Giant River Turtles
Batagur species and *Orlitia borneensis*

An adult male Painted River Terrapin, *Batagur borneoensis*, in breeding coloration. Photo by Trisha Shears.

Comments: These turtles, all critically endangered in nature, are prime candidates for captive breeding programs. It has been shown by Shawn and Natasha Heater of Dark Hammock Turtle Farm in Florida that *B. borneoensis* can be produced in very large numbers and that the healthy, captive-hatched offspring thrive in captivity. Certainly *B. baska*, *B. kachuga*, and *B. trivittata*, the most threatened species of the genus, would benefit greatly from similar captive breeding, head-starting, and releasing back into their natural range. Turtle breeders with large outdoor ponds and the knowledge should be utilized to help save these turtles ex situ as their numbers continue to plummet in their native ranges.

Taxonomy:

Batagur affinis affinis (Cantor, 1847) Western Malay River Terrapin
Batagur affinis edwardmolli Praschag, Holloway, Georges, Packert, Hunsdorfer, & Fritz, 2009 Eastern Malay River Terrapin
Batagur baska (Gray, 1831) Northern River Terrapin
Batagur borneoensis (Schlegel & Muller, 1844) Painted River Terrapin
Batagur dhongoka (Gray, 1834) Three-striped Roofed Turtle
Batagur kachuga (Gray, 1831) Red-crowned Roofed Turtle
Batagur trivittata (Duméril & Bibron, 1835) Burmese Roofed Turtle

A male Northern River Terrapin, *Batagur baska*, in breedingg coloration. Photo by Peter Praschag.

Orlitia borneensis Gray, 1873 Malayan Giant Turtle

Distribution: *Batagur affinis affinis* is found in Myanmar, (Irrawaddy River), southern Thailand (probably extirpated), southern Vietnam, Cambodia, West Malaysia, and Indonesia (Sumatra). *Batagur affinis edwardmolli* is found in eastern Malay Peninsula, Cambodia (and is now extirpated from Thailand and Vietnam). *Batagur baska* is found in Myanmar (Irrawaddy River), southern Thailand (probably extirpated), Cambodia, West Malaysia, India (Gujarat), and Bangladesh. *Batagur borneoensis* is found in southern Thailand, West Malaysia, Indonesia (Sumatra, Borneo), and Singapore. *Batagur dhongoka* is found in Nepal, Bangladesh, and NE India (Assam, Ganges and Brahmaputra drainages). *Batagur kachuga* is found in central Nepal, NE India (Himachal Pradesh), Bangladesh, (primarily in the watershed of the Ganges River), and probably NW Myanmar. *Batagur trivittata* is found in Myanmar (Irrawaddy and Salween river systems). *Orlitia borneensis* is found in Malaysia, Sumatra, and Borneo.

Adult male Eastern Malay River Terrapin, *Batagur affinis edwardmolli*, from the Setiu River in Malaysia, in breeding coloration. Photo by E. H. Chan.

The only surviving population of the Red-crowned Roofed Turtle, *Batagur kachuga*, is in Myanmar with no verified reports from Nepal or Bangladesh in recent years. Once thought to be extinct, it was "rediscovered" in 2002. Its wild population is estimated at only about 400 animals. Little is known of its natural history in its last stronghold in the Chindwin River and the only substantial numbers of this beautiful turtle are found in the National Chambal River Gharial Sanctuary (TTWG, 2010). Dedicated efforts are being undertaken by Turtle Survival Alliance and local heroes to save this amazing species. Photo by Sheena Koeth.

Orlitia borneensis, The Giant River Turtle, is found in Malaysia, Sumatra, and Borneo. It is unfortunately one of the turtles that is shipped to the Chinese food markets not by the individual, but by the ton. These massive turtles are herbivorous, feeding mainly on floating aquatic vegetation in the large rivers where they live. Female *Orlitia* typically lay clutches of 12 to 15 eggs that measure 40 mm x 80 mm. Hatchlings are roughly 60 mm long and have a rough carapace with serrated marginals (Liat and Das, 1999). Photo by Natasha Heater.

Adult Size: Females of Northern River Terrapins, *Batagur baska*, grow to 24" (60 cm) and a maximum weight of 40 pounds (18 kg). Adult males are smaller. Adult female Painted River Turtles, *Batagur borneoensis*, reach 23 to 28" (60 to 71 cm) and adult males are usually in the 20 to 30" (50 to 60 cm) range and weights of up to 100 pounds (50 kg). Female Three-striped River Turtles, *Batagur dhongoka*, can reach up to 19" (48 cm) and males only 10" (26 cm). Red-Crowned Roofed Turtles, *Batagur kachuga*, can reach 22" (55 cm) and can weight up to 50 pounds (25 kg). The males are shorter, only reaching about 12" (30 cm). The Malayan Giant Turtle, *Orlitia borneensis*, is the largest freshwater turtle in Southeast Asia, growing to 31" (80 cm) and reaching weights of more than 100 pounds (50 kg).

Captive Care: These turtles obviously require very large enclosures. Large, secure outdoor ponds in warm habitats are the ideal captive environments for these river turtles. They love to bask and access to direct sunlight is desired. In-ground ponds must be secure as these heavy turtles will explore on land and can push over small fences or flimsy barriers. Be sure not to overcrowd these turtles as they produce a lot of waste and their ponds can quickly become unhealthy. Also, they tend to bite each other when overcrowded.

Some innovative keepers seek out unwanted above-ground swimming pools from the classified ads online. These pools are usually large, inexpensive, and easy to move and to set up as large ponds for captive turtles.

We suggest the addition of large amounts of aquatic vegetation to help keep these turtles healthy and to offer them some cover for security. Unfortunately, each of these turtles can eat literally bushels of aquatic plants each day. They are especially fond of water hyacinth and water lettuce. Keepers that don't have access to lots of aquatic plants can keep an extra pond outside during warmer months just for raising lots of aquatic plants for these turtles.

If set up indoors, it is a necessity to set up an efficient filtration system. Many keepers choose to simply drain their large ponds and refill them with fresh water every few days rather than go through the labor-intensive changes involved in a pre-filter and filter system for these turtles.

It is reported that "murky" water is naturally beneficial for captive specimens (McCord, pers. com.) as the visual barrier provided by algae-filled water keeps the large females from attacking males and smaller specimens, which is a common problem. Their sharp, vegetation-chopping jaws can inflict serious injuries.

Young Painted River Terrapins, *Batagur borneoensis,* are round in shape with a strongly keeled carapace. They are large babies, requiring relatively large enclosures (40 to 60 gallons or more). As they grow, their shape becomes the more typically smooth, oblong shape of adults. Hatchlings feed well on a variety of foods and though they seem to enjoy commercial pelleted food, try to keep their protein and fat intake as low as possible. We suggest offering pellets twice a week and edible plants, greens, and fruit twice a week. Young males and females appear quite drab. Males become brightly colored as they reach maturity. Photo by Russ Gurley.

Feeding: In the wild, these riverine species feed on aquatic vegetation and fruit that fall into the rivers. In captivity, floating plants (water hyacinth and water lettuce), romaine lettuce, kale, and collard greens are eaten ravenously and they relish bananas, mangos, and pieces of melon as an occasional treat.

Commercial aquatic turtle food can form a part of their diet if they are fed those pellets that are highest in fiber and lowest in fat and protein.

Common Health Problems: Shell abrasions, plastron injuries, missing nails, and eye and skin problems were common in imported specimens. Eye, skin, and shell problems also develop when specimens are kept in poor water conditions. Treat abrasions and minor injuries with an application of antibiotic cream. Minor eye and skin irritations will heal quickly in fresh, filtered water with the addition of some aquarium salt or sea salt (up to 2–3 tablespoons per gallon) especially for *Batagur* as they regularly inhabit saline-mangrove environments in nature.

Imported specimens of *Orlitia borneensis* were often plagued with fish hooks. These specimens, usually caught for the Asian food markets, are captured on baited lines, the lines are cut, and they are boxed up and shipped to the markets. Often, turtles caught in this manner will also enter the pet trade. These turtles usually die unless veterinary intervention occurs soon and the hooks are removed. "Lucky" specimens have hooks near their mouths that can be easily removed. Other animals have been able to pass the fish hooks with their feces after traveling the length of the digestive system!

If kept in small enclosures and if fed a diet too high in fat and protein, these large turtles often become obese. This obesity can lead to premature death. This problem is usually directly related to over-feeding of commercial food that is too high in fat and protein and the inability of keepers to offer these big turtles a large enough enclosure.

Breeding: These river species need lots of room, lots of water, warmth, sunlight, and aquatic vegetation. *Batagur baska* and other large species can be succesfully kept and bred in temperate areas in large, greenhouse facilities but the efforts and expenses are enormous compared to outdoor keeping in warm climates (https://turtle-island.org/northern-terrapin-fights-for-its-survival).

As is expected for species from warm tropical areas, we have found that even mild seasonal changes with the addition of rain, natural or manmade via a garden hose or sprinkler, quickly trigger the *Batagur baska* males to change to their incredible breeding coloration (black with white or yellow eyes) and to begin showing interest in females. Males of *Batagur borneoensis* change from having a gray head and

Batagur baska, The Giant River Terrapin, is found in Burma, Borneo, Bangladesh, Thailand, Vietnam, and Malaysia. It is protected internationally by CITES Appendix I and domestically by the U.S. Endangered Species Act. As males of these large turtles approach breeding season, they change dramatically from an overall dark gray to a turtle with a striking black head, neck, and legs and their typical golden eyes turn white (Moll, 1978). Female *Batagur baska* lay their eggs on large sandy beaches. They typically lay three clutches of 13 to 34 eggs and these eggs incubate for 70 to 100 days (Ernst and Barbour, 1989). Their nesting sites are well-known and nests are often raided by humans (and have been for hundreds of years). This large female is part of a captive breeding program in Florida. Photo by Raul Gonzalez.

body to having a blaze of crimson red on the top of a beautiful white head. Juveniles and females of both species remain drab.

Care must be taken that these species do not go below an outside temperature of 55 to 60° F (13 to 16° C) for long periods of time. They can take colder air temperatures (45 to 50° F) in a deeper pond where the water is warmer, but they will not live through a winter at these temperatures.

To date, only collections with multiple male Batagurs have produced offspring. It is speculated that the competition for females seems to play a role in the captive reproduction of this species (Heater, pers. comm.). However, long-term or consistent success has not been seen with any of these species other than with *Batagur baska* and *Batagur borneoensis* in large ponds in Florida.

In nature, *Batagur borneoensis* females dig deep nests on sandy beaches. Therefore, the ideal laying site in captivity would be a large, sandy area in association with their pond. As with other large river turtles (*Phrynops hilarii*, *Trionyx triunguis*), these turtles want to lay eggs far from their pond, so creating a way for them to escape to a nesting area above the level of their pond seems to be critical for success.

They can lay two or three clutches of 11 to 26 eggs each year and these eggs incubate for 60–65 days at 79–91° F (26–33° C) when incubated outdoors in a nest on a sandy beach (Weissenbaucher, et al. 2015).

A large, fenced pond in southern Florida that features deep water and plenty of sunshine, ideal for *Batagur* and other large turtles. Photo by Shawn Heater.

Works Cited and Suggested Reading

Blanco, S., J. Behler, and F. Kostel. (1990). Propagation of the Batagurine Turtles *Batagur baska* and *Callagur borneoensis* at the Bronx Zoo. Proceedings of the 1st International Symposium on Turtles & Tortoises: Conservation and Captive Husbandry, pp. 63–65.

Dedieu, A., Scherzer, N., Paumann, T., Morshed, A. G. J., Weissenbacher, A., Walzer, C., and D. Preininger. (2023). Camera Traps Provide First Insights into the Nesting Behavior of the Critically Endangered Northern River Terrapin (*Batagur baska*). Chelonian Conservation and Biology, 22(1), 46–57.

Guntoro, J. (2012). Tracing the Footsteps of the Painted Terrapin (*Batagur borneoensis*) in the Aceh Tamiang Regency, Aceh, Indonesia. Preliminary Observations. Radiata 21(1): 60–67.

Moll, D. and E. O. Moll. (2004). The Ecology, Exploitation and Conservation of River Turtles. Oxford University Press. 420 pp.

Moll, E. O. (1978). Drumming Along the Perak. Natur. Hist. 87: 36–43.

Moll, E. O., Matson, K. E., and E. B. Krehbeil. (1981). Sexual and seasonal dichromatism in the Asian river turtle *Callagur borneoensis*. Herpetologica 37:181–194.

Weissenbaucher, A., Preininger, D., Ghosh, R., Morshed, A. G. J., and P. Praschag. (2015). Conservation breeding of the Northern river terrapin *Batagur baska* at the Vienna Zoo, Austria, and in Bangladesh. International Zoo Yearbook 49(1): 31–41.

* *Batagur affinis, B. baska,* and *B. kachuga* are protected by the Endangered Species Act.

* *Batagur affinis, B. baska*, and *B. kachuga* are listed on Appendix I of the Convention on International Trade in Endangered Species (CITES). *Batagur borneoensis*, *B. dhongoka*, and *B. trivittata* are listed on Appendix II. *Orlitia borneensis* is listed on Appendix II.