

# Decision Making in the Release of Injured Freshwater Turtles and Tortoises

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**Abstract:** Chelonians are the most frequent reptiles presented to wildlife rehabilitators. While they are often able to recover from very severe injuries, this may be a prolonged process involving months to years of care. Major factors in deciding when and where to release rehabilitated chelonians include population demographics, extent of injuries, locality data of the specimen, infectious disease transmission, legal issues, the likelihood of future reproduction, healing ability in the wild vs. captivity, and time of year.

**Keywords:** Chelonian, turtle, tortoise, trauma, infectious disease, wildlife rehabilitation, translocation, reproduction.

## INTRODUCTION

Injured turtles and tortoises are commonly presented to wildlife hospitals and wildlife rehabilitators. Common injuries include trauma from automobiles or predators and fishing gear ingestion. Many injured chelonians can be successfully rehabilitated to releasable condition. However, it is unclear in some cases whether an individual turtle may have injuries that are too extensive to allow for release. In addition, the best time and location of release is often debated. The following discussion will address concepts that should be considered on a case-by-case basis, when deciding on the fate of an injured chelonian.

## DISCUSSION

Populations of turtles and tortoises are declining on a global scale. Within the United States, several species are listed as federally endangered or threatened and many species are protected by individual states. Habitat destruction, fragmentation, and progression have had the most significant impact on turtle populations, but collection of turtles for the food, shell, and pet trades has also adversely affected many species.

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Turtles mature slowly, sometimes taking ten to twenty years to reach sexual maturity. They have low annual reproductive success due to high depredation of nests and hatchlings. In spite of this, turtles have been able to persist by having very long reproductive lives. In species with this reproductive strategy, the most important factor to the survival of the population is the survival of individuals that have reached sexual maturity. Consequently, the most serious threat to a population is the removal of sexually mature adults from that population (Congdon et al. 1993).

In addition to overall survival of adults, it is important that adults are able to find each other to reproduce. Recent evidence indicates that significant population densities are required to ensure that individual turtles can locate mates. For example, for the eastern box turtle (*Terrapene carolina carolina*), it appears that males generally only locate females if they can visually locate them; they are unable to track females by olfaction (Belzer 2002). This reproductive strategy relies heavily upon chance interactions of males and females, a situation that is only likely to occur if population densities are high. With reduced population densities, the likelihood of copulation is reduced.

In light of the above discussion, it should be clear that it is important to keep sexually mature chelonians in the population. Therefore, every attempt should be made to return injured chelonians to their population of origin. As discussed below, many other factors can influence the decision to release, but acceptance of this general philosophy is the first step in the decision process. The main question then becomes “why should I not release this turtle?” Major factors to be considered in this regard include structural abnormalities of the animal, infectious disease risks, genetic factors, and federal, state, and local laws.

There are few structural abnormalities that would prevent the release of a rehabilitated turtle. Wild turtles

are often found with completely healed, old injuries, from which they have managed to recover and survive. It is common to find turtles with a missing eye, limb, or shell fragment. Such injuries apparently do not prevent these animals from successful foraging, swimming, locating hibernacula, etc. In fact, there is a recent report of successful nest construction and oviposition by an eastern box turtle that was missing one hind leg (Lee 2002). Injuries that prevent turtles from moving or swimming effectively, or prevent the animal from feeding may prevent release. Such injuries include multiple missing limbs, paralysis of limbs, missing both eyes, or skull trauma that prevents voluntary feeding. Cases with these injuries should be evaluated carefully on a case-by-case basis to determine whether release, captive management, or euthanasia is appropriate. In general, however, it is the author's philosophy that turtles with structural abnormalities should be returned to the wild unless overwhelming evidence indicates that the animal will not survive.

Infectious diseases represent a serious threat to chelonian populations. While several chelonian infectious diseases have been defined, many are poorly understood, and many have probably not yet been discovered. Literature in the past decade has highlighted the seriousness of chelonian diseases such as mycoplasmosis and herpesvirus (Jacobson et al. 1999; Brown et al. 2002). These diseases, if introduced into naive populations, could produce significant morbidity and mortality. As such, all injured wild chelonians should be kept isolated from any other sick reptile and any other reptile that does not originate from the immediate locality of the injured specimen. Furthermore, all tanks, tubs, tools, etc. that are used to rehabilitate native turtles should never be used for exotic species. Native turtles that have had any contact, direct or indirect, with exotic species should be considered non-releasable unless overwhelming evidence indicates that they are free of contagious diseases. Because many diseases have not yet been discovered, verifying that a turtle is free of infectious disease is problematic. Diagnostic tests such as blood analysis, fecal analysis, cultures, etc. may be useful, but do not address all possible diseases. In most cases, the safest approach is not to release the specimen if contact with an exotic species has occurred. Jacobson et al. (1999) present an excellent analysis of the importance of infectious disease in releasing chelonians.

Genetic factors should also be considered when deciding if an injured chelonian is to be released. Recent data indicate that within turtle species, there is wide geographic genetic variability. For example, Berry et al. (2002) provide a review of the genetic factors affecting management of the threatened desert tortoise (*Gopherus*

*agassizii*). Data demonstrate that even within a small geographic region, isolated genetic populations can be identified based on analysis of mitochondrial DNA and microsatellite loci in nuclear DNA. These genetic differences have likely evolved over generations in response to local environmental factors and geographic barriers (such as canyons, rivers, etc.) that prevent exchange of genes among populations. If an animal is translocated by humans to a genetically different population, there is risk of introducing genetic material that is detrimental to that population.

To apply this information to the issue of releasing an injured turtle, one must ensure that an individual is released back to the genetic population from which it came. If the locality of origin of the animal was recorded when it was found, this process is simplified. However, if the origin of the animal is unknown, the animal should not be released. Range-wide genetic analysis of several species of turtles is currently under way, and may soon provide the ability to determine the geographic origin of unknown specimens based on DNA analysis. Until such data are complete, caution should be exercised.

Legal issues may influence the release of certain chelonian species. All veterinarians and rehabilitators working with native turtles must be familiar with all international, federal, state, and local laws that apply to each native species. If legal issues do apply to an animal that is to be released, the appropriate authorities must be contacted to discuss the case. The most common legal issue that may affect the situation is the requirement that injured native animals be released at the locality of origin. Because many injured turtles are often found in altered, dangerous habitats (e.g., habitats close to highways or construction sites), it is often difficult to consider returning the turtle to that site.

However, due to all of the factors discussed above, it is clear that releasing a turtle in a "better" site, but not the site of origin, may be harmful to the population. In addition, telemetry data for translocated eastern box turtles indicate that most individuals fail to remain within the release area and fail to develop normal home ranges (Belzer 2002). This supports the conclusion that it is best to release a turtle back to its site of collection.

In addition to deciding if the turtle can be released, and where the turtle can be released, one must decide when the turtle can be released. This decision is open to individual philosophy, and studies are needed to provide objective data in this regard. A conservative approach to release generally involves maintaining the animal in captivity for months to years, during which time the patient is closely evaluated and traumatic wounds are allowed to completely heal prior to release. While this approach cannot be faulted, it does require an investment of time

and resources to care for the animal. It also keeps the animal under captive conditions that may not provide optimal nutrition, temperature, photoperiod, seasonal changes, etc. Furthermore, animals held for longer periods could be at increased risk of exposure to infectious disease from their patients within the facility. For these reasons, the author has accepted a more aggressive approach to release.

If analysis of all other factors does not preclude release of the turtle, the author prefers to release the turtle within weeks of the time of injury. This philosophy is based on the premise that the patient will heal faster in its native habitat than it will in captivity. All discussions of the medical care of reptiles indicate that correct environmental and nutritional parameters are important for healing. This author believes that there is no better environment or nutrition than that found in the natural environment of the specimen. This is not meant to encourage the release of moribund animals, or the release of animals in the middle of winter, or is it meant to promote hasty, reckless treatment.

Rather, it is meant to promote the release of turtles when they have been physiologically stabilized, traumatic wounds have been repaired, infections have been treated, etc. If a turtle is otherwise ready for release but is not voluntarily feeding, one must determine if there is any medical reason that prevents the turtle from eating. If no medical reason is found, the turtle may simply be refusing to eat under captive conditions. In this case, release should be considered. A complete discussion of medical management of these patients is beyond the scope of this paper, but recent reviews are available (Bonner 2000; Mitchell 2002).

Finally, the time of year is an important factor in releasing chelonians. In temperate climates, most species hibernate during winter, and must be in good physical condition to survive hibernation. It is best to release turtles in late spring or early summer to allow for a full summer of feeding and healing prior to hibernation. If a late-season release is contemplated, the author prefers not to release animals later than six weeks prior to the normal hibernation period for the species. Specimens must have time to familiarize themselves with the environment, replace nutrition reserves, and locate hibernacula. If late-season release is not possible, the animal should be maintained in rehabilitation until the following spring.

## CONCLUSION

Clearly, the decision of when, where, and if an injured chelonian should be released is complex. It is the author's hope that this discussion will stimulate thoughtful consideration of these issues. Objective

studies are needed to determine the effect of various philosophies and treatment plans on the survival and reproductive success of the released turtle. Researchers with access to radiotelemetry equipment are encouraged to use this equipment to document the fate of released injured turtles and to report their findings. Also, anecdotal observations on recapture of previously rehabilitated turtles, including the condition of the animal and evidence of reproduction should be reported.

## LITERATURE CITED

- Belzer, B. 2002. A Nine Year Study of Eastern Box Turtle Courtship with Implications for Reproductive Success and Conservation in a Translocated Population. *Turtle and Tortoise Newsletter: The Newsletter of Chelonian Conservationists and Biologists*. 6: 17-26.
- Berry, K. H., D. J. Morafka, and R. W. Murphy. 2002. Defining the Desert Tortoise(s): Our First Priority for a Coherent Conservation Strategy. *Chelonian Conservation and Biology*. 4(2): 249-262.
- Bonner, B. B. 2000. Chelonian Therapeutics. Pp. 257-332 in *The Veterinary Clinics of North America Exotic Animal Practice: Therapeutics* (S. A. Fronefield, editor). W. B. Saunders Company: Philadelphia, PA. 3(1): 1-370.
- Brown, D.R., I. M. Schumacher, G. S. McLaughlin, L. D. Wendland, M. B. Brown, P. A. Klein, and E. R. Jacobson. 2002. Application of Diagnostic Tests for Mycoplasmal Infections of Desert and Gopher Tortoises, with Management Recommendations. *Chelonian Conservation and Biology*. 4(2): 249-262.
- Congdon, J.P., A. E. Dunham, and R. C. van Le teen. 1993. Delayed Sexual Maturity and Demographics of Blanding's Turtles (*Emydoidea blandingii*): implications for conservation and management of long-lived organisms. *Conservation Biology*. 7(4): 826-833.
- Jacobson, E. R., J. L. Behler, and J. Jarchow. 1999. Health assessment of chelonians and release into the wild. Pp. 232-242 in *Zoo and Wild Animal Medicine: Current Therapy* (M. E. Fowler, ed.), W. B. Saunders Company: Philadelphia, PA.
- Lee, D. S. 2002. A note on Box Turtle Reproduction. *Turtle and Tortoise Newsletter: The Newsletter of Chelonian Conservationists and Biologists*. 6:27.
- Mitchell, M. A. 2002. Diagnosis and Management of Reptile Orthopedic Injuries. Pp. 97-114 in *The Veterinary Clinics of North America Exotic Animal Practice: Therapeutics* (T. N. Tully, editor). W. B. Saunders Company: Philadelphia, PA. <sup>NR</sup>