelonians in captivity are held in private collections. Specifically, a number of major private collectors in the US and Europe have established significant groups of these species. As many of these species are decimated in the wild through years of unsustainable exploitation, the individuals surviving in private collections represent an invaluable and irreplaceable resource.

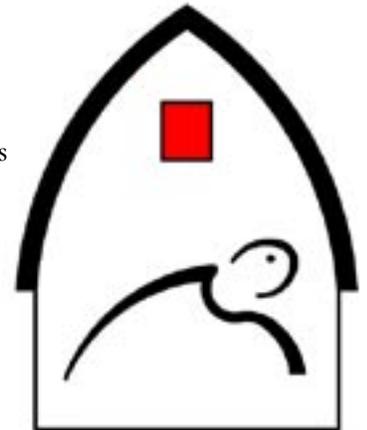
In August, 2002, the Tewksbury Institute of Herpetology (TIH) was organized to establish a large assurance colony complex of endangered turtles and tortoises as an international center for chelonian conservation, reproduction, research, education and public awareness. The TIH is located on a 50-acre conservation easement in the rolling farmland and horse country of Tewksbury, New Jersey. The site is approximately 15 minutes from Princeton University, 20 minutes from Rutgers University and 55 minutes from New York City. The property includes 20 acres of cleared meadow, 30 acres of forest, two streams, three artesian wells and a historic dairy barn complex.

The TIH, a non-profit corporation, is in partnership with many of the world's leading chelonian conservation organizations, including the IUCN's Turtle Survival Alliance, the Turtle Conservation Fund and the World Chelonian Trust. A major focus of TIH will be education projects involving Rutgers University, the local school systems and a sister school project with Chengdu,

China. The TIH staff, project directors and advisors represent the leading edge in chelonian nutrition, veterinary medicine, husbandry, reproductive physiology and captive breeding.

Eight major private collections, holding several thousand chelonians representing more than one-third of the world's species, are included in our collection management plan. The TIH is currently relocating over 1,000 turtles and tortoises from these collections and international confiscations to our facility that will include outdoor enclosures, a greenhouse complex and a veterinary/quarantine clinic. Through combining these private collections, the TIH now holds many of the largest groups of the world's most endangered species of turtles. These groups will be the focus of intensive research projects to ensure the species' continued survival. TIH presents a unique opportunity to educate New Jersey and the larger community about the world's vanishing biodiversity and the massive efforts and scientific advances needed to preserve it.

TIH's Executive Director Richard Ogust and his collection were recently featured in a front page story of the *Washington Post*, followed by coverage from *ABC* and *NBC National News*, *CNN*, the *BBC* and *Reuters International*. This type of media attention has been very positive in emphasizing the role that private collections play in the global turtle conservation picture.



The TIH Groundbreaking Crew gets ready to begin construction of the perimeter fence in June 2002.

TSA Supports Turtle Conservation Center at Cuc Phong



Paul Calle (WCS) and Henk Zwartepoorte (Rotterdam Zoo) instruct Cuc Phong staff on tubing an Elongated tortoise

In a unanimous vote, the TSA Steering Committee recently committed funds to support the Turtle Conservation and Ecology Program (TCEP) in Vietnam. TSA will fund TCEP's Coordinator for the next year. This position, held by a Vietnamese national, will coordinate ranger training, gather trade statistics and participate in TCEP's public awareness and education initiatives from the Hanoi office.

Established largely through the efforts of Doug Hendrie and his involvement with Cuc Phong National Park, TCEP has a five-pronged approach to conserving turtles. They aim to raise awareness and educate the public about the Asian turtle crisis, train local wildlife authorities, rescue and rehabilitate confiscated turtles, build the capacity, interest, and expertise of Vietnamese nationals in turtles and their conservation and conduct research on the ecology and trade of turtles in Vietnam

TCEP is most noted for the Turtle Conservation Center (TCC) developed at Cuc Phong National Park. The TCC is now managed by Cuc Phong National Park, with TCEP providing funding and technical assistance to integrate the Center with regional conservation needs. Although the TCC remains the most visible component of TCEP, the most valuable advances in turtle conservation have related to progress in the public awareness, education and training of wildlife protection authorities – activities for which the new Coordinator will be integral.

The importance of Vietnam, the TCEP and Cuc Phong to turtle conservation is reflected in their history of international support. The TSA joins a growing community of conservation organizations in supporting the efforts of TCEP and the TCC.

In the last two years, the Conservation Endowment Fund of the American Zoo and Aquarium Association has funded collaborative projects by TSA partners from the Tennessee Aquarium, the Wildlife Conservation Society and the Cleveland Zoo to support husbandry and veterinary training and

facility development at Cuc Phong. These efforts join with those of the Allwetter Muenster Zoo, the Auckland Zoo, Melbourne Zoo, Conservation International, WWF and others to conserve turtles at Cuc Phong and raise awareness throughout Vietnam.

Vietnam remains a hub of the Asian turtle crisis. The grass-roots nature of the TCEP projects and collaboration with government are one of the regions models for a sustainable range-state turtle conservation program. The actions encompass habitat protection, research and field surveys, capacity building as well as captive assurance colonies.

Despite the TCEP's progress, conservation needs remain great as pointed out by recent confiscations in Vietnam. A recent confiscation at Hanoi's International Airport resulted in the seizure of nearly 5 tons of wildlife labeled as soft-shell turtles, including 3.4 tons of pangolins, and an assortment of hard-shell turtles including *Heosemys grandis*, *Hieremys annandalii*, *Siebenrockiella crassicollis* and *Cuora amboinensis*. The animals were transferred to Soc Son Rescue Center outside Hanoi until a determination could be made on what to do with the confiscated animals. The TSA offered veterinary and husbandry support for the confiscated animals and was on standby to receive the *Hieremys* and *Heosemys*, most of them large adults. Despite clearing a number of official hurdles, in the end the CITES paperwork could not be obtained in time to rescue the turtles.

This case represents an emerging trend where Vietnamese companies are playing a part in trade, coming from Malaysia and Thailand and perhaps Indonesia. Although some of the wildlife may be consumed in Vietnam, the market remains focused on China. The TSA will continue to work with the TCEP and Vietnamese authorities to aid in the care and placement of future confiscations.

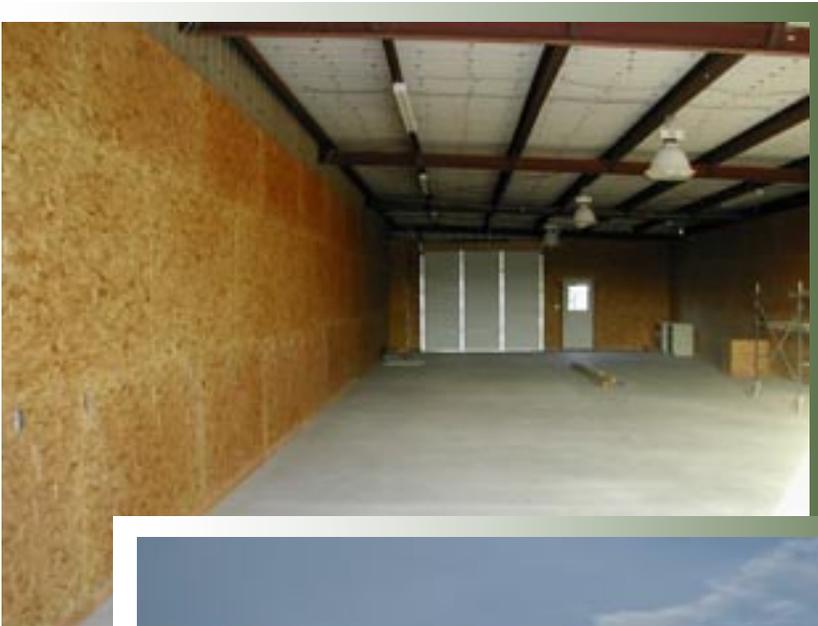


Group of confiscated Yellow-headed Temple turtles as the Soc Son animal rescue center



New Facility Dedicated to Softshell Turtle Conservation

In the beautiful Hill Country of central Texas plans are beginning to take shape for a new facility dedicated to Asian softshell turtles. One of the TSA founding partners just broke ground on a 3000 sq. ft. building that will contain five circular aquaculture ponds measuring 20 ft in diameter, each with a central island for nesting. Few facilities in the U.S. offer the space necessary to effectively house and reproduce giant softshells, and this could prove to be a model of its kind. Filtration and water flow will be set up to create a flowing stream effect, and each tank can be partitioned to separate aggressive animals. Five species are currently targeted for management including two narrow-headed softshells (*Chitra chitra* and *C. indica*) and three taxa of *Pelochelys* (*P. cantori*, *P. bibroni* and the recently described *P. signifera*). One of the primary goals of this facility is to provide an innovative and space-efficient method for managing large softshell turtles, a group that can be extremely challenging in captive situations. These techniques need to be developed soon, while stocks are still available, as softshells are one of the most highly sought and over-exploited groups of Asian turtles.



Detroit Zoo Announces Plans for Turtle Conservation Center

The Detroit Zoological Institute (DZI) is embarking upon a new and exciting venture, the construction of a dedicated chelonian conservation facility. Currently in the planning stages, this facility will concentrate on endangered and threatened turtles and tortoises from around the world. Building upon the success of the National Amphibian Conservation Center, which opened at the DZI in 2000, the new chelonian building will be the third dedicated herp facility located at the zoo. A final budget and opening date has yet to be determined, but it is expected to open sometime in 2005/2006.

Zoos Find Creative Solutions for Supporting TSA

Hard economic times have resulted in some major belt-tightening by most zoos. Despite these conditions, two zoos have stepped up and found creative ways to channel much-needed financial support to the TSA. The highly successful breeding program for *Chelodina reinmanni* at the Denver Zoo produced so many surplus offspring that the breeding had to be suspended until they could be placed. Due to increased interest in this taxa (which is no longer available through importations), Denver reactivated the program and now captive hatched *reinmanni* are available for a \$100 donation to the TSA. The Columbus Zoo acquired a group of 20 captive hatched *Chitra chitra* from Malaysia in 2002. These species are the founding nucleus for a breeding program for this critically endangered softshell. Specimens are now being offered to other facilities and all proceeds will be donated to the TSA.

Successful captive reproduction is the goal of every TSA partner. Fortunately, while much of the news on the turtle front is discouraging, many TSA partners have experienced phenomenal breeding success. In the next few pages, we highlight a few of the myriad species that have been bred in captivity by TSA partners in the last year.



First captive breeding of the Sulawesi forest turtle

On July 25, TSA Partner Dr. Charlie Innis discovered this hatchling *L. yuwonoi* in with its mother, having hatched in the enclosure from an undetected egg. The egg was deposited in a nest under a rock and apparently incubated on dry sphagnum peat moss and hatched at ambient temperature (75-82°F). The mother was imported in 1998, has laid eggs previously, and there are two possible sires. The baby weighed 33 grams upon discovery with a straight line carapace length of 50 mm. This hatchling is believed to represent the first worldwide captive breeding for this critically endangered turtle.



Flapshell turtle hatches at Baltimore Zoo

The Baltimore Zoo announces the hatching of a flapshell turtle, *Lissemys p. andersoni*, in what is believed to be a first breeding in captivity, at least in the U.S. Two hatchlings emerged on 28 June and 7 July 2003 from a clutch of eggs laid 8 December 2002. Another clutch of five was subsequently deposited on 1 June. The breeding group consists of 3.3 adults but all egg production has been from one female.



Chelodina reinmanni

Hatchlings are slow growing, hesitant feeders. It can often take these slow strikers three attempts to catch a meal and are probably nocturnal, bottom feeders, feeding on crustaceans, mollusks and insects. The two *Chelodina* on this page were hatched at Chapman University, photos courtesy of Dr. Fred Caporaso.

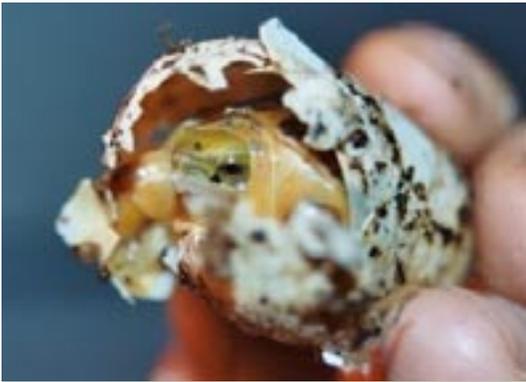
Chelodina mccordi

One week old Roti Island snake-necked turtle hatchling (27 mm carapace length). Egg incubated at 82 °F and hatched 11/27/02.



Malacochersus tornieri

Pancake tortoise hatchlings are as communal as the adults and are excellent climbers. After 1-2 weeks hiding in the substrate without eating, neonates will emerge to feed and eventually start seeking shelter under the low stone shelves. Courtesy of Paula Morris.



Cuora mccordi

Extinct in the wild? Fortunately, *mccordi* is very hardy and a prolific breeder. Incubated at 84°F, the eggs hatch in 75 days and large fully mature females can quadruple clutch.



Pyxis arachnoides brygooi

Despite large numbers being exported to the trade markets, successful captive reproduction of spider tortoises is still uncommon.



Cuora aurocapitata

Female *aurocapitata* dig nests 1.5 times longer than their carapace length. A large adult female is typically only 6" long, yet their nests can be a pit as wide as 12" and as deep as 9".



Forsten's tortoise and Flat-tailed tortoise at Zoo Atlanta

Zoo Atlanta announces the successful hatching of a Forsten's tortoise, *Indotestudo forstenii*. The first two of six eggs, deposited in three clutches from early January to late February 2002, hatched in mid-May after a 4 ½ month incubation period at 86-88°F. Prone to a range of health problems in captivity, captive reproduction is still uncommon in this endangered tortoise. We learn more about their medical management this trend should reverse. Note the pronounced serrations on the rear carapace marginals.



Also at Zoo Atlanta, two *Pyxis planicauda* eggs, each from a different pairing, were deposited in November 2002. These were incubated in the mid 70s for one month, dropped to the upper 60s for a month, then back to the mid 70s for an additional month after which the temperature was gradually raised to the upper 80s for three more months until the eggs hatched in late May. The temperature diapause intervals required to successfully incubate eggs from this critically endangered tortoise are just now beginning to become understood. Captive breeding has now occurred in at least three private collections and two zoos (all TSA Partners).

Kinixys belliana

Siblings from two seasons.

The largest is photographed at 19 months, the two smaller are one year of age. All three appear to be females and were incubated at 86.6°F, although Paula Morris has produced both males and females at this temperature.



Geocelone denticulata

This captive-bred yellowfoot tortoise is at risk for abnormal scute formation as it grows from hatching to young adult. The syndrome, sometimes referred to as reverse pyramiding, is currently under study as Walkabout Farm. Photo courtesy of Susan Donohue, Walkabout Farm.



Cuora serrata

This one-year-old is from a clutch of three, all surviving today. Great confusion persists as to the origin and taxonomy of *serrata* and it seems that more extensive genetic analysis will be required to resolve this issue. Many adults' carapaces bear very old scars, environmental indicators of a long natural life.

Geoemyda japonica

This hatchling was incubated at 83°F, a higher temperature than its more widely known congener *Geoemyda spengleri*. *Japonica* possesses very similar behavior patterns to *spengleri*, but is larger, more robust and decidedly more colorful.



Cuora flavomarginata

Ray Ferrell's observations of nesting *C. flavomarginata* began in 1981. His turtles live in two large outdoor pens. Between 1981-1983 he observed the females nesting on high ground with good drainage.

Since 1984 they have chosen to lay in damp shaded areas under bushes. It's possible that suitable shaded areas may not have existed in the pen causing them to nest on higher ground. Nesting occurs in late June and early July. Clutch size ranges from 1-5 eggs, averaging 2.5 eggs.

The spring weather plays a key role in the development of the eggs in the females and the time of nesting. Size and weight of the female determines the number of eggs. On two occasions, a female double clutched. The incubation period varies depending on temperature. Incubation is from 75 to 116 days at temperatures ranging from 70°F to 78°F.





Building Captive Populations Through Confiscations

The TSA's working relationship with the USFWS continues to grow stronger and, increasingly, we are called on to help place confiscated turtles. Since July 2002, the TSA

has received and processed 537 turtles and tortoises including 290 *Geochelone elegans*, 87 *Testudo graeca*, 57 *Kninixys*, 3 *Leucocephalon yuwonoi*, 1 *Heosemys spinosa*, 2 *Geochelone denticulata*, 17 *Cuora amboinensis*, 80 *Podocnemis unifilis*, 38 *Pelomedusa subrufa* and 2 *Batagur baska*. These actions are possible largely due to the dedicated work of TSA Registrar, Annabel Ross, and a "ready and willing" group of supporting veterinarians. The processing fees charged for most of these turtles has generated a fund that is used to reimburse these vets and caretakers for medical and diagnostic expenses. The TSA is also extremely grateful to Partner Bill Ninesling who gives tirelessly of his time and facilities to help us with confiscated turtles.

Manouria impressa

A rehabilitation program for rescued market specimens yielded a few fertile eggs which hatched. Six years later, this 9" female exhibits very natural growth patterns. The experience to date with captive hatched *impressa* indicates they respond to captivity extremely well and are proving quite adaptable and undemanding.



Cuora galbinifrons picturata

This species will lay 1-2 eggs per clutch and will double clutch in January/February and June/July. These gregarious hatchlings consume predominately insects, worms, crickets, dead mice and fruit.

Burmese Star tortoise at SCI

The Wildlife Conservation Society's Wildlife Survival Center announces the first two hatchings of the Burmese Star Tortoise, *Geochelone platynota*, at their St. Catherines Island tortoise facility. Three eggs were laid between 9-17 January 2003 and incubated on dry vermiculite at room temperature (70°F) for the first 38-40 days. The eggs were then moved to an incubator at 84°F and lightly misted weekly. Blood vessels were evident by the second week of incubation. Two hatchlings pipped between 9-17 June 2003 after an incubation period of 108-116 days.



What can you do to help the TSA save turtles?

The TSA has developed some crucial global partnerships and is well positioned to have a major impact on turtle conservation in a number of range countries such as Cambodia, Vietnam, Thailand, Madagascar and Myanmar. We will only be successful if we can raise the necessary funds to support these grassroots conservation initiatives. We need your help!!

YES! I want to help the TSA become a global force for turtle conservation. My contribution will make a difference. For example:

- \$25 helps the TSA keep you informed of our international efforts in conservation
- \$50 can help the staff from Cuc Phong Turtle Conservation Center in Vietnam conduct field trips to locate potential release sites for the critically endangered Vietnam pond turtle, *Mauremys annamensis*.
- \$100 can pay the monthly salary for five local villagers to monitor and protect nesting beaches for the mangrove terrapin *Batagur baska*, in Cambodia.
- \$300 can pay the annual salary of a Malagasy biologist to monitor tortoise populations in southern Madagascar.
- \$500 can help train aspiring young Asian turtle biologists in conservation methods.
- \$1000 can help to develop a captive-breeding program for the critically endangered *Kachuga trivittata* at the Yadanabon Zoo in Mandalay, Myanmar.
- \$2500 can fund the Turtle Conservation & Ecology Project coordinator position in Vietnam for **one year!**

For tax purposes, please send me an invoice for the following amount _____.

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