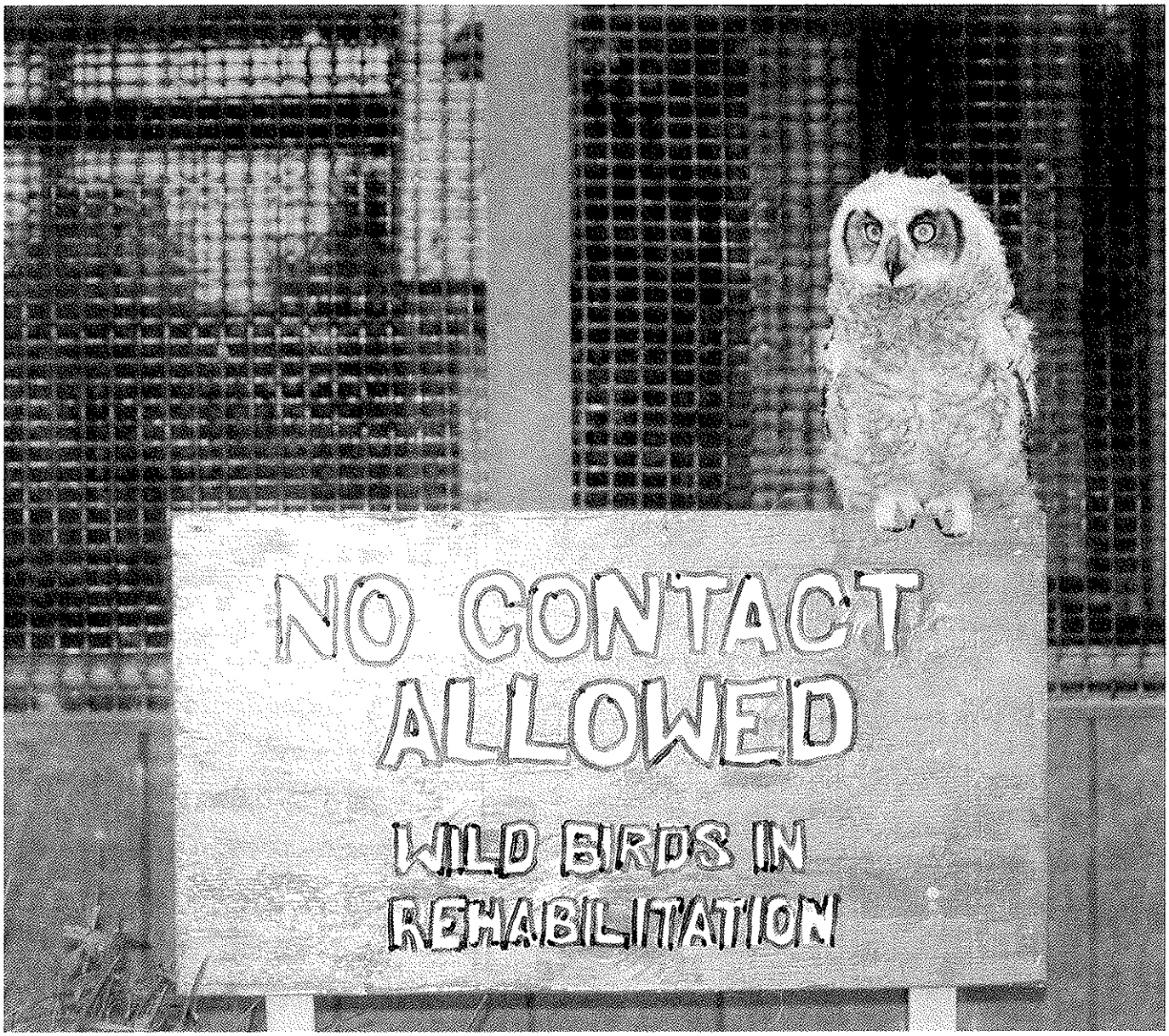
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JOURNAL of Wildlife Rehabilitation

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Spring Arrives!

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The *Journal of Wildlife Rehabilitation* is designed to provide useful information to wildlife rehabilitators and others involved in the care and treatment of native wild species with the purpose of returning them to the wild. All feature articles are subject to a review process, and our staff and reviewers work with authors to produce the most accurate information possible in our ever-changing field.

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Cover Photo: Marge Gibson, Raptor Education Group, Antigo, WI
NOTE: This was not a captive bird. Photographer just happened to be in the right place at the right time for this exceptional shot.

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Guest Editorial
Educate as you Rehabilitate

E. P. Elliston
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It has been said that most rehabilitators who become full-time participants in work with wildlife also get involved in education. Education can be considered the 'prevention' side of rehabilitation. Unfortunately, as with human preventive medicine and public health, prevention is often less glamorous and less heralded than cure. For instance, much attention is focused on the heroism of the stereotypic rehabilitator who, at great cost to her/himself, rescues the hawk, eagle, or whale, in immediate jeopardy. Much criticism is also leveled at this 'paragon of virtue' by those who feel rehabilitation of individuals is of no benefit to the species and resources would be better spent elsewhere.

In my view education — in all its forms — is the **only** place that rehabilitators exercise real influence on the future. The orphaned or injured animal entrusted to our care is brought to us by another human being who has a humanitarian urge. It (the animal) can be properly viewed as a 'tool' for creating another person's investment in the well-being of wildlife. The well-being of wildlife, in all its diversity, is important for the well-being of the planet. And, in the end, the well-being of our own species depends on the health of the planet.

Given the general tendency of humans to do violence against ourselves and anything we view as a threat, it is surely beneficial to all of us to encourage humanitarian urges in adults and nurture those in children. Concepts of ecological balance, diversity of species, and human impacts can also be discussed in the context of caring for wildlife in trouble.

Rehabilitators are uniquely placed in their relationship to animals, and can therefore make unique observations. One example: sex ratio at hatch and measuring the growth rate of the bill of nestling hummingbirds would require a lot of field work in the wild, as well as necessitate disturbing the many nests with young required for an adequate sample. Collecting this kind of information through rehabilitators raising orphan nestlings is relatively easy. Of course, it's not particularly glamorous, and it does require some tedious attention to detail. It also requires taking the trouble to put the information into a form that can be shared by the scientific community.

In the end, though, it adds to the general hummingbird knowledge. It is education. There are many questions to be asked and rehabilitators can contribute to the answers.

•Returns on banded birds may answer some dispersal questions.
•Collecting thorough data on the dates and origins of birds brought to rehabilitators can contribute to the recognition of previously unrecorded information, new subspecies and distribution patterns.
•Carcasses of deceased specimens can add to museum collections thereby increasing the study skins without the "collection" of an otherwise healthy live animal.

R.W. Dickerman, Co-curator, Division of Birds at the

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A Natural History of North American Box Turtles --- With Information on the Triage of Injured and Ill Turtles

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ABSTRACT

The increasing destruction of box turtle habitat, as well as heightened interest in box turtles as pets, has placed this animal in high profile to the public as well as possible danger of extinction. As a result, wildlife rehabilitators are encountering this animal more frequently than ever before. Few wildlife rehabilitators have more than a passing acquaintance with reptiles. Reptiles have distinct needs during rehabilitation that require knowledge not commonly found in either the rehab community or even among most general practice veterinarians. The author provides a brief introduction to the natural history and a basic introduction to triage practices based on experience as well as some of the more recent findings on these species of turtles.

Key Words: box turtle, triage, trauma, natural history, turtle rehabilitation

Introduction

The Common Box Turtle is regularly found throughout much of the United States and Mexico. As a result, it is one of the most commonly seen turtles in wildlife rehabilitation work. Despite its wide distribution, it is still something of an unknown in terms of its complete life-cycle and natural history. Research is being carried out at this time to better understand the habits of this fascinating and gentle reptile. As of the date of this writing, there is still no single text that draws together the many pieces of information collected about box turtles. Research is sufficiently new that some studies present conflicting reports regarding behavior, habitat preference and related matters. The bulk of the material presented will be based on my own experiences with the species and its rehabilitation. References are provided where appropriate.

Current Scientific Classification

The Emydid family of box turtles, found only in the New World, are currently grouped under the order Chelonia, sub-order Cryptodira, genus Terrapene. They are currently divided into four species: *Terrapene carolina, Terrapene ornata, Terrapene coahuila*, and *Terrapene nelsoni*. The latter two species are found only in Mexico and will not be discussed here. *Terrapene carolina* is usually divided into six subspecies (ssp.), four of which are found in North America: *T. c. carolina* (Eastern or Common Box Turtle), *T. c. triunguis* (Three-toed Box Turtle), *T. c. major* (Gulf Coast Box Turtle), and *T. c. bauri* (Florida Box Turtle). *Terrapene ornata* is usually grouped into two subspecies: *T. o. ornata* (Ornate Box Turtle) and *T.o. luteola* (Desert Box Turtle). (Ernst, Barbour 1989) (Ernst, Lovich, Barbour 1994) (Behler, King 1996).

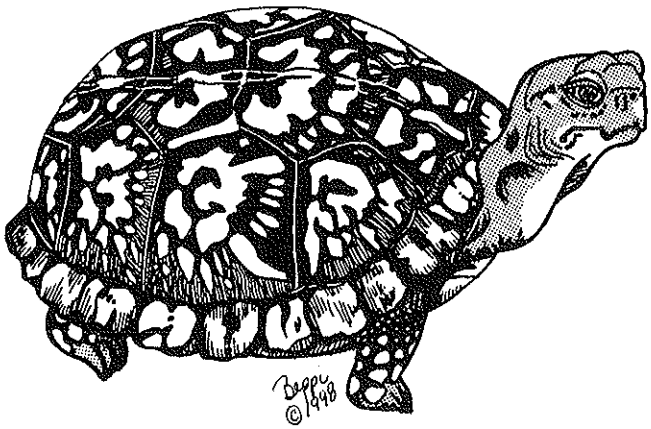
At any given point in time these classifications are under discussion by taxonomists. Presently, for example, there is a debate as to whether *T. c. major* and *T. c. triunguis* are actually subspecies of T. c. or separate species, since they do not seem to inter-breed despite range overlaps. *T. ornata* and *T. carolina* do not interbreed, by definition. Where range overlaps occur, various intergrades of the *T. carolina* subspecies, sharing some characteristics of each are somewhat common, making clear identification difficult in these cases.

Identification

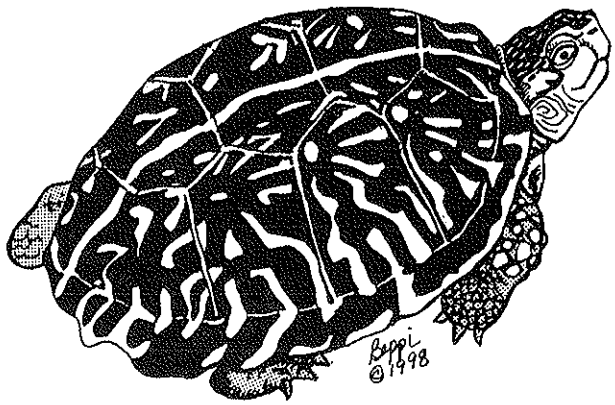
Subspecies identification is, however, generally not critical from a rehabbers' perspective. Instead, the rehabber should focus on the differentiation of the Ornate (Western) species from the Carolina (Eastern) species, due to slight but significant differences in long-term rehab practices. General range information and some physical characteristics are provided as an aid to identification.

The four *T. carolina* subspecies are found from Southern Maine to the Florida Keys; they can also be

The following illustrations highlight the major differences between the two North American species:



***T.c. carolina*-Common or Eastern Box Turtle**



***T.o. ornata*-Ornate Box Turtle**

found as far west as Eastern Texas, Oklahoma and Kansas. There is also an isolated population in the southeastern corner of Wisconsin. Due to their extreme popularity as pets, however, individuals have been released outside of their normal ranges in places as far away as California and Canada.

The Eastern Box Turtle ssp. can generally be distinguished from other turtles by their high, domed and centrally keeled carapace. Due to population differences the ssp. are quite variable in patterning. Typical shell color ranges from tan to dark brown, with some yellow, orange or olive base colors not uncommon. Some are patterned with thick radial lines or indistinct blotches; some are virtually un-patterned. Adult size ranges from 4 - 8 inches depending on ssp. The Gulf Coast ssp. is the largest, and is typically found only on the coastal plain from the Florida panhandle to Louisiana. The Three-toed Box Turtle is distinguished by the presence of only three toes on its hind legs, whereas the general rule is four.

Sometimes known as the Western Box Turtle, the Ornate Box Turtle ssp. are generally found west of the Mississippi. Their known normal range extends from southern South Dakota, Iowa and E. Illinois south into Texas and Louisiana and New Mexico.

The ornate species is generally distinguished from Eastern varieties by their strongly patterned shells and the lack of a clearly defined keel. Instead of the keel, they often have a clearly marked yellow or orange line. Each scute will generally have a series of radiating yellow lines that will contrast sharply with a darker background color. The Ornate ssp. is distinguished from the Desert by the number of lines on the second costal scute - generally 5- 8 on the Ornate as compared to 11- 14 on the Desert ssp. Adult sizes range from 4 - 6 inches.

Sexing Turtles

Box turtles are among the easier reptiles to sex. Male box turtles of all species are usually distinguished by their concave plastrons. Females have flat or slightly convex plastrons. Males usually have red eyes, while females generally have yellow-brown eyes. Males' tails are generally thicker at the base and longer than females' tails. The vent or cloacal opening in males is typically past the edge of the carapace, while it may be under the edge of the carapace in females. Some males have longer front claws than the females of the same species. Some populations of certain sub-species, such as the Three-toed, have proven difficult to sex. Eye color and plastron differences may be misleading or almost non-existent. Males have certain distinguishing features that can vary by species and ssp. These can be pursued in more detail using the references provided.

Longevity

Box turtles, under proper care, have been know to live as long as 25 or more years in captivity. A potential life-span of thirty to forty years could be expected at birth. There are, however, anecdotal reports of turtles living more than 100 years.

Habitat

The Eastern Box Turtle inhabits a variety of environments that can generally be characterized as 'moist' or 'humid'. They seem to have a preference for woodlands and forest areas but may be found in coastal flood plains, meadows and pastures or prairie grasslands. They will typically forage in an area the size of one to two football fields their entire life. All box turtle species establish home ranges or defined polygonally shaped areas that they

tour on a regular basis. These are usually defined by nodes where they feed, water, hide, bask, etc. Overlaps between male and female ranges appear to define the possibilities for mating.

There is evidence of territoriality among males. They will fight, particularly during mating season, which is generally in the Spring. Combat frequently takes the form of 'pushing contests' where one male will attempt to push the other away or over. There may also be 'sparring' matches that involve alternate bouts of biting each others' shells (Belzer 1997). These contests seldom (if ever) result in the death of a combatant.

Home range variation is significant in these ssp., even in individual populations. Studies have shown that in a single population, one turtle may have a range as large as a 500 yd. radius, while another may never wander more than 50 yards from its home (Gaines 1997). Wintering behavior varies significantly as well. Some turtles seem to establish a 'home base' or preferred hibernaculum where they will tend to hibernate year after year. Others simply seem to 'dig in' somewhere in their home-range. Wintering behavior differences may be due to micro-climate issues, where, under ideal conditions the turtles may be able to 'choose' more freely. In more restricted circumstances, the turtles seem to be more likely to return to their hibernacula year after year (Gaines 1997). Box turtles tend to adjust the depth of their burrows depending on temperature. That is, they will tend to burrow to maintain a 'comfortable' depth below the frost line.

The Western varieties of box turtle inhabit primarily open prairie, but are also found in pastures, small woodlands and along waterways in more arid regions. They are somewhat less needful of moisture than the Eastern ssp. Several studies have shown that Ornate Box Turtles will tend to stay in prairie or grassland during the winter, even when woodland areas are available to them. Eastern Box Turtles seem to have a preference for woodland in winter if it is available to them (Sammartino 1996).

Feeding, Movement, Normal Activities, Predators

Box turtles, in general, are typically characterized as carnivorous during their juvenile years, and 'opportunistically omnivorous' as adults. Juveniles display a strong preference for live foods during their early growth years. They are particularly fond of garden slugs, earthworms and other small insects. As they age they will add such foods as wild strawberries, mushrooms and some green plants to their diet. Western boxes seem to have a strong preference for snails as a 'favorite' food. Other foods that they have been observed eating in the wild and in outdoor cages include: insect larvae and pupae, small mammals, spiders, millipedes, crayfish, frogs, sowbugs, beetles, crickets, and even smaller turtles. Plant foods included most red berries and tomatoes as well as garden greenery such as lettuce. (Box turtles are notoriously difficult to observe during feeding in the wild. They will notice observers' approach and stand still, waiting to 'see what happens'. Many of the noted food preferences are based on fecal studies or by observation of the turtles noses and faces after feeding).

They typically feed on plant matter by either grasping and tearing with their horny beaks and/or by pressing stalks down with their forelegs to give easier access to taller plants. Live food is often pursued with great vigor, the turtles scurrying after crickets, slugs and worms as fast their legs will move. They frequently pin their prey with a foot while tearing at it.

Many observers have noted that feeding tends to take place in the morning hours during summer, followed by a retreat to a shaded but warm area during the mid-day hours. Later in the day, as the sun begins to drop, the turtles will once again begin to move about and may feed again. As evening sets in, the turtles tend to head for a sheltered area that seems safe to spend the night. These are sometimes referred to as 'forms', 'sets' or 'lies'. While typically diurnal, during hot summers, turtles may shift to crepuscular or nocturnal habits. In areas with mild summers, they may be found active during most parts of the day.

Turtles can be quite mobile and will travel distances of 50 yards (and more) per day without difficulty. They normally walk with a firm stride and their heads upright. They are intensely visual and have excellent hearing. If you encounter one, they may either close up their shells completely, having 'hinges' (or mobile sutures) in their plastron that allow them to completely hide their heads and forelegs, or they may attempt to scurry away. Turtles are able to move with some speed over short distances.

Turtles, like all other reptiles, shed their outer skin and shell scutes regularly. In a normal shed, the individual scutes on the carapace and plastron generally separate individually from the shell, leaving fresh, new, more brightly covered shell underneath. Skin generally sheds in a patchy fashion, leaving 'shreds' of skin behind in their surroundings.

Adult turtles have few successful predators. Coyotes, raccoons and dogs are their most effective natural enemies. People, in the form of vehicles, farm equipment, lawn mowers (and through habitat destruction) are the turtle's most dangerous enemies. Young turtles may fall prey to many animals including birds, larger turtles, snakes, foxes, opossums and cats. The mortality rate for young turtles is surprisingly high. According to some sources, mortalities as high as 70% have been observed in a given clutch.

Reproduction

Mating generally occurs in early spring (April-May) but has been observed to continue throughout the summer into July. Southern ssp. may continue to mate into September. Dr. Belzer has noted that in his popula-

tion, turtles appear to mate almost continuously when not in hibernation with peak activity periods occurring in May/June and again in September/October. There is some evidence that hibernation may be a pre-requisite for successful breeding in certain subspecies. Females will generally lay a clutch of eggs between May and July. Nests are usually flask-shaped cavities only a few inches deep. Eastern Box Turtle hatchlings have been known to overwinter in their nests. Typical clutch size in the Eastern is about 3 - 10 elliptical whitish eggs about 1 3/8 inches in length. Western Box Turtles are quite similar in terms of both egg and clutch size, though on average, Western clutch sizes tend to be smaller. Time to hatching is usually six to ten weeks, depending on such factors as temperature and humidity. Many box turtles have been known to clutch two or three times in one breeding season, though clutch sizes tend to be smaller when this behavior has been noted. Box turtles have been known to retain sperm for as long as four years, producing clutches without mating activity.

Eastern Box Turtles appear to reach sexual maturity slightly more rapidly than Westerns, approximately 5 - 7 years by some estimates, while Westerns may be closer to ten years. These numbers are primarily based on breeders observations. There is some evidence that these estimates may be short by as much as ten years for wild animals.

Hibernation

Box turtles 'slow down' or hibernate for as much as six months out of the year in the wild. Hibernation times and behaviors can vary depending on the climate where the individual species is found. Southern species and populations tend to hibernate for much less time than more northern species due to the wide variance in the severity and length of the winter. Box turtles appear to be well adapted to this behavior (Costanzo, Irwin, Lee 1997).

As winter approaches, box turtles slowly cease feeding and slow down in terms of their activity cycles. They will eventually attempt to select a moist, loose-soiled area and dig a shallow form in which to spend the winter. On warmer days, they will move about, re-hydrating if water is available and possibly sunning themselves. They will then return to their hibernating state until spring or the next bout of warm weather. Ornate Box Turtles tend to select open grassland or prairie sites for their hibernacula while Eastern Box Turtles tend to select woodlands areas. There is still debate regarding whether turtles are responding primarily to visual or heat cues where hibernation activity is concerned. Keepers have noted that using artificial full-spectrum light in a summer pattern appears to assist in preventing the animals from developing a hibernation response. Others have noted that increased heat has accomplished the same goal. Neither is 100% effective in preventing a hibernation response in all animals.

There are varying opinions on the necessity of hibernation to these animals longevity. At this point there is no definitive answer for this question (Klingenberg 1997). The author's opinion is based on the practical issues confronting the rehabber. It is my feeling that box turtles need to be returned to their own environments as rapidly as possible, assuming that they are in a healthy state. A sick animal is unlikely to survive the rigors of a winter hibernation. The over-wintering of any ill animal, as well as any animal that has not gained sufficient weight after treatment during the late summer and early fall, is highly recommended. Both heat and light are used to avoid a normal slowing response.

Conservation and Legal Issues

All North American Box Turtles are currently listed on Cites Appendix II as endangered animals and thus require a permit for export. Most states require permitting for or forbid the wild collection and keeping of box turtles. Maryland requires specific permitting for the rehabilitation of wild reptiles and the keeping of more than four of any one species. Check the laws of your state carefully, prior to becoming involved in their rehabilitation.

Box turtles are currently not listed as endangered or threatened by the U. S. government (as of 11/30/97). Some states protect them, others do little or nothing. It has become obvious that hard, scientific data will be required before the status of these animals will be modified. Seminal work is being done to determine the impact of wild collection on native populations, but it requires time. In the meantime, a substantial pet trade continues in wild caught specimens. There is some preliminary evidence that 'thinned' populations may not be reproductively viable (Belzer 1997).

Three options are generally available to rehabbers in terms of return to the wild: return of the animal to its pickup point, repatriation of the animal to un-tenanted but appropriate habitat, and release of the animal to appropriate, but tenanted habitat. Only the first has proven successful without regular human intervention. Dr. William Belzer of Clarion University in Oil City, PA is undertaking repatriation studies at the McKeever Environmental Learning Center (Belzer 1997). These have shown, tentatively, that repatriation can be successful, but at a substantial cost in both time and money. Return of animals to inhabited sites has shown, anecdotally, a very high death rate for various species of snakes and possibly turtles as well. Thus, determination of the origin point of the animal being rehabbed is very important in terms of its likely survival.

Rehabilitation Notes

Several concerns should be addressed prior to attempting the rehabilitation of box turtles. The first is access to an experienced reptile veterinarian. Few professionals should be offended by a request for their qualifica-

tions in this area of expertise. Zoo internships might be an indicator, for example, of appropriate expertise, if the veterinarian was exposed to exotic reptiles there.

A second area is your own knowledge. Reading about reptile care, both in general and regarding the specific species you are likely to encounter, is very important. Reptiles are likely to be the most 'alien' creatures you will encounter as a rehabber. They have few or no facial expressions and are seldom vocal - thus they are exceptionally difficult to triage. Pain is very real for them, but it seldom shows in ways that are obvious to humans. A recognition of what constitutes 'normal' behavior for a reptile is essential if you are to successfully treat illness or injury.

The next area of focus should be the keeping environment. Without an appropriate vivarium setup, the best trauma care in the world will likely fail. Box turtles, while reasonably tough animals, are ectotherms - requiring external heat sources to maintain and manage their own temperatures. When we, as rehabbers, isolate and contain them, we are taking responsibility for this maintenance. 'Micro-habitats' are selected based on issues such as humidity and light that are nearly as important as temperature. If an appropriate setup for their care cannot be provided, do not try to rehabilitate them.

Two setups are required for proper care of injured turtles. The first is a 'hospital' setup, used during the early stages of treatment for trauma and illness. The second is used for maintenance if long-term convalescence is required. The first is described below.

Box Turtle Husbandry Issues:

Eastern Box Turtles:

These animals require a **warm**, not hot, environment with a temperature range of 70-85°F (21.1-29.4°C). This is known as their Preferred Optimal Temperature Zone or POTZ. They will tolerate nighttime lows into the 50's (10-15°C) during spring, summer and fall, though temps below 60°F are not recommended. These temperature ranges should be maintained year-round if overwintering. If the animal is ill, it should be maintained at the high end of its temperature range (up to 5°F above their POTZ is acceptable) during the early part of the healing process. This has been shown to simulate the effects of a 'fever' in mammals. This is somewhat controversial, in that not all turtles or reptiles have been shown to seek higher temperatures during illness on their own. However, it does appear to enhance both immune system response and healing. Many drugs are virtually ineffective if temperatures are not maintained above the 70-75°F range. Humidity for box turtles should be kept in the medium to high range, 50-80%. Turtles also require full-spectrum light to avoid shell-rot and other related metabolic illnesses. Turtles need and enjoy access to shallow water for both drinking and soaking. They also require access to a variety of foods. If at all feasible, box turtles in rehab should be maintained on a diet that matches their wild food supply as closely as possible.

Ornate Box Turtles

Ornates or Western Box Turtles have similar husbandry requirements with the exception of a couple of particulars. First, they will tolerate lower humidity, in general, if an appropriately humid hide box is available for their retreat. Second, they tend to be very active animals requiring large spaces to move around in if long-term care is contemplated. They will also require a hide box or a substrate suitable for burrowing if long-term care is anticipated.

These goals can be met through the design of an appropriate vivarium for keeping.

Minimum 'Hospital' setup:

10 Gallon Aquarium
Large flat water dish (may be changed to a small, flat water dish if plastron or limb injuries are present)
Un-printed newsprint or plain paper towels for substrate.
Overhead heat source or Under-tank heater (UTH)
Small full-spectrum light[1]
Thermometer
Screen top

The aquarium should be set up in a quiet, low-traffic area. Install heating unit and adjust heat. The sides of the aquarium should be covered with cardboard or cloth to provide a sense of security for the turtle. Overhead heat sources can be adjusted either through the use of a rheostat or by simply varying the height of the lamp from the cage. UTHs can be controlled by rheostat or by varying the cage height above the UTH through the use of shims under the edge of the aquarium. The temperature should be set to the low to mid 80's°F (or the upper end of their optimal temperature zone). I use an 18" fluorescent fixture with a Repti-sun™ 5.0 bulb for lighting. Measure your heat after both lamps are set up - the ballast in the fluorescent can add unwanted heat. It is a good idea to set a large flat terrarium dish (available from garden supply houses) over the UTH or under the heat lamp. This insures that the water will evaporate and raise humidity. If you choose to use a UTH, be sure to measure the temperature at the cage bottom, *not* in the air above it. The screen top is used with appropriate clips (called 'reptile cage clips' - available at most pet stores) to prevent injury to the turtle from outside sources. It also provides a convenient method for mounting the fluorescent fixture and heat lamp. Appropriate temperatures should be established before a reptile is placed in the tank. Because box turtles are generally reclusive shade dwellers, the fluorescent bulb does not need to be on more than a few hours per day. Also insure that the bulb is no more than 18" away from the turtle or its valuable UVB radiation will be too diffuse to be of any use.[2]

Maintenance Setup:

Information on maintenance setups is available from the sources listed in the bibliography.

Assuming you have the basic components for temporary housing, you are prepared to perform basic triage and provide short-term care. The following material is presented primarily for the relatively inexperienced rehabber of turtles. It is not all-inclusive and should act only as a guideline. Veterinary care is indicated in a number of instances where more experienced reptile rehabbers might treat on their own. If you have access to culturing, cytology and similar diagnostic tools, you may wish to perform some tests yourself. However, it should be noted that what constitutes normal bacteria and/or parasites for reptiles may not be normal for other species you may work with. Salmonella, for example, is a fairly normal resident as are a good many Gram-negative bacteria. Often, the only indication of these as a disease-causing agent is a specific knowledge of appropriate counts. Thus, interpretation is best left to an appropriately trained and experienced veterinarian or technician.

CRITICAL EMERGENCY SITUATIONS:

The following signs indicate the need for immediate transport to a veterinarian.

1. Blood in mouth or nares accompanied by facial fractures or head trauma. *Attempt to clear blood from nares and mouth with a sterile cotton swab or ball.*
2. Object obstructing breathing. *Remove with forceps.*
3. Signs of major blood loss. *Apply pressure with a sterile gauze pad or tie off. Begin fluid replacement.*
4. Crushing wounds to the carapace or plastron. (Cover with sterile gauze moistened with saline.)
5. Unconsciousness accompanying any of the above.

Handling Safety Precautions

It is appropriate to assume that all reptiles are reservoirs for Salmonella and similar zoonoses. It is good practice to wash your hands thoroughly both before and after handling any reptile. The use of standard surgical gloves is recommended. If you treat more than one reptile, this practice is even more important due to possibilities of cross-infection. Standard procedures for the sterilization of any instruments used is mandatory. Disposable equipment should be used wherever possible.

Basic Exam

First, try to gather as much background information regarding the animal as possible. Interview the person who found the animal as well as anyone who transported it. Observe the turtle's behavior on its own. Is it lethargic? Can it stand on its own? Walk? Support its own weight fully? Does it have a head tilt? Does it hold up a leg or drag a leg? Lethargy can be an indicator of shock or Vitamin A deficiency. Head tilts can indicate cranial trauma or infection to an ear. Holding up a leg or dragging is a good indicator of trauma.

After your visual behavior review, weigh and measure the turtle. You may find that examinations are considerably easier if two people are available - one to restrain and one to manipulate. Begin the physical exam by looking over the eyes of the turtle. This may appear to be a difficult task, since they tend to close up when threatened. First, try tickling the perineum. If this doesn't work, try inserting a slender catheter between the carapace and plastron in the front or anterior shell opening and tickle the turtle's tympanum. You may also try *gently* squeezing the posterior shell, applying pressure from above and below simultaneously. As the turtle's head emerges from its shell, gently grasp the head between thumb and forefinger at the jaw. (A rubber eraser may be useful in keeping the shell open, if inserted carefully as the anterior shell opens). Make sure the turtle's body is fully supported during this procedure. Look for swelling, discharge, redness, and foreign bodies that may be present. Examine the ears. These appear as round, disk-like scales behind the eyes and toward the shell. Look for swelling and infection. Examine the nares for discharge. Check the mouth. Look for hemorrhaging, a generalized yellow appearance, necrosis, swellings or caseous material. Note any drooling. Watch to see if the turtle wheezes or keeps its mouth open for breathing when not held.

Review general skin and shell condition. Examine all areas of exposed skin closely for the following: sloughing, edema, abscesses, jaundice, small perforations with swelling or areas of trauma. Small perforations with substantial swelling may indicate the presence of blowfly larvae. Look carefully for the presence of mites and ticks. Mites will generally appear as small, mobile red or black dust specks. Then proceed to the shell. Look for damage or trauma. This could appear as cracks, scrapes, indentations or even breaks and crushing. Look at the plastron for a red 'flush'. Boxes will normally have even, regular skin markings in their base color plus yellow or orange on their plastron; a pale red color is usually indicative of severe systemic septicemia. Look for discharge or signs of infection in the shell itself. Examine the turtle's limbs for mobility and use. Check the nails for breaks and tears. Finally examine the cloaca for trauma, discharge or other signs of infection. If you have access to a laboratory, you may wish to take samples of urine, feces and/or oral and cloacal swabs. X-rays should be taken if limb breaks, shell fractures or head swelling is present or suspected.

Once complete notes are taken, review the following list of common presenting symptoms. They are presented in the order of the exam protocol. Do not attempt to treat prior to a *complete* review.

The drugs noted in the following tables are the most common, readily available and least expensive brands or types available in America. Others that are perfectly suitable substitutes are available and should be used as recommended by your veterinarian.

Symptoms	Likely cause	Indicated Treatment
Eyes:		
Inflamed, swollen	Conjunctivitis, may be secondary to respiratory infection (Complications: Vitamin A deficiency) (Also check for foreign bodies.)	Apply triple antibiotic ointment 3 -4 times per day. If no response within 3-4 days, assume a vit. A deficiency may be involved.
Sticky eyes with thick tears or secretions	Vitamin A deficiency	Use opthalmic drops (artificial tears) several times per day. If the case is mild, add several drops of cod liver oil to food once per week. If more severe - consult vet.
White or opaque eyes, eye-caps	conjunctivitis with pus retained under 'eye-lid'	Apply triple antibiotic ointment 3 -4 times per day. Once swelling is reduced, use a moistened swab to gently 'roll' the pus out from under the eyelid.
Ears:		
Swelling in 'cheek' or tympanic scale. May be one or both sides. The head appears to 'unbalanced' or asymmetrical.	Infection of the middle ear. Complications: respiratory infection, Vitamin A deficiency	Requires veterinary treatment. Basic approach is lancing and currettage. As a rule, follow-up is daily flushing with Betadine and packing with anti-biotic ointment.
Mouth:		
spot hemorrhaging, viscous secretions, excessive drooling, yellowish pus	Stomatitis (Mouth Rot) This is generally an indicator of a more serious underlying condition, seldom a disease in itself.	Requires veterinary review. Treatment involves debridement of the affected areas followed by flushing with a mild Betadine solution. Insure that the animal does not ingest any of the Betadine.
Distinct yellow tones instead of pink.	Jaundice complications: frequently a presenting symptom in a turtle coming out of a bad hibernation. May be an indicator of or accompanying symptom of anorexia, severe dehydration and/or renal failure	Requires veterinary treatment.
Nares:		
Bubbling, discharge	Respiratory infection (complications: Vitamin A deficiency.)	If a simple Vit. A deficiency, it is likely to be a clear discharge. If bacterial, it is likely to be colored. Both may be present. If turtle is eating, increase temp to 80 - 85 degrees - keep warm and dry. If no improvement or no appetite or conditions worsen - take to vet.
Respiratory:		
Wheezing, open-mouth breathing, distended throat, constantly extended neck.	Respiratory infection (If accompanied by cyanosis and/or concurrent illness it may indicate an acute pneumonia) Also check for physical obstruction.	Likely to be pneumonia or severe bronchitis. Requires veterinary treatment. If acute - transport immediately to veterinarian.
Skin:		
Simple Wounds	trauma	Depending on severity, debride, flush with Betadine, treat with triple antibiotic ointment. If massive, or obvious severe local infection seek veterinary intervention.
Wound with small white larvae	Myiasis complications: location of the larvae are an indicator of possible underlying damage - review carefully for trauma issues	Pluck larvae with tweezers. Treat same as wounds above. Repeat as needed. (Treatment may be required for some days due to hatching fly eggs.)
Wound with swelling, crusty black discharge, may be partially healed, may appear to be a small puncture. Lump under wound. Lump may appear to 'ripple' without accompanying muscle movement.	Myiasis - Botfly complications: location of the larvae are an indicator of possible underlying damage - review carefully for trauma issues	If wound is accessible, look for brownish, rice-grain size larvae. Remove with tweezers. Flush, debride, pack with anti-biotic. Repeat as needed. If infiltration site is inaccessible, seek veterinary assistance for lancing and debridement.

Skin peeling	May be caused by over-exposure (too much soaking) to water - most often seen in captive turtles. (also possible drug reaction)	Keep turtle warm and dry. Use small water dish. Limit soaks.
Skin sloughing - severe	Hypervitaminosis A, or drug reaction	If the reaction occurs within several days of a Vit. A injection, assume an overdose of A. If within two or three drug injections, assume an allergic reaction. If the latter, discontinue and review case with veterinarian for alternate drug therapies. Treatment involves keeping in a sterile cage with daily sterilization of water dish. Change a plain paper substrate daily. Flush affected areas with dilute Betadine and dry. Apply triple antibiotic ointment daily.
Ticks		Manual removal can be risky due to possible infection from mouth parts embedded in skin. MacArthur reports some success with dilute Amitraz (2 ml/l) (MacArthur, 1996)
Edema	Usually seen in captive turtles (unless accompanied by signs of general dehydration and anorexia, in which case renal failure is a possibility.) May be caused by iodine deficiency -(accompanied by goiter and lethargy) Protozoan infection is a third possibility	Requires veterinary intervention.
Swollen Leg(s)	Fracture, Septicemic arthritis, fungal infection, gout	Requires veterinary review and intervention
Red flush under skin	Septicemia, Peritonitis (frequently accompanied by vomiting, lethargy, yellow mucous membranes)	Requires veterinary intervention. Supportive therapy includes fluid therapy, increased temps and immediate systemic antibiotic treatment
Abscesses, present as lumps that break up the normal outline of the skin. Frequently caused by partially healed wounds.	Multiple possible bacterial agents such as Pseudomonas, Aeromonas, Citrobacter, Serratia, Klebsiella	Generally requires veterinary intervention. The abscess must be lanced, then curetted. Supportive therapy may require fluids, daily flushing and wound packing. Systemic antibiotics may be required, depending on severity.
Burns	trauma	Debride with dilute Betadine or hydrogen peroxide. Dry. Treat with Triple Antibiotic cream, Silvadene or Gentamicin applied topically.
Shell:		
Red flush under plastron or shell	see notes on red flush under skin	
Roughened or eroded areas on shell, grayish 'cement'-like areas. Easily detached scutes.	Ulcerative Shell Disease (Dry variety). Typically fungal in origin, may be complicated by bacterial infection.	Requires Veterinary intervention. Basic protocol requires the removal of any affected tissue. Cultures must be taken to determine the causative agent.
Softened areas with foul-smelling discharge. Scute(s) easily removed, reddish or bloody tissue exposed. May have exposed yellowish or white pussy areas under scutes.	Ulcerative Shell Disease (Wet variety). Typically bacterial in origin. Complications: potential for septicemia, may spread to include skin.	See above for dry USD. Sometimes referred to as SCUD.
Malformed or soft shell (may often be depressed by finger pressure), shell overly thickened in relation to size.	Metabolic Bone Disease (seldom seen in wild animals) Usually caused by poor diet.	Have veterinarian review for calcium, D3 metabolism.

Depressed area in shell with accompanying cracks	trauma	debride with dilute Betadine. A sterile bandage with triple-anti-biotic ointment may be taped to cover the wound and prevent myiasis. Healing is a lengthy process and may require 1 -2 years t complete. The turtle should not be released until complete knitting of the tissues is complete.
Piercing wound to shell - exposing soft tissues, or body cavity.	trauma	Requires veterinary intervention. Long-term care will be required.
Crushing wound to shell, multiple breaks, exposed body cavity	trauma	If veterinary or experienced rehab assistance is available, transport immediately. Otherwise, euthanasia is indicated.
Gastrointestinal:		
Mass protruding from cloaca	May be prolapsed organ. If any areas are blackened - this may indicate gangrene.	Saturate sterile bandage in sterile saline. Wrap gently around mass and transport to vet immediately.
Swelling, redness, or discharge from cloaca.	Cloacitis , systemic infection. Complications: cloacal calculus, egg retention, parasite infestation	Requires veterinary intervention. Cultures and physical exam required to determine cause.
Bloody or mucous-laden stools	parasite infestation or enteritis	Requires fecal exam and/or culture.
Intense diarrhea with no parasites or few bacteria upon exam. Passing undigested vegetable matter	SGS (SBS) or Sterile gut syndrome. Generally caused by use of broad spectrum antibiotics.	Try adding a small amount of active culture yogurt to diet to 'reseed' the intestinal tract. Alternatively, feed some fecal matter from a healthy turtle with food for 're-seeding'. Acidophilus cultures may be useful as well.
General:		
Shock - may be indicated by lack of responsiveness, pale mucosa, low blood pressure, muscle weakness, elevated heart rate	May be caused by fluid loss from a number of possible causes - wound seepage, vomiting, diarrhea, bleeding, or toxic shock.	Raise temperatures to mid 80's, administer fluids, consider the use of corticosteroids such as dexamethasone. A generalized dose for dex is .1 mg/kg IM.

Transport Protocol

Transport requirements are similar to those used for birds. The rehabber should keep a supply of small cardboard boxes or 'Critter Carrier'-type enclosures available at all times. The animal should not, however, be shifted through a substantial temperature change. For example, movement between an air-conditioned area and a hot summer day is highly traumatic for any ectotherm, including snakes and lizards. A tightly woven cloth such as a tea towel can be used to pad the bottom of the carrier. If a transparent carrier is used, cloth can be used to cover the sides. A hot water bottle may be placed under the cloth in the carrier to provide warmth. Make sure it is not too hot (i.e. over 90°F). In cold weather emergencies, you can place an animal in a loose cloth wrap and then inside clothing near the body for transport.

Euthanasia

Euthanasia in reptiles is an on-going debate at this time, and should, in most instances, be handled by your veterinarian. There are a number of possible non-veterinary methods, most of which have significant drawbacks for the rehabber and/or animal. Decapitation is not suitable since there is evidence that some level of consciousness may be maintained for as long as one hour after administration. Freezing, while accepted in the past, may not be effective. Temperature requirements for successful freezing are extreme, substantially below those available to the average rehabber. Turtles have a number of adaptive behaviors that allow them to function under cold conditions and without air for lengthy periods of time. The latter makes inhalant use risky as well. There is further risk to the administrator, due to the lengthy period of time and large amounts of agent required for successful usage of inhalants.

The Tortoise Trust's current preferred method is the administration of a suitable barbiturate (i.e. Pentobarbitone), administered IV or intracardiac. Dosage should be administered to excess, no less than 200 mg/kg. Ketamine IM, at a high dose, may be administered for immobilization to aid in subsequent injection of the euthanasia agent. (MacArthur 1996) **This procedure *must* be performed by a veterinarian due to the restricted class of drugs required.**

Glossary

Beak - horny tissue covering the jaw
Betadine - trade name for Povidine-Iodine
Carapace - The upper part of a turtles' shell.
Caseous - paste-like
Chelonian - a generalized term used for turtles by many hobbyists and taxonomists
Cloaca - a chamber where the urinary, genital and digestive systems empty.
Costal - the middle row(s) of scutes between the spinal or vertebral scutes and the marginal or edge scutes.
Ectothermic - characterizes animals that regulate their temperature by external sources, for example, solar radiation or sun-warmed rocks.
Hemi-Penis - The male sexual organ of a reptile, characterized by it's forked pink-red appearance and large proportional size.
Hibernacula - a place chosen by an animal as safe for and used to hide or hibernate.
Hinge - mobile suture in the plastron
Nares - paired nasal openings
Plastron - the lower part of a turtle's shell.
Scute - one of the many plates or scales that make up the turtles shell.
Suture - the seam between scutes or plates in the turtles shell
Tympanic Scale - the scale that covers the ear
Vivarium - an enclosure designed to mimic the natural conditions an animal lives in.

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[1] Avoid tubes designed for plants.

[2] The typical usable lifespan of a UVB bulb is about 4 four months of continuous use. This life can be extended substantially by simply using it as described in the text. If only used intermittently, tubes should last up to 12 months.

Author Profile

Frank Gould is the founder of RR&R, a backyard rehab organization devoted to the care and rehabilitation of injured wild reptiles, amphibians and mistreated or abandoned exotic pets. State licensed since 1997, Frank has been involved in the capture, study and rehabilitation of reptiles since he was a small child. He currently maintains an average of 30 animals at any one time, ranging from abandoned Boa Constrictors and Green Iguanas to injured box turtles. He is also a founding member of the MD Wildlife Rehabilitator's Association. In his 'other life', he is a computer network architect for a large financial services firm in Baltimore, MD.

Upcoming Meetings

•***Environmental Summit '98***: May 11-15, 1998, Sheraton Imperial Hotel & Conference Center, Research Triangle Park, North Carolina. 1-888-ES1998.

•***Summit of the Americas '98: Energy & Environment***: July 14-17, 1998, Miami Beach Convention Center, Miami Beach, FL. 305-375-9444.

•***Association of Avian Veterinarians***: August 24-29, 1998, Radisson Hotel St. Paul, St. Paul, MN. 303-756-8380.

•***IWRC 21st Annual Wildlife Care Conference***: October 15-18, 1998, Radisson Plaza Hotel, Fort Worth, Texas. 707-864-1761.

•***Wisconsin Wildlife Rehabilitator's Association***: October 23-25, 1998. Interlaken Spa Resort, Lake Geneva, WI. 414-248-5055.

*****NOTICE: Journal Authors*****

If you have submitted an article for publication in the IWRC *Journal of Wildlife Rehabilitation* within the past year (1997-1998) and have not received any information on the status of the article, please resubmit. During the changeover of editorship of the journal, some submissions were misplaced or not accounted for.

We apologize for any inconvenience or confusion this may have caused.

Editorial Continued from page 2

Museum of Southwestern Biology, University of NM (formerly of the American Museum of Natural History in NY) supports the idea that rehabilitators can make valuable contributions: "From the museum scientist's point of view, the advent of widespread efforts to rehabilitate wildlife, in this case birds, has literally ushered in a new era of ornithology. Never before (at least in recent times) has it been possible to handle such large numbers of individuals. This has made it possible to discern variations not observed... I cannot herein enumerate the "record" specimens saved from Wildlife Rescue, Inc. material..." (pers. com.).

All of these examples are part of the big picture of education. Regardless of the personal gratification that drives us, we should each strive to maximize the returns on our "investment".

In my view, all efforts to mitigate human impact on the planet are of value. We each contribute our little piece of the puzzle, which will eventually unfold as a great panorama. Whether it is a panorama of parking lots and skyscrapers inhabited by humans and their closest associates, or includes room for a wide diversity of species, is yet to be determined.

-E. P. Elliston-

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Exploring the Concept of the Minimum Dose: Wildlife Rehabilitators Consider Homeopathy

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ABSTRACT

Homeopathy is an approach to medicine that works to strengthen the body's ability to heal itself. It has been used around the world by homeopathic practitioners for almost 200 years and is considered a primary health care modality for millions of people. While initially developed for and used with humans, it has become an increasingly popular treatment for owners of livestock and companion animals. In recent years, it has become a topic of increased interest by wildlife rehabilitators, and has been presented at national wildlife rehabilitation conferences and other forums. The authors provide some introductory material on classical homeopathy and its scientific foundation. Some of the factors rehabilitators consider when deciding whether or not to pursue the use of homeopathy for first aid with wildlife are also discussed. Rehabilitators are strongly encouraged to study identified resources and work closely with homeopathic veterinarians. A bibliography and resource list are provided.

Key Words: wildlife rehabilitation; homeopathy; veterinary homeopathy; holistic veterinary medicine; complementary veterinary medicine

It is important to remember that this article is an extremely brief introduction to a complex and unique healing modality. This article provides only an extremely limited description of a modality which incorporates thousands of published resources and professional practitioners as well as full medical schools. Readers are strongly encouraged to seek out further information from the resources listed in order to more fully learn about homeopathy.

What is Homeopathy?

Homeopathy is a system of medicine that treats symptoms, imbalances and disease by giving very minute doses of a substance. The administration of this homeopathic medicine, or remedy, has been found to serve as a catalyst to the body's own healing mechanisms. As such, the homeopathic remedy is not given to eliminate the disease or condition, but rather to stimulate the body's own healing process. This approach is also based on the belief that health is a natural state and that all beings have the ability to heal themselves. Homeopathy thus focuses on the body, whereas allopathic medicine focuses on the disease or injury. A brief discussion of the scientific theory behind homeopathy is provided in the next section, followed by a brief discussion of the principles of homeopathy.

Scientific Foundation for Homeopathy

There are many excellent books that discuss the scientific basis for homeopathy. The following description is summarized primarily from George Vithoulkas in his work, *The Science of Homeopathy*, with additional information from *Homeopathy - A Frontier in Medical Science* by Paolo Bellavite, M.D., and Andrea Signorini, M.D., and from *Homoeopathic Science and Modern Medicine* by Harris Coulter.

The primary foundation for homeopathy is based on recent work in Quantum Physics that holds that all matter in the Universe, from a simple atom, to a complex structure such as the human body, has electromagnetic properties. A corollary is that all matter must possess electromagnetic energy and emit electromagnetic waves.

These waves have measurable properties of wavelength (or frequency) and amplitude (or force).

As complex as the human body is, it has its own unique and characteristic energy when it is in a healthy state. Alternatively, the body's energy will undergo a change when it becomes diseased or injured. From the homeopathic perspective, this change in energy in the body is manifested by the presence of symptoms (physical, mental, or emotional), such as swelling or inflammation, or grief or sadness, mental confusion or sudden forgetfulness. As the body undergoes healing, the energy "signature" becomes that of a healthy state with an absence of symptoms.

Homeopathy accepts the notion of the existence of a naturally occurring life force in all living beings that constantly strives for a state of wellness, or a balance in the state of health and disease, known as homeostasis. This notion of a "Vital Force" can be traced back in time through the philosophy of Vitalism. This philosophy holds that the vital force animates the body and possesses the "intelligence" to govern all facets of the body's existence, the balance of health and disease. Another way to describe this Vital Force or life force is as having ". . . a dynamic self-regulatory capability which all living creatures are undeniably endowed with in order to give them a better chance of survival." (Bellavite and Signorini).

In the homeopathic view, it is the Vital Force that causes the change in the vibrational energy of the body in response to a stimulus or insult, such as a virus or injury. This change in energy prompts symptoms to occur as the way for the body to heal itself. The goal of the homeopath is to assist the Vital Force in the healing process. This is done through a careful observation of symptoms in a sick patient and selection and administration of the homeopathic medicine.

Homeopathic medicines or remedies are developed from various substances such as plants, minerals, tissue and toxins. First, these substances are placed in a solvent such as water or alcohol. Then they are diluted to extremely small or even ultramolecular microdilutions to reduce the toxicity of the original substance. During the serial dilutions, the remedies are also vigorously shaken or succussed, a process that has been found to impart higher levels of energy into the resultant solution. This "potentization" (Vithoulkas) or "dynamization" (Bellavite and Signorini) is what gives the remedies of higher dilution (or lower chemical concentration) their higher levels of energy or potency.

These remedies, once made, are then studied on healthy people. In controlled study conditions, healthy people are given a single remedy and asked to record any resultant physical, mental or emotional symptoms that may occur. Those symptoms that occur in these people form the "picture" of that remedy. This "remedy picture" represents the collection of symptoms and signs that may then be treated by the remedy. This process is called a "proving" taken from the German word, Pruefuhg, meaning "test".

Finally, it is through the physical property of wave mechanics known as resonance that the homeopath is able to assist the body's Vital Force in healing itself. Resonance is the property of waves that explains why two identically pitched tuning forks (same frequency) in close proximity will vibrate at the same force (amplitude) when one fork is struck and begins vibrating. It also explains why they will both vibrate at a higher force when one is struck even harder. A homeopath will draw upon this property of resonance by choosing a remedy that has the same symptom "picture" (or energy) as is being observed from the patient's set of symptoms (same energy). And, the homeopath will choose a potency (or energy force) of the remedy that will give a boost to the energy of the Vital Force. The additional energy provided by this remedy (through resonance) may actually amplify or temporarily aggravate the symptoms, as the body responds in its own natural healing process. This aggravation may well be a confirmatory sign that the remedy and potency have been correctly selected.

As with any field of science, there exist believers and non-believers. Homeopathy is no different, with many vocal critics, including many from the more established, conventional medical community, who decry lack of scientific basis. Interestingly, one of the primary tenets of the scientific approach is application of a precise, repeatable and regimented set of procedures and techniques. The very precise homeopathic approach described by Hahnemann involving the "Law of Similars", the detailed case-taking, the single medicine, and the minimum dose has not changed in over 180 years.

Several of the homeopathic medicines that were originally proven in the early 1800's, have been re-proven recently in double blind controlled conditions with identical results (Coulter). Critics will also denounce the notion of a Vital Force, as being too religious or metaphysical. Others are quick to attack the concept of potentization of remedies and the use of ultramolecular dilutions, citing lack of scientific foundation. Many of these critics are the same that accept certain "givens" in physics, such as inertia, gravity, magnetism, the Laws of Thermodynamics, etc. All of these physical "Laws" are accepted not because of their scientific explanations, since none exist, but are accepted merely because they are repeatable, observable phenomena.

So it seems to be that, with many homeopaths, certain aspects of homeopathy are "givens", because they have been seen to work successfully and repeatably, time and time again. Most homeopaths seem to embrace homeopathy for what it can do, and do not seem to be too concerned about the scientific nuances of its workings. Its critics seem to remain mystified. Perhaps as advances continue in the realm of Quantum Physics, some of the less understood aspects of homeopathy will be afforded a more conventional scientific basis and understanding, and then perhaps more widespread acceptance. In the interim, the books listed above are excellent sources covering the current understanding of the science behind homeopathy.

Principles of Homeopathy

The Law of Similars

The concept of stimulating the body's healing response through the concept of "like cures like" is called the "Law of Similars". The homeopathic practitioner conducts a thorough "case-taking" in order to get a complete picture of the patient's condition and thus find the remedy that is most similar to or closely matches the patient's symptoms. Homeopaths also emphasize the importance of considering the whole being in case-taking. That is, that all the physical symptoms are not viewed as isolated functions, but must be addressed together in their totality as part of the complete being. Thus, a homeopathic practitioner would not just focus on a single complaint or symptom, but would consider everything about the patient. Clearly this is much easier to do with human patients, but the homeopathic concept of considering the whole being also applies to animals.

Selecting a Homeopathic Medicine

The homeopathic practitioner then strives to find and select a single homeopathic remedy which most closely matches the patient's totality of symptoms. Detailed descriptions of the homeopathic remedies found in homeopathic "materia medicas" are an important tool for understanding the remedies and what they do. These descriptions are often extensive and address many different body functions as well as special symptoms, general etiologies (or causative situations), and modalities that make the condition better or worse (e.g., movement, heat) which most closely match the symptoms. In order to provide a cross reference between symptoms and remedies, books known as "repertories" have been developed to help guide the homeopath from symptoms to the proper remedies. The materia medicas and repertories are basic tools of homeopathy.

Should the symptoms change, another remedy might be selected; but again, it is dependent on the patient's symptoms. Thus homeopaths do not attempt to address the healing of a patient based solely on the name of a general condition or disease. Rather, the homeopathic treatment is based on the individual's symptoms. For example, rather than a blanket treatment for diarrhea, the classical homeopath would consider various descriptive and distinguishing details, such as the consistency, color, and smell of the stool; if there was accompanying bloat; if the abdomen was tender; whether the patient sought heat or cool; how the stool was expelled; if it was caused by overeating, the wrong diet, or decayed food; and so forth. Such thorough case-taking helps the homeopath select the homeopathic remedy that is the closest match.

The Role of Symptoms

It should also be noted that homeopaths consider symptoms to be the body's attempt to activate its defensive forces to heal itself. Thus, homeopathic theory views symptoms as positive and indicative of which direction the healing should take place rather than something which should be suppressed. This view is somewhat different than that of allopathic medicine using drugs to remove or oppose symptoms.

How Did Homeopathy Start?

In the 1790's, Dr. Samuel Hahnemann, a physician in Germany, questioned the theory proposed by another physician that Chinchona Bark eliminated the symptoms of malaria because it tasted bitter. Dr. Hahnemann took a dose of the Cinochona Bark himself and found that he developed the symptoms of malaria. Repeating the procedure on himself and several friends produced the same results. He used this experience to expand on the Law of Similars concept proposed by Hippocrates in fifth century BC.

Dr. Hahnemann continued to test a variety of plants, minerals, and other substances to find out the full range of symptoms (physical, emotional, mental) they would cause in a healthy person; he called this a "proving". Since some of the substances caused severe symptoms, he wanted to test the least amount possible and see the resulting symptoms. So he kept reducing the amount of the substance by dilutions, with vigorous succussing (shaking) between the precise dilutions. This process was called potentization. Dr. Hahnemann found that the more dilute and succussed the homeopathic medicines, the stronger their ability to stimulate healing.

Dr. Hahnemann then attempted to match the symptoms of his patients with those of the homeopathic substances when given to healthy people. When he gave the homeopathic medicine that was the closest and most complete match, he saw remarkable improvements in his patients. While his popularity grew with patients, many of the conventional medical establishments of the time opposed what they considered heretical practices.

Others tested Dr. Hahnemann's theories and practices and found them effective in treating both chronic and acute conditions. The successful use of homeopathy in typhoid and cholera epidemics, as well as on the battlefields of war, resulted in its expanded use and an increasing number of homeopathic practitioners.

By the 1920's, there were major advances in allopathic medicine and the belief in its ability to cure numerous conditions with antibiotics. At the same time, the influence of the pharmaceutical industry and allopathic medical associations increased. Concurrently, there was growing conflict in the homeopathic community. While homeopathy continued its strength in some parts of the world, its practice declined in North America for decades. Then, in the late 20th century, dissatisfaction with allopathic medicine, the desire to return to more natural healing methods, and growing research on the effectiveness of homeopathy has resulted in rapidly increasing interest in homeopathy.

The Minimum Dose

Since the purpose of the homeopathic remedy is to stimulate or "jump start" the healing, only minimum amounts of a homeopathic medicine are used. The minimum dose also refers to giving only one dose or a few doses and observing the response. The use of the homeopathic medicine on a preset schedule is generally considered unnecessary and inappropriate. An analogy would be that once a key is turned in the car ignition and the engine is running, the driver does not need to keep turning the key. This use of a minimum dose of a homeopathic medicine is also one of the key principles of classical homeopathy.

This section on principles provides an extremely limited overview on some of the basic concepts of homeopathy. Those interested in homeopathy are strongly urged to study the principles by reading some of the more complete materials available (see resource list).

Why are Rehabilitators Interested in Homeopathy?

There are a variety of reasons that homeopathy, specifically, has attracted the interest of wildlife rehabilitators. That is not to suggest that they are discarding all allopathic treatments, but are looking to expand the options available for treating wildlife in order to help animals safely, effectively, and quickly regain health and return to live independently in the wild.

Homeopathy has a long history of successful use with humans and (other) animals in both acute and chronic cases around the world (Ullman, Coulter). There has been extensive documentation of the safe and effective use of homeopathy with a wide range of captive animal species (livestock, poultry, companion animals). The health of these animals has been in some cases for an entire lifetime, and in other cases of herd or flock situations, over generations (Day, McLeod).

Increasing research, published documentation, and easy availability of information about the effectiveness of homeopathy has raised overall awareness of the modality (Ullman, Jonas). It has also made it easier for people to learn about homeopathy and decide if they want to consider using it.

There are increasing concerns about the use of allopathic medications such as antibiotics and corticosteriods, including allergic reactions, side effects, and depression of immune functions (Day, Blackmer). There are also a variety of conditions where allopathic medicines may be unsafe or not work effectively on animals (Day). In addition, homeopathic treatments tend to be less invasive and to be relatively free of unwanted side effects of some allopathic treatments.

There are also a variety of conditions that allopathic medications have been unable to treat. Viral disease is one such condition (Coulter, Ullman), emotional state is another. While some people say it is inappropriate to attribute feelings or emotion to animals, rehabilitators commonly discuss the consequences of extreme fear and stress on wildlife in captivity and work to reduce them and the consequences. Rehabilitators have also commented that some animals seem to grieve and lose their appetite when separated from flock or family. Homeopathy has remedies that address the full range of physical, emotional, and mental symptoms (Kent, Clarke, Ullman).

Homeopathy works to treat the whole creature. The focus on detailed case-taking, observation and the selection of specific remedies to match the whole creature result in very individualized treatment (Kent, Vithoulkas).

Homeopaths believe in giving a minimum amount of medicine — this means per dose and number of repetitions (Hahnemann, Kent, Vithoulkas). This appeals to rehabilitators for many reasons. Helping support the animal's defense system to heal itself seems to be a positive approach and more likely to result in the animal being stronger when returned to the wild. Secondly, it seems to be good for the animal to not have to take so much medication. Thirdly, each time a wild animal is handled, there is increased stress and risk to both animal and rehabilitator (e.g., injury, disease, imprinting). Lastly, it is less expensive to use less medication.

Homeopathic medicines are relatively easy to administer (Day, Ullman). Generally they are placed in the animal's mouth dry, or in water; if the animal cannot be handled, the homeopathic medicine can be placed in food or a water bowl. Again, less capturing and handling generally reduces stress and risk to both the animal and rehabilitator.

Homeopathic medicines are relatively easy to obtain and are cost- effective. While homeopathic medicines can be very powerful catalysts for healing, most are available without a prescription. In addition, the cost of each homeopathic tablet is extremely low compared to other medications. Plus, the theory of the minimum dose often results in using very little medication per animal; so a container of homeopathic medicine can last a long time if handled appropriately. In addition, rehabilitators using homeopathy have mentioned that their use of allopathic medications has also decreased, which also helps to reduce costs. However, since homeopathic remedies are not available at every pharmacy or veterinarian's office, it may be necessary to plan ahead in order to have some of the first aid remedies used on hand at the rehabilitation facility.

Homeopathic medicines can be and often are used in conjunction with other health care modalities (Morgan, Subotnick, Ullman, Panos). For example, a dehydrated animal would be placed on heat in a quiet place, given hydrating fluids — and possibly given a homeopathic remedy (orally) to accelerate the reabsorption of fluids. A broken leg would still be immobilized and set, and then a homeopathic remedy might be given to help speed fracture healing. Homeopathy can be highly complementary to other modalities.

There have been examples where homeopathy

has helped to strengthen and accelerate the animal's healing (Day, Chapman, McLeod). Faster recovery means reduction in the animal's time in rehabilitation and reduction of the associated stresses. The average cost of caging, food, and treatment can thus be decreased. Less time in rehabilitation also means that the rehabilitator spends less time and energy on that animal — and that there is less risk of injury to the rehabilitator.

Why Do Some People Not Want to Consider Homeopathy?

It is not exactly clear how homeopathy works (Ullman, Vithoulkas). Some people prefer more complete information on and understanding of how a modality works before using it (Coulter).

Research studies on homeopathy are still relatively limited. There have been fewer studies than some opponents believe would be necessary to prove homeopathy's effectiveness. In addition, because homeopathy works on very specific, individualized symptoms, it is quite difficult to do comparisons control groups (Coulter, Ullman, Jonas).

Homeopathic provings, that is tests of the remedies, were done on humans. As a result, it may be more difficult to know how some of the remedies work on animals. However, experience has demonstrated that at least some of the remedies seem to work similarly on humans and animals (Day, Chapman, McLeod); this needs to be explored further. In addition, published repertories and materia medica refer to human physiology. This means that some of the information is not directly transferable to wildlife and must be interpreted (e.g., birds and reptiles do not have a rectum or urethra; normal stool color and shape for many wild creatures is very different from humans).

There is a limited database on the use of homeopathy with wildlife. Most of the research and documentation has been done on humans and a limited amount has been done on captive animals. While the use of homeopathy by knowledgeable and skilled homeopathic veterinarians and practitioners has been found safe and effective, there has been less experience with its use with wildlife. This is a concern for some rehabilitators.

Homeopathy is extremely different from other modalities (Vithoulkas, Ullman, Coulter). Some people will be uncomfortable with the concepts and principles, many of which may seem counter-intuitive.

Homeopathy requires some different resources, approaches, and techniques. This can mean significant changes in how one approaches rehabilitation and the practices in a rehabilitation facility. It means finding and acquiring different resources, such as repertories, materia medicas, homeopathic remedies, and homeopathic veterinarians. It also means seeking out training and studying resources in order to become proficient. This takes time, money and planning. Homeopathy is not something that can be done effectively at the last minute and without adequate knowledge.

Homeopathy can be time-consuming as it demands more thorough observation and documentation on individual animals during case-taking and watching for results of treatment. Repertorizing and finding the most effective remedy to match the symptoms can also take time; however, with practice, the time involved with repertorizing decreases. While the initial time with each wildlife patient may be greater than previous rehabilitation practices, some rehabilitators have found that the animal's recovery from acute trauma accelerated, which resulted in decreasing the overall time committed to caring for each animal.

There are a limited number of homeopathic veterinarians (Hanks). While the number of veterinarians attending training and becoming certified is growing, there are still very limited numbers of homeopathic veterinarians. This makes it more difficult to find a homeopathic veterinarian. It also means that the rehabilitator needs to be as knowledgeable and skilled as possible and to do a thorough and effective case-taking so that time with the veterinarian can be optimized.

Some allopathic medical professionals oppose homeopathy. As mentioned earlier, homeopathy is very different from some allopathic medical practices. Some allopathic veterinarians are unfamiliar with it since it was not part of their training but might consider learning about it and how it works. Others may oppose it all together. Rehabilitators need to consider if and how their studying and using homeopathy might affect their relationship with their veterinarian. Previous articles in the *Journal of Wildlife Rehabilitation*, Winter, 1997, may be useful in this regard.

Work with a Homeopathic Veterinarian

The effectiveness of homeopathy is significantly influenced by the knowledge and skill of the homeopathic practitioner. While homeopathic remedies are increasingly available in stores and by mail, it is their careful selection and use that makes them effective. This takes knowledge and skill beyond just reading a short news article or the suggestion of a homeopathic remedy based on informal comments in a pharmacy. While the authors have found homeopathy can be very safe and effective in some situations, there are some risks, especially if the person using it has limited knowledge or skill with the practice of homeopathy. For example, selecting the wrong remedy can delay treatment or risk deterioration of the animal; repeating remedies too often can create a proving; giving too high a potency can stimulate an aggravation. There are also considerable differences between using homeopathic first aid on acute traumas and acute flare-ups of chronic conditions. It is important to consult with a veterinarian in many situations.

It is the responsibility of the rehabilitator choos-

ing to use homeopathy to work closely with a veterinarian, preferably one knowledgeable about homeopathy. While there may be situations when the veterinarian and rehabilitator decide that the rehabilitator will apply first aid treatments independently, it is still important for the rehabilitator to have that relationship and to consult with the veterinarian.

Ways to Learn More

Books

In addition to working with and learning from a homeopathic veterinarian, there are many other ways to learn about homeopathy. There are many popular, contemporary books as well as classic books available. The following books provide a general introduction to basic concepts and some of the scientific theory: *The Science of Homeopathy*, by George Vithoulkas; *Healing with Homeopathy: The Complete Guide*, by Wayne Jonas and Jennifer Jacobs; *Homeopathy: Beyond Flat Earth Medicine*, by Dr. Timothy Dooley; and *The Consumer's Guide to Homeopathy*, by Dana Ullman.

The following books discuss some of the basic principles, but also cover some basic practices and first aid information: *Everybody's Guide to Homeopathic Medicine*, by Dana Ullman and Stephen Cummings; *The Complete Homeopathy Handbook*, by Gloria Castro; and *Homeopathic Medicine: First Aid and Emergency Care*, by Lyle Morgan; and *The Complete Family Guide to Homeopathy*, by Christopher Hammond.

There are far fewer books on the use of homeopathy with animals than its use with humans. Those most available focus on health concerns of companion animals and livestock. While some of the conditions may not be common in wildlife (e.g., mastitis, milk fever), they may have helpful information about conditions that are found in wildlife, such as frostbite, lacerations, bites, collapse, and slow healing wounds. Some useful titles include: *The Homoeopathic Treatment of Small Animals*, by Christopher Day; *The Homoeopathic Treatment of Birds*, by Beryl Chapman; and McLeod's books on the homeopathic treatment of goats, cattle, and horses.

There are several other critical resources that people wishing to practice homeopathy must have a good homeopathic materia medica and a complete repertory. Boerike's *Materia Medica with Repertory* is an inexpensive materia medica and considered a reasonable basic volume. Other excellent and more complete materia medicas are *The Concordant Materia Medica*, by Vermeulen; *Lectures on the Materia Medica*, by Kent; *A Dictionary of Practical Materia Medica*, by Clarke; and *The Desktop Guide to Keynotes and Confirmatory Symptoms*, by Morrison. While many of the homeopathic books include short descriptions of the remedies, it is vital to have a more complete materia medica in order to better understand the full remedy picture.

The Repertory of the Materia Medica by Kent is considered a classic repertory and is extremely valuable, though somewhat difficult to use until one becomes familiar with the organization, style and language; it is also inexpensive. *The Synthesis Repertorium Homeopathicum Syntheticum*, by Schroyens and *Repertorium Generale*, by Kunzli are organized similarly to Kent's but in more contemporary language and thus somewhat easier to use; they are also more expensive. The *Homeopathic Medical Repertory* by Murphy is somewhat less complete than Schroyen's or Kunzli's, but some people find its alphabetical organization and contemporary language easier to use. Some books, such as Boerike's *Materia Medica*, might include short repertories, but the person wanting to achieve the closest match of a remedy to a suite of symptoms needs to have a more extensive repertory, such as those listed above.

Training

In addition to reading, there are several courses and workshops available that address homeopathy for animals. The National Center for Homeopathy offers short, reasonably priced, workshops in the summers on homeopathy for animals. The British Institute of Homeopathy offers two levels of veterinary homeopathy self study courses with certificates (approximately $1500). The Academy of Veterinary Homeopathy offers an extensive homeopathy course for veterinarians.

WildAgain Wildlife Rehabilitation, founded by two of the authors, has also offered one day programs in conjunction with the annual conferences of the National Wildlife Rehabilitator's Association and the International Wildlife Rehabilitation Council. Additionally, they, teamed with holistic veterinarians (such as co-authors, Dr. Facinelli and Dr. Blackmer), conduct a more in-depth two day program in various locations, based on local rehabilitator interest and demand. This program focuses solely on homeopathic first aid and acute trauma care for wildlife in a wildlife rehabilitation setting. The course and the accompanying manual discuss 50 homeopathic medicines commonly used for wildlife trauma care.

Many of the homeopathic educational programs focus on humans and chronic conditions, but some may still have useful applications for acute wildlife situations. These include short workshops, conferences, symposia, and several year degree programs. Some professional homeopathic associations (see resource list) have schedules available. In addition, small homeopathy study groups are emerging in a variety of areas. The schedules and topics vary. Again, the National Center for Homeopathy and other professional homeopathy associations can provide information on contacting such study groups.

Some holistic veterinarians may also be able to recommend local educational programs. In addition, some of the homeopathic veterinarians or other homeopathic practitioners might be willing to share resources and provide some coaching for the rehabilitator demonstrating an effort to learn.

Conclusion

Classical homeopathy is not for everyone. For some, who have taken the time to understand it and use it correctly, it has dramatically changed the way they treat many of the wild animals that come into their care. While continuing to use certain conventional practices, such as fluid therapy, administering heat, and setting fractures, previous therapies of antibiotics and corticosteriods have been in many situations reduced. Many animals have healed faster; unwanted side effects have been reduced or even eliminated; animals have been handled less and released back to the wild sooner. Costs previously incurred for antibiotics and corticosteriods and other therapies have been reduced dramatically.

Classical homeopathy is comprised of a precise set of tools and techniques. It is not a folk cure nor an approach to healing to be taken lightly or without proper training. It is a modality that has proven to be successful with animals when used in the classical approach, that is using the single medicine or remedy, and, if necessary, prescribing another remedy if and when symptoms change. It is a modality that is best pursued in conjunction with a veterinarian trained in its use, and it is viewed as a modality that can be complementary to certain conventional medical techniques. It is not an either/or choice.

Homeopathy takes time and resources. The case-taking described above requires more time up front with each animal. The offset is generally less total time with the animal and a faster return to the wild. The basic tools of homeopathy, such as the books and the homeopathy remedies, require an initial investment. This investment can range from $150 for basic books (e.g.,repertory, materia medica, practices and procedures), and another $100 or so for a basic selection of remedies. This does not include the costs for training. Here again, the offset is often less money spent on conventional medications.

In summary, the objective of this article is to acquaint the reader with a complementary modality that seems to be gaining favor with wildlife rehabilitators. In addition to the books and training listed above, the reader is encouraged to contact other rehabilitators or veterinarians who have tried homeopathy in a wildlife rehabilitation setting. The two authors at WildAgain can be contacted and can provide a growing list of rehabilitators who have begun using homeopathy, as well as a list of some homeopathic veterinarians interested in helping with wildlife cases. For it is largely through these testimonials of successes, and failures, that the reader can best decide if he or she wants to further pursue homeopathy as a complementary modality in treating wildlife.

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Some Sources of Books

- Natural Health Supply; Box 6033; Santa Fe, NM; 87502; 505-982-4071.
- Minimum Price Homeopathic Books; P.O. Box 2187; Blaine, WA 98231; 800-663-8272.
- Homeopathic Educational Services; 2124 Kittredge St., Berkeley, CA 94704; 800-359-9051.
- Local bookstores, natural food stores; local holistic veterinarians; libraries.
- Some Holistic Health Associations
- National Center for Homeopathy; 703-548-7790.
- American Holistic Veterinary Medical Association; 410-569-0795.
- Academy of Veterinary Homeopathy; 305-652-1590.
- International Association for Veterinary Homeopathy; 770-516-7622.
- British Institute of Homeopathy; 800-498-6323.

Authors' Profiles

Dr. Rachel Blackmer graduated from Tuft's University School of Vet Medicine in 1991. While at Tufts she worked extensively at the Tufts Wildlife Clinic and left with a deeply entrenched interest in helping wildlife of all species. After leaving the university, she began work in a conventional veterinary practice in Vermont. Growing concerns about conventional therapies led her to study a variety of alternative health care modalities. She was certified by the International Veterinary Acupuncture Society in 1993. She also studied veterinary chiropractic in 1996; her certification from the American Veterinary Chiropractic Association is pending. She became a Reiki Master in 1996, and also took extensive training in classical homeopathy from 1994 through the present. She has worked with wildlife rehabilitators and offered a workshop on alternative therapies considered for wildlife called, "Health in Balance". Dr. Blackmer is co-owner of Indigo Quill Healing Arts, a thriving holistic veterinary practice in the mountains of Colorado.

Janice Facinelli, DVM owns and operates Holistic Care for Animals, a veterinary clinic in Denver, Colorado. Dr. Facinelli received her veterinary degree from Colorado State University in 1972. She practiced conventional veterinary medicine for many years before becoming interested in various holistic veterinary practices. She received her accreditation by the International Veterinary Acupuncture Society in 1988, her certification from the Academy of Veterinary Homeopathy in 1991, and her certificate from the Academy of Classical Homeopathy (2 yr. program) in 1996.

Shirley and Allan Casey are licensed wildlife rehabilitators in Evergreen, Colorado and specialize in squirrels. The Caseys have had assistance from both allopathic and holistic veterinarians since 1993. They are co-founders of WildAgain Wildlife Rehabilitation, Inc., which also conducts research and presents a variety of training programs for rehabilitators, wildlife agencies and others, including a two day seminar on homeopathic first aid considered with wildlife. The Caseys have also published and presented nationally on wildlife rehabilitation regulations. They are also members of the Board of Directors of The Colorado Wildlife Alliance, a statewide environmental group working on wildlife policy issues in Colorado.

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Returning Bats to the Wild...An Experiment in Release

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ABSTRACT

This case study details the successful release of different aged Pallid Bats—*Antrozous pallidus pacificus*. Two were raised from the age of three days and one of the bats had been captive for over four years. Many in the rehabilitation community have long thought that hand-raised bat pups could not survive in the wild after being raised by humans. This study demonstrates that, with some planning, Pallid Bats can successfully be released into the wild.

Key words: *Antrozous pallidus pacificus,* Pallid Bat, transmitters, receivers, radio telemetry, glue, bands, roosts.

Introduction

It has long been a tenet of bat rehabilitation that these mammals could not be released successfully into the wild. Rather, they should be kept in captivity as educational animals (Barnard 1991). Although this concern is justified in many cases, there is a need for more studies to determine the efficacy of releasing many species of rehabilitated bats (including hand-raised infants).This paper documents the successful release of Pallid Bats (*Antrozous pallidus pacificus*) into an existing colony.

Importance of Free Flight Room

In 1992, an adult female Pallid Bat was found on the ground in Marinwood, on the west side of Highway 101 in Marin County, California. Although she had no visible injuries, she refused to fly. Every attempt to launch her resulted in failure. The bat did not fly for nearly two years—neither releasable nor usable for educational purposes. She was an older bat and one that would not tolerate being part of a program that would expose her to hundreds of ogling children. (Only non-releasable bats with the proper temperament are suitable for display.) Instead, this bat became a roost mate for temporarily injured Pallid Bats until they healed and were released.

In 1994, several injured Pallid Bats were brought in for care. Eventually, they needed to be exercised. The bats failed to fly vigorously when individually launched by hand. Subsequently, a flight room was established; fiberglass screening was fastened to the windows and walls for the bats to hang on and their cages were permanently left open. After approximately one week they began flying every night, even the adult female from Marinwood.

Fostering Young Bats

The following June of 1995, two very young orphaned female Pallid Bats were brought in for care after being found on a driveway near a maternity roost in Novato. Both were under one week old. After six weeks they were weaned, joined the other adults in the flight room, and began to fly within two weeks. The young ones rapidly learned, perhaps by watching the adults feed, how to swoop down to the floor and pluck mealworms from a bowl.

Amputating and Pinning Recoveries

In the early spring of 1996, an adult male Pallid Bat, who had come from an attic in Olema, California, was brought in suffering from three crushed distal phalanges. These were subsequently amputated by veterinarian Scott

Sims. The right wing was now noticeably shorter than the left. Pallid Bats are normally strong flyers, able to launch easily from the ground where they often forage for large arthropods. Even knowing this, we assumed that, with such a severe injury, this bat would never be able to fly well. However, by the summer of 1996, he was up and flying strongly.

An adult male Pallid Bat was transferred to California Bat Conservation Fund in 1995 from Alexander Lindsay Museum of Walnut Creek with a compound fracture of the radius. The bone was pinned by our veterinarian and healed so perfectly that the fracture site could not easily be detected, even on radiograph.

Many bat rehabilitators consider pinning to be of little value, possibly due to lack of access to reports of successful outcome. Susan Barnard, in her 1991 manual "The Maintenance of Bats In Captivity," mentions pinning, but gives no indication of any successes. The California Bat Conservation Fund first tried this procedure on a Pallid Bat with a mid-shaft compound fracture of the radius. The bat was released eight weeks later (Scott, C., 1996). Veterinarian Scott Sims, has been striving to perfect this procedure on bats and has succeeded in repairing many bats in our care. Of the various species that Dr. Sims has operated on to date, Pallid Bats have responded the most successfully to pinning. He has performed five pinning operations on Pallid Bats, and all five of the bats have been successfully released.

Pre-Release Housing

In Olema, during July, 1996, we constructed a flight cage, measuring forty eight feet long, eight feet wide, and eight feet high. It is located about fifty yards from the attic of the old farmhouse where the adult male with the crushed wing was found. Here, in the flight cage, the bats could exercise and acclimate to the changing temperatures. The cage was partially covered with dark plastic tarps to help raise and stabilize the temperatures. A small pond was sunk into the ground inside the flight cage to provide a source of drinking water. Bowls of fortified mealworms and pet-shop crickets were placed in several locations throughout the cage; all of the Pallid Bats were adept at landing on the floor of the flight room, grabbing mealworms and flying up to a roost.

Progress and Monitoring of Pre-Release Bats

The bats were introduced into the flight cage on August 18, 1996 when the outside temperatures were 82°F (day) 61°F (night). These warm temperatures, which would be conducive to bat activity were important, as we lacked an alternate heat source. Data loggers, which read the air temperature every half hour and saved the information, were installed in the flight cage and the attic roost.

Initially, we released ten bats in the flight cage: four Pallid Bats (*Antrozous pallidus*), four California Myotis (*Myotis californicus*) and two Long-eared Myotis (*Myotis evotis*). All the bats were banded on their forearms with Lambournes™ bands—males on their right forearm, females on their left.

The male with the amputated phalanges received band #C3005 and the male with the pinned radius received band # C3006.

Weights of Pallid Bats on August 18, 1996:

Bat	*Weight*	*Band #*	*Color*
Adult Male-amp	22.5 gr.	#C3005	Gold
Young Female	21.6 gr.	#C1001	Red
Young Female	22.5 gr.	#C2004	Green
Adult Male-pin	21.3 gr.	#C3006	Gold

On August 21, 1996, the bats were weighed and all had lost weight.

Weights of Pallid Bats on August 21, 1996:

Bat	*Weight*	*Band #*	*Color*
Adult Male-amp	20.6 gr.	#C3005	Gold
Young Female	19.6 gr.	#C1001	Red
Young Female	18.8 gr.	#C2004	Green
Adult Male-pin	18.9 gr.	#C3006	Gold

By August 21, 1996, one of the Long-eared Myotis had fractured an elbow and both Long-eared Myotis were removed from the flight cage. All of the California Myotis had lost weight and they were also removed. They were placed in the smaller indoor flight room. We believe that the smaller species would do better in a smaller flight cage with an abundance of moths inside the enclosure to feed on. In the large flight cage it was necessary for them to fly down eight feet and pluck mealworms from a container on the ground. No effective way was found to introduce native insects into the flight cage.

Weights of Pallid Bats on August 22, 1996:

Bat	*Weight*	*Band #*	*Color*
Adult Male-amp	21.4 gr.	#C3005	Gold
Young Female	19.4 gr.	#C1001	Red
Young Female	19.4 gr.	#C2004	Green
Adult Male-pin	18.0 gr.	#C3006	Gold

Because of his low weight, #C3006 was brought in to feed. He was returned two days later at 19.0 grams.

The bats were beginning to drop weight. This was probably due to their unfamiliarity with their new surroundings and the energy demands of their increased activity. Weights were checked every 3-5 days.

By September 12, 1996, all of the Pallid Bats had adjusted to their surroundings. They were feeding well and gaining weight. The adult female who had been in captivity for four years was introduced to the flight cage on this day. She weighed 25.5 grams and was given Band # C3007 - Gold.

Weights of Pallid Bats on September 12, 1996:

Bat	*Weight*	*Band #*	*Color*
Adult Male-amp	23.5 gr.	#C3005	Gold
Young Female	22.0 gr.	#C1001	Red
Young Female	22.5 gr.	#C2004	Green
Adult Male-pin	21.0 gr.	#C3006	Gold
Adult Female	25.5 gr.	#C3007	Gold

On October 4, 1996, Holohil BD-2B® transmitters, weighing 0.78 grams, were attached to three bats using Skin-Bond®, an adhesive used primarily for human prosthetics. The transmitters were glued to the bare area between the shoulder blades and the surrounding fur was brought over and glued to the transmitters. We used a Teleonics™ Receiver, with a range of nearly a mile in flat terrain and a Yagi™ 3-element antennae.

Weights of Pallid Bats on October 4, 1996:

Bat	Adult Male	Young Female	Adult Female
Weight	31.5 gr.	27.5 gr.	29.0 gr.
Band #	#C3005	#C2004	#C3007
Color	Gold	Green	Gold
Frequency	4552	4527	4198

The other young female, #C1001, was not assigned a transmitter. All of the bats were checked before release. Fecals were done on all releasable bats to make sure that no endoparasites were introduced into an existing colony. All tested negative but adult male, #C3006, was held back because of a minor bout of diarrhea. When placed on a diet of crickets for four days, the feces returned to normal. The four other bats were placed into the attic in Olema with an existing maternity colony of approximately one hundred female Pallid Bats. This was a perfect site—safe and accessible.

Release and Post-Release Monitoring

The first night, the adult male, #C3005, promptly left the roost about 8:30 p.m. to forage and was almost immediately out of range. The adult female, #C3007, left at 9:00 p.m. and flew southwest across a creek to an open field to forage. At 9:18 p.m. the signal was still coming from the creek area and one minute later, the signal was gone. The area was checked in three directions up to seven and a half miles, and the only signal remaining within one mile was from the young female bat, #C2004, who had not moved from the attic.

On October 5, 1996, at 7:30 a.m., the adult female, #C3007, was roosting in an old wooden barn located approximately ten yards from the attic. The young female, #C2004, was still in the attic. The bat with Band #C3005 was not found. On the night of October 6, we received no signal from either #C3005 or #C3007. The young female, #C2004, went out foraging beyond the creek and then back to the barn to roost.

On October 7, 1996, Dr. Gary Fellers was driving north along Highway 101 in Marin County looking for a signal. He picked up a signal from #C3007 at St. Vincent's School for Boys in Marinwood. The adult female had flown home to where she was found four years earlier—a distance of approximately fifteen miles.

We followed the young female, #C2004, as she went out to forage every evening in the open field, roughly one quarter mile from the barn, and then back to the barn at night to roost with the other bats. The adult female, #C3007, remained roosting in the tallest tower at the St. Vincent's School and we were able to locate her there for the next ten days. We were unable to physically capture her to retrieve the transmitter as the top of the tower was totally inaccessible.

Steve Rezas offered his Cessna to fly over some of the ridges and far-reaches of the county searching for the missing adult male, #C3005. Even with this luxurious tracking extension, the bat was never located.

Weighing In

On October 12, 1996, we attempted, but failed, to capture the young bat in the barn with a mist net. Another try on October 14, 1996, also resulted in failure. On October 20, 1996, Ray Miller supplied an eighteen foot pole net. Finally, we were able to catch the young female, #C2004, from the rafters of the barn. She had done well. She had gained 0.5 grams. In her brief time of being a free bat she had learned how to forage for natural food. She was brought in to retrieve the transmitter. She preened it off two days after she was caught with absolutely no fur missing. She was allowed to feed on mealworms for two days and to fly inside a room. On October 24, 1996, she was returned to the attic roost. She was seen for over a week, roosting alone in the barn late into the night. Outside temperatures had dropped into the low thirties and whether she would follow the others to a safe hibernaculum was doubtful. We fully expected to find her dead and lifeless body on the floor of the barn. Eventually, she disappeared from the barn. During the winter, the barn and the attic were checked but no bats were seen.

Successful Rehabilitation

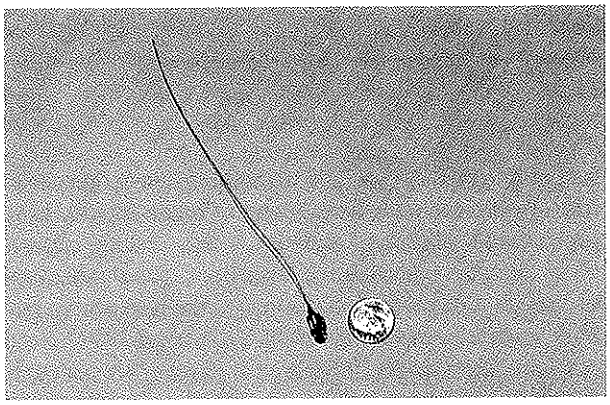
The ultimate proof of the successful rehabilitation of a Pallid Bat, hand-raised from infancy, came with the rediscovery of female bat, #C2004, nearly seven months after her initial release date. On April 16, 1997, while checking the original attic release site, she was found roosting with approximately 15 other Pallid Bats and several Mexican Free-tail Bats (*Tadarida brasiliensis*).

Conclusion

The above experiences and post-release monitoring contradict and disprove the majority of previous reports indicating that successfully releasing hand-raised

and rehabilitated bats was problematic and probably impossible. In the light of our experiences with these monitored releases, one may now question the conclusion of Routh, in his 1991 article, "Bats in the Surgery: a Practitioner's Guide," who suggests that if a recovering bat must be kept over 20 days, it should spend the rest of its life in captivity. The article also cites Walsh and Stebbings, who in 1989 wrote that if an orphaned infant cannot be placed back in the maternity roost, it will be a life-long captive.

This current study demonstrates that Pallid Bats are intelligent, adaptable, and possess a remarkable sense of direction and roost site fidelity. In our first post-release study of a hand-raised juvenile Pallid Bat (Dicke 1994), we successfully reintroduced a single male to his natal colony. The young Pallid Bat who learned to forage, roost, and survive her first winter, and the adult female Pallid Bat (who after four years of captivity, not only remembered how to forage for native insects, but returned to her original roosting site), strongly suggest that rehabilitated and hand-raised Pallid Bats can, indeed, survive in the wild.



BD-2B Transmitter
(Photo by Jan Wild)

Products Mentioned in the Text

•Transmitters: Holohil Systems, Ltd. 112 John Cavanagh Road, Ontario, Canada KOA 1LO. Telephone (613) 839–0676 Fax (613) 839–0675 e-mail: holohil@logisys.com
•Temperature Loggers: Onset Computer Corporation 536 MacArthur Blvd., Box 3450, Pocasset, MA 02559–3450 Telephone (508) 563–9000 Fax (508) 563–9477 e-mail: sales@onsetcomp.com
•Glue: Skin Bond® Smith and Nephew United, Inc., Largo, FL 34643 Telephone (800) 876–1261
•Receiver: Teleonics, Inc. 932 Impala Ave., Mesa, AZ 85204–6699 Telephone 602–892–4444
•Bands: Lambournes Ltd. Shallowford Court off High Street, Henley-in-Arden, Solihull, West Midlands B95 5BY, England. Fax: 011–44–1 564–793075

EDITOR'S NOTE: ***We all send Christine "Get Well" wishes and hope she will be back home soon, continuing with the work she loves!***

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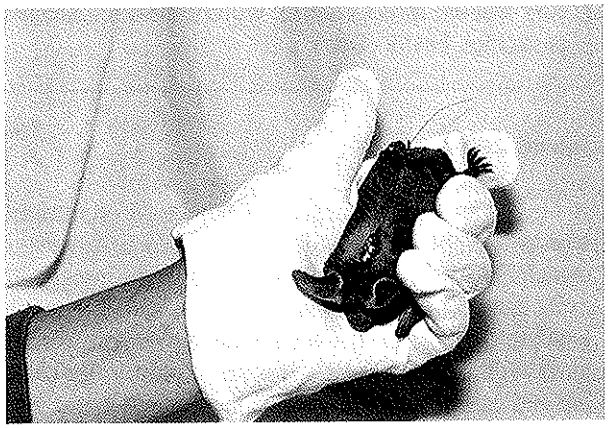
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Pallid Bat *Antrozous pallidus pacificus* with a BD-2B transmitter
(Photo by Jan Wild)

Author Profiles

Christine Scott began rescuing orphaned and injured bats in 1988 and co-founded the California Bat Conservation Fund five years ago. Prior to that she worked for many years at a wildlife center which provided her valuable rehabilitation experience. During that time, bats were automatically, upon intake, being euthanized at many Humane Societies and Animal Control facilities, as well as wildlife care centers. In order to help save some of these beneficial creatures, it was vital for her to learn as much about the animals as possible. She was fortunate to work with some of the leading bat biologists in California, and for many years worked under their research permits. The author has now been granted a Memorandum of Understanding (operating permit) from California Department of Fish & Game to care for orphaned and injured bats in California.

Cindy Dicke is the Assistant Director of Animal Care at WildCare of San Rafael, California. She currently shares her home in California with four species of bats.

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Safe Insect Control: the Basics

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ABSTRACT

Spring is here, and for many parts of the country (thanks to el Niño) the entomological forecast is for higher bug populations, earlier than usual. For wildlife rehabilitators that creates another set of concerns: how to control problem populations of roaches, ants, flies, bees, wasps and other insect pests without resorting to pesticides that can pose health risks to both animals in treatment and people caring for them. Pesticides, by definition, are poisons. They are designed to kill organisms deemed to be pests. Many commonly used insecticides and herbicides pose significant health risks. It is prudent for rehabilitators to establish non-toxic processes for dealing with insect problems. This article offers a framework for approaching most insect problems with simple and least-toxic solutions.

Key words: insect control, wildlife health management, pesticide alternatives, integrated pest management, insects, pesticides, health effects

Introduction

The process described herein for controlling insects is commonly known as integrated pest management (IPM). IPM works by understanding the insect's life cycle and needs, developing reasonable tolerance levels, looking to structural changes that can prevent problems in the first place, implementing physical controls like cleaning and creating barriers, and using non-synthetic, non-chemical substances when they are effective and safe. Such approaches are known as 'non-toxic.' Pesticides (in low volatility formulations such as baits and spot application gels) are used only after non-toxic alternatives have failed to provide control. They are used in combination with non-toxic approaches to decrease the insect population quickly. Once this goal is achieved, resuming non-toxic approaches will provide long-term control in most cases. IPM works not just for insects but for plants and rodents deemed pests.

Pesticide Risks: An Overview

Pesticides are chemical or biological substances designed to kill organisms deemed to be "pests" including insects (insecticides), plants (herbicides), molds (fungicides), and rodents (rodenticides). They are designed to interfere with the target organism's vital biological processes. However, most pesticides do not discriminate between target and non-target organisms; non-target beneficial plants, animals, insects, and micro-organisms are exposed to pesticides through a variety of indirect means (e.g. proximity to target organisms, spray drift, feeding or foraging habits). In addition to harming non-target organisms, pesticides have been found to cause serious heath problems in laboratory animals. These include cancers, birth defects, reproductive disorders, gene mutations, endocrine disruption, and damage to the nervous system, liver, and kidney (Abrams 1992; Ecobichon 1991). Pesticides are increasingly implicated in a host of human health problems (Colborn 1996; Davis 1998), especially in children (Leiss 1995; Davis 1993). Ongoing research has identified pesticides as hazards for pets (Hayes 1991), wildlife (Colborn 1995; Jarman 1993), and the environment (Pimentel 1992). Nevertheless, their use is widespread. In the United States we use some 1.25 billion pounds of pesticide-active ingredients annually (Olson 1996).

Because of the inherent health risk of pesticides, and because a growing number of insect species are developing resistance, non-toxic alternatives are growing in popularity and importance.

Insect Control Strategy

In almost every case where insects congregate indoors, the reasons are straightforward. You are providing them with food and water, and, most likely, a desirable place to hide between feedings. Your goal in solving this problem is to deny them access to food, water, and hiding places, and to block their access to the indoors. Keeping insects out of indoor exam rooms, food preparation areas, and animal housing is in most cases a reasonable goal.

Keeping all insects away from exposed outdoor areas is not reasonable, but keeping swirling masses of insects away from these areas is.

The framework is simple:

1. *Identify the insect*—Take time to identify what kind of ant or flying yellow and black thing you are dealing with. This is the only way you'll get accurate information and assistance from others. (Information resources will be presented below.)

2. *Identify what the insect wants*—Sometimes this seems a big mystery, especially with ants. Ants and cockroaches can locate the tiniest residues of food. For ants indoors, that means the spilled sugar you didn't quite wipe up, or any number of medicines that are sugar based. Another food source in medical environments can be blood residue. Ants are drawn to either proteins or sugars—sometimes the difference is species related, or seasonal. In outdoor cages a big insect draw is food. Many rehabilitators like to provide recovering animals with a constant supply of food. Here, there are no easy answers; food will attract insects. But when possible, clean up food remnants or uneaten pieces no longer of value to the rehabilitating animal. Keep eating areas clean, not allowing buildup. Vary the location of food and water sources. Also, try using nylon mesh screen panels as temporary covers for outdoor cages during peak insect seasons.

3. *Use elbow work*—Nothing provides long term relief from insects like keeping things clean. Avoid clutter. Do long-term maintenance. For example, consider ants again. Most ants form a line and start to serve themselves once they find your indoor buffet.

•Step one, trace the ant serving line to its source. (That's probably a crack, hole, window, or door—we'll get to that in a bit.) Then, take a bucket of warm soapy water and douse them (household soaps are toxic to most insects). Wipe up the ants and the area along which they were treading.

•Step two, take a probing look around. If you find more ants, do the same thing. If you find other potential food sources clean them up now.

•Step three, go back to that hole, crack, poorly weatherstripped door or ajar window. Fix it. If you've got a hole (gee, maybe that was where those mice came from late last autumn), stuff it with steel wool and caulk over it. If you've got a long crack along the base board, caulk it and if necessary replace the edging. Fix leaking faucets indoors and out. These are simple repairs any rehabilitator can handle. It's inexpensive and easy to learn.

This may seem tremendously simple and nothing more than common sense. On the other hand it is time consuming and demands constant vigilance to keep things neat and clean. And for those in older buildings full of cracks and holes and perhaps without foundations, this process is not always simple and may create up-front expenses for structural repairs. (Recommendations for these can be obtained through the organizations listed). But the key to insect control is not the band-aid approach of spraying a potentially harmful pesticide on surface areas where the chance of hitting more than a small proportion of the target insect population at any one time is slim. (Indeed, much of that spray goes into the air you breath). Instead, true long term control demands that areas intended to remain largely insect free be made unattractive and unavailable to insects.

As an aside, before moving on to a few insect-by-insect recommendations, a brief word about tolerance levels. The IPM process described here is predicated on the notion that zero tolerance for insects is unrealistic. Rehabilitators recognize that insects have a valuable role in their outdoor ecosystems. The idea of "eliminating" or "exterminating" insects who become indoor pests is replaced by the goal of making indoor environments poor and inaccessible substitutes for their outdoor environment. Some insects will always manage to enter any environment and we should expect to live with a few day-to-day encounters.

Common Insects and Common-Sense Controls

What follows is the most basic advice regarding the most common insect pests. Remember that insect habits and resistance can vary from region to region and in different contexts. Nine times out of ten your problems will be controlled by the simple ongoing process described above. However, when chronic infestations occur, as a last resort, small amounts of low volatility pesticide may be warranted after non-toxic steps fail to achieve realistic levels of control. In those cases, you can still stick to a least-toxic program but you need to level the playing field. Some least-toxic options are included below, others can be learned by contacting one of the organizations listed at the end of the article.

Ants—There are 455 known species of ants in the U.S. alone; most you will never see, especially indoors. Pest control operators and pesticide use reduction organizations agree (unusually) that pesticides are rarely necessary or effective with ants. If you have a chronic ant problem, it is critical that you identify the species in question. Least-toxic approaches for several persistent ant species (e.g. fire ants, carpenter ants, argentine, and pharaoh ants) have become somewhat specialized and very effective. The organizations listed at the end of the article and, in many cases, your state university extension service, can help you identify your specimen. Most common indoor invader species are odorous house ant, pavement ant, pharaoh ant, and thief ant. *Non-toxic controls*: sealing points of entry, soapy or boiling water, flooding, non-pesticide sticky barriers. *Least-toxic controls*: desiccating dusts (diatomaceous earth, silica aerogels), boric acid powder,

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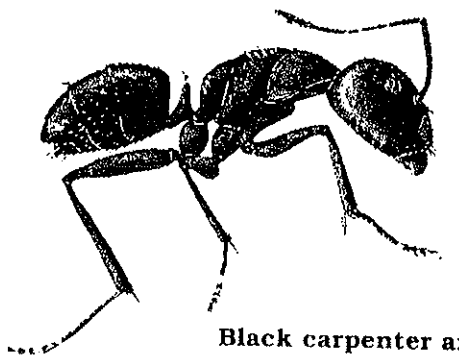
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Author Profile

Kelley R. Tucker holds federal and state permits to rehabilitate wildlife and works primarily with raptors. She is currently project associate and fundraising coordinator for the Safer Pest Control Project where she specializes in programs to reduce pesticide use in green spaces and animal habitats.



Black carpenter ant, *Camponotus pennsylvanicus*

BOOK REVIEW

Can We Save Them?
by David Dobson, Illustrated by James M. Needham
32 pages. Available in either hardcover ($15.95) or paperback ($6.95)

This book, geared to younger readers (age 10 and under) addresses the very important issue of conserving endangered species in North America. It does this through the use of some beautiful illustrations, and addresses not only the causes for the species' decline, but also offers ideas and suggestions as to what steps need to be taken in order to protect these creatures. An interesting point is the author highlights some of the more unusual species, like Oahu Tree Snails and the American Burying Beetle, rather than the more commonly known, yet just as threatened ones, like the Bald Eagle.

In short, yet descriptive paragraphs, the reader is given lots of useful and interesting information about the individual animal as well as their normal habitat. It would make an ideal gift for your younger children's classrooms or a welcome addition to their own book collections. A great "read-aloud".

Will We Miss Them? Endangered Species
by Alexandra Wright
Illustrated by Marshall Peck III
32 pages, 30 color illustrations.
Reinforced ($14.95)

This book, written for young children by an eleven year old girl, approaches the endangered and threatened wildlife issue from a slighly different perspective. The author describes the physical appearance of the animal as well as some of their major attributes and benefit to nature as a whole. Beautifully illustrated with full color prints, each animal is shown in its native habitat, with many of them also depicted enjoying their natural foods.

This book will appeal even to the child who is not yet able to read on their own. They will be fascinated by the colorful drawings.

The author provides information on little known and interesting facts about the animal and also includes a map of the world showing the areas in which they are normally found in the wild..

This book would also make a great addition to your child's school or local library.

-Mary Reynolds-

Both books published by:
Charlesbridge Publishing, 85 Main St., Watertown, MA 02172, USA, 800-225-3214..

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For the Rehabber

The Use of Knox® Blox in Rearing Avian Species

E. P. Elliston
Wildlife Rescue, Inc. of New Mexico
Albuquerque, New Mexico, USA

Introduction

How many of us have raised young songbirds ranging from robins to ravens on a semi-solid diet delivered through a syringe? This seems to work nicely for the first few weeks. The birds accept the syringe as they would the parental bill, and the operation is neat and clean. Then we come to the point at which the parent would normally be handing the youngster pieces of food material (insects, vegetation, etc.), and the nestling passes into an advanced stage of development. Holding these birds to an "injection" regimen may no longer be acceptable to the youngsters, resulting in head shaking to eliminate excess food, or in delaying their learning to self-feed. How can one give these adolescents the proper diet, with enough moisture, in a form that they will readily accept?

Insectivores thrive on a variety of bugs to enhance their diet. Wouldn't it be nice to be able to add fruit flies, aphids, ant eggs, and myriad other tiny creatures of the season, as well as powdered insect-based fish food and powdered house fly larvae (Soya Musca™, Cockerum Oregon Insects Corp., PO Box 714, Tillamook Oregon, 97141-0714, USA) to a solid 'salad' that they would eat in volume?

Knox ® Blox

Gelatin manufacturers such as Knox® (Nabisco, Inc. East Hanover, NJ, 07936, USA) have a multitude of recipes in which gelatin can be used. Plain, unflavored gelatin has the pleasant effect of adding firmness to liquid or semisolid foods. It can also incorporate lumps of meat or fruit into a single mass. Gelatin allows these foods to hold a shape under certain conditions, such as cool temperatures. The more gelatin present the firmer the gel and the warmer it can remain before it loses its shape.

One packet of plain gelatin (7g) contains 25 calories of food value, entirely in protein. If that granular material is added to 25cc of cool water the powder absorbs the water and you end up with a moistened, softened, gelatin mass containing 1 Kcal/ml. If this mass is gently heated in a warm water bath, or 10-15 sec in a microwave, the protein will dissolve and can then be mixed with the warm slurry usually used as food. If the diet is a slurry of soaked cat or dog food, prepare as usual and add the dissolved gelatin. Spread in a thin layer in a flat container and chill. When hard, cut to the desired size and shape. If you use 1 package of gelatin to 1/2 cup of slurry the resulting gel should remain solid at room temperature. Insects and Soya Musca™ can be added directly to the dissolved gel, 'gluing' them together and forming a nutritious aspic for variety.

It is important to remember that gelatin, being protein, is digested by proteolytic enzymes. Consequently, fruit such as papaya which contains papain, and pineapple which contains ananase, will prevent jelling, as will too high a concentration of insects in which the enzymes have not been denatured. Dried fish food and Soya Musca™ do not contain active enzymes.

We have found that juveniles of many species, including woodpeckers, robins and a variety of flycatchers, accept this preparation readily. Since they continue to pick it up as self-feeders the pre-release diet has greater breadth than the usual collection of mealworms. The gels (blox) seem to have a smooth "springy" texture pleasant to feel, and they deliver a lot of moisture into the gut of a young bird which "shakes out" a wet mouthful.



Drawings by Joe Papp

J. Wildlife Rehab. 21(1):32-36
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FEATURE: "Up For Discussion" IWRC *Journal of Wildlife Rehabilitation*

Wildlife rehabilitators discuss many topics in addition to those involved with the direct care and handling of wildlife, including professionalism, standards, ethics, wildlife policy, community involvement, and much more. The following case studies present hypothetical cases with fictitious names. If these fictional cases look familiar, it is because they were created based upon a composite of actual situations. They are not intended to represent any specific circumstance or person.

The objective of the case and published responses is to generate open dialogue among rehabilitators and others involved in the wildlife rehabilitation field, on topics that could benefit from a broader and more public discussion. There is no single perspective or solution to these cases. Rather, the topics are "up for discussion." Some of the cases may also be discussed at upcoming IWRC conferences.

Each case is followed with several proposed questions and additional input is welcomed. Every journal issue will highlight responses from the previous topic(s). Respondents are given the option to respond with or without using their names, but listing experience, position, and general geographic region.

Due to space limits, we will not be able to use all responses that are received, nor in all cases, the complete responses from each contributor. We will make every attempt to include as many returns as we can, but even if your information is not used, we sincerely appreciate your participation in this project.

NOTE: ***The International Wildlife Rehabilitation Council (IWRC) makes no claims as to the accuracy or truth of the information contained in the "Up for Discussion" cases, nor does it endorse any particular answer or response. They are fictional representations and all responses are printed as they are received from respondents, with the exception of being edited for available space and spelling errors. Any resemblance to actual current or past situations or persons, living or dead, are purely coincidental.***

UP FOR DISCUSSION: Case III - "No Good Deed...."

Before this morning, Jeff Singleton had never heard of anything or anyone called a 'process server'. When the man entered the Johnson County Wildlife Rescue and Rehabilitation Center (JCWRRC), Jeff just assumed he was there regarding some wildlife situation. When the gentleman realized he was, in fact, talking to Jeff, he then introduced himself as Mr. Holland, a process server from the County Clerk's office, and handed over the papers.

Also before this morning, Jeff had never seen a court summons, just served to him by Mr. Holland. Certainly he had never seen one with his name on it! After a frantic call to his attorney, Jeff learned that JCWRRC and he were being named as co-defendants in a liability lawsuit filed earlier in the week at the county courthouse. The plaintiff, Mrs. Betty Jo White, was seeking $875,000 in damages. In the back of his mind, he seemed to remember a newspaper article describing some fire damage to Mrs. White's house last week.

Jeff and his wife, Melinda, had built up the JCWRRC from scratch. As independent rehabilitators starting about 14 years ago, they dreamed of having their own facility. So ten years ago, they formed their activities into a non-profit corporation and filed for the Federal 501(c) 3 tax exempt status. With some aggressive fund-raising and grant writing, their dreams came true. They also benefitted from donations from some major contributors who lived in the resort community, including a sizable gift nine years ago from none other than Mrs. Betty Jo White

In addition to providing direct animal care under JCWRRC's rehabilitation license, Jeff also offered the community the service of providing humane solutions to wildlife conflict situations, including "critter-proofing" private residences and commercial buildings for a small fee. So when Mrs. White called during the past summer complaining of a raccoon in one of her six chimneys, Jeff could not respond fast enough for one of JCWRRC's major benefactors.

Due to an unusually heavy incoming animal load that day, Jeff asked Fred to tend to Mrs. White's request. Fred Garvin, a 56 year old retiree, volunteered every so often since the time he left the postal service two years ago with a minor disability. So, Fred found the 28 foot extension ladder, grabbed some welded wire from the back that had been left over from recent cage construction, and was off to Mrs. White's.

Fred was a little unsure as he approached the 12 foot iron fence that surrounded Mrs. White's 12 acre estate. The ivy was so overgrown, he could hardly find the entry gate. He navigated his way to

the front door and rang the door chime. Mrs. White, just over five feet tall, appeared in a well-worn housecoat, her long silver hair flowing over her shoulders almost to her waist. Fred, thinking to himself, hoped that when he reached Mrs. White's age, he would still be active. It was commonly known throughout the community that Mrs. White's Alzheimer's was progressing rapidly.

Fred went about his business, fashioning caps for the chimneys with the 1/4" welded wire he had brought along. Surely this would keep out future raccoon visitors. (Unbeknownst to Mrs. White and Fred, the raccoon had already moved down the road.) Having to move the ladder several times was very tiring, so it took him most of the afternoon. He only slipped off the ladder twice, but fortunately was only two rungs up each time.

That winter, Mrs. White's son built a fire in one of the fireplaces, to help take the chill off the old house. He was there during his annual visit, hanging around just long enough to collect his Christmas check from Mother. Three hours later, the county fire department had just extinguished the blaze in the west wing of the house. The cause of the fire was determined to be an accumulation of hot embers in the chimney, not able to escape fast enough due to an obstruction. The obstruction was the chimney cap that Fred had installed that summer.

Six long weeks after Jeff met the process server, the Singleton's now sat in the courtroom, occasionally glancing over at Mrs. White's son and his three attorneys. The Johnson County Wildlife Rescue and Rehabilitation Center was soon to be history. Jeff and Melinda were hopeful they would still have their house after the bankruptcy proceedings.

Their earlier JCWRRC dream was now becoming a nightmare. Jeff kept replaying in his mind where things went so wrong, so fast.

RESPONSES

1. As a rehabilitator who runs a wildlife "hotline", I feel that it is essential for us to give advice to the public on how to humanely resolve nuisance animal problems. People act out of ignorance, panic and fear when encountering wild animals in their homes or on their property.

This has resulted in the birth of a new industry—the nuisance wildlife control industry—which charges people a fee to remove wild animals from homes. Most nuisance trapping occurs during the birthing season, when mother animals are discovered in people's attics and chimneys trying to raise babies. The unfortunate outcome is that mother animals are trapped and orphaned young are left behind. In Connecticut, over 25% of the orphaned raccoons taken in by rehabilitators were "created" by nuisance trappers.

We can prevent a lot of this unnecessary orphaning by giving out good prevention-oriented advice.

In *No Good Deed*, Fred had the right idea in telling the panicked benefactor that a chimney cap would be the solution to her problem of raccoons denning in the chimney. Yet he made several mistakes.

There's a big difference in giving advice and actually doing the work yourself. If you or your staff are going to do any work on a person's property, you **must** be properly trained, licensed and insured. You should have contracts signed before initiating any "critter-proofing". Had Fred been properly trained and licensed, he would have known that the ONLY acceptable chimney cap is the kind with a stainless steel top and screening on the sides. This kind of cap prevents debris from clogging the mesh and causing a fire, as occurred in *No Good Deed*. All-screen caps are a fire hazard and should never be used.

Rather than offer to do ANY work, Jeff should have given Mrs. White a good referral for chimney cap installation. He could have advised her to call a chimney sweep. If she wanted one of her employees to do the work, he could have referred her to a Home Depot-type store where caps can be purchased.

Jeff opened himself up to additional liability by sending a volunteer to the site—the volunteer could have fallen off the ladder (as almost occurred) and sued the Rehab Center too, since he was not covered by insurance when acting as an agent of the Rehab Center. All rehab facilities should have adequate umbrella insurance policies if volunteers (or paid staff) work on or off-site for the organization.

Fred also made a mistake in assuming that the raccoon was out of the chimney. One should never seal any den cavity without a thorough inspection to ensure that no animals are trapped inside. Countless phone calls about raccoons and squirrels doing damage to rooftops and siding are merely a result of entry holes being sealed and mother animals doing damage while desperately trying to get back to their young.

While worrying about whether or not we should give nuisance wildlife advice to the public, let's remember that we're *already* in the advice-giving business. When we tell people to put a fallen chick back in its nest, we *could worry* about them breaking their necks and suing us. Instead, we encourage them to put the bird back "if safe to do so" and tell them how to hang an alternate wicker basket nest if the original nest is inaccessible. When routinely telling the public to bring orphaned baby squirrels to our facility, we *could worry* about a squirrel getting loose and running up their leg, causing a car accident. Instead, we tell them how to properly contain and transport the squirrels and rely on them to follow our instructions.

Lets face it, we live in a lawsuit-ridden culture. We can't fully protect ourselves unless we never step out of the house nor answer the phone.

How should rehabilitators protect themselves from liability? Make sure your advice is good. Use credible resources, like the HSUS book *Wild Neighbors* or *The Humane Control of Wildlife in Cities and Towns*. If you're not sure a particular solution will always work, **say so**. Keep a phone log so you have a record of

each call and the advice you gave.

Give people options, allowing them to choose what they feel would be best for their situation. I may slant them towards a particular solution by saying "I'm not telling you what to do, but if it were me, I'd keep the damper closed and let the mother raccoon keep raising her babies for a few more weeks until she moves them out on her own anyway."

Never assure a caller that a given solution will definitely work unless you know it will. For example, I **can** assure people that a few drops of the $4 product *Odors Away* will instantly neutralize skunk spray odor in the home, or the Rubbermaid® garbage can with a 4 inch high twist-on lid will prevent raccoon access.

Qualify your advice by telling people what solutions have proven most successful, yet be sure to remind them that there's no guarantees when it comes to wild animal behavior. If a caller asks "will the skunk leave within 24 hours after applying ammonia-sprinkled rags and a blaring radio under the front step crawl space?" My response is that most do, but some animals can tolerate more harassment than others so the caller should be patient.

What's the proper advice for a raccoon family in the chimney? I would have told the caller that the simplest and most humane solution is to keep the damper closed and let the mother raccoon finish rearing her young. I caution callers that they may continue to hear sounds, yet assure them that Mama Coon will move her babies when they're big enough.

If the caller simply won't tolerate the raccoon family, I instruct them how to put a blaring radio in the fireplace, along with a bowl of ammonia on a footstool, just before dusk. I explain how the smell and sound combined usually drives the mother out (with cubs) the first night, but the trick is to apply the deterrents **at dusk**, right before the raccoon's normal activity period. As a last resort, I will refer them to one of three rehabber/nuisance trappers I've trained in humane methods (i.e. who know how to humanely release families *intact* and *on-site*). I never refer them to nuisance control operators at large because of price-gouging and inhumane practices in this rather new, largely unregulated industry.

After the raccoons are gone, I forcefully recommend—or rather insist—that the problem be permanently solved through chimney cap installation. Callers are referred to a chimney sweep for proper installation. If they want to install a cap themselves, they are cautioned about the potential problems with using any other cap than the stainless steel topped kind with screening on the sides.

Finally, think about your liability. Two days before Christmas, I responded to a call involving a skunk that had fallen into an uncovered swimming pool, and was hiding behind the pool liner. The only way to get the skunk out was to enlarge a pre-existing hole in the liner. Although the homeowners gave me verbal permission to do this, I should have gotten a liability release in writing since I was doing physical damage to their property.

The bottom line is that we can save many wild animals and prevent many unnecessary rehab intakes by giving the public good advice on how to humanely solve nuisance problems. Fear of liability need not be an obstacle, as long as our advice is good, we don't **tell** people what to do (rather, give them options and let them decide), we describe long-term solutions (e.g. eliminating the food or nesting site) and we don't do on-site work without proper licensing, training and insurance.

The public really appreciates free advice, especially these days when most advice is preceded by a 900 number or sales gimmick. Let's not be afraid to actively help people co-exist with wildlife.

-Laura Simon, President, Connecticut Wildlife Rehabilitators Association, Urban Wildlife Director, Fund for Animals, 203.393.1050-

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2. Being sued and losing a lawsuit are two different things. Anyone can be sued by anyone else. It is a small price for living in a democratic society. Furthermore, the majority of people who have acted in good faith do not lose lawsuits brought against them in questionable liability cases.

The specifics of this case would need far more investigation to offer a legal opinion. Important questions and issues are:

1) Was the service done as a favor or for a fee? The liability in cases where there is no fee for services is generally held to be less.
2) If the old lady had been told that the chimney was blocked, her illness would not add to the rehab center's liability. If she was competent enough to call for service, she could be presumed competent enough to receive it.
3) Unless the volunteer did something incredible to block the chimney, he probably would not be considered to be negligent. In most states, you cannot successfully sue a volunteer, board or staff member of a non-profit organization as an individual unless gross negligence is proved by the plaintiff, and then usually only for an amount up to their compensation level.
4) Did the son look up the chimney or have reason to believe it was not obstructed? In an old house, failure to look up the chimney would be considered negligent.

There are a number of other flaws in the disaster scenario that so many people fear. Unless Mr. Singleton lived at the rehab center, as opposed to having the rehab center at his home—an important distinction—he could not lose his house or any personal property. Only the actual assets of the corporation are at risk. Our hero, Jeff, is getting an ulcer needlessly. The chances are good that the case will be dismissed against him. The organization may have a bit of a battle, but is not likely to lose.

The real answer to the situation is for Jeff to have had insurance. Any organization that doesn't carry at least a $1 million liability policy is begging for trouble. In this case the lawsuit would have been defended by the insurance company. Jeff, as a staff member, would be covered as well. Without insurance, even if Jeff wins, he has to pay his attorney and

any related fees.

Regarding volunteers, basic training is, of course a necessity. In addition, a simple acceptance or release form could be used. The client, in this case the little old lady, is asked to sign the form acknowledging that the service was provided and that no guarantee is given that raccoons won't be back or that the function of the chimney has not been affected. Most statements of release of liability don't really protect you from suit if you mess up, but they can prove that the customer, client, or member of the public freely accepted the service given.

The greatest risk may have been in sending out a volunteer with an extension ladder, a potentially dangerous piece of equipment if not used properly. Again, that same insurance policy would cover Jeff's backside.

To fail to anticipate liability problems is equivalent to ignoring sanitation. Liability, like germs, is a fact of life. Insurance, like simple maintenance and cleaning, is a very inexpensive and proactive way to avoid a potentially serious problem.

-Ed Clark, Co-founder & President, Wildlife Ctr. of Virginia. Member of numerous non-profit boards and management consultant for conservation organizations and community hospitals for almost 20 years. Waynesboro, VA-

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3. In this litigious society one does well to remember that anyone can sue anyone else. Whether or not the case has merit may be determined after all the money has drained way.

The first mantra of the rehabilitator, after "Don't feed it", should be, "Protect thyself". And who is the most dangerous animal in the world? We all know the answer to that! One should phrase suggestions carefully, using language that is not definitive. "If I were in that situation, I might..."; "The Humane Society has a publication that makes suggestions for this problem."; "Less Desirable Neighbors is a local company that specializes in humane pest removal. They work with licensed and bonded chimney sweeps... "; "I suggest you call the Department of Fish & Game... Health Dept..., Animal Control..., University of ...". Depending on our local resources, we should network with the relevant agencies.

Jeff, perhaps in his desire to help a benefactor, was negligent. The first thing to do was to recognize that this issue could wait until there was time to talk to Mrs. White and consider her needs. If she had made a contribution to The Center, and her house has 6 chimneys, she deserved his full attention. Jeff is lucky that Fred didn't fall off the ladder higher than 2 rungs up. He's lucky Fred didn't sprain a muscle picking up the ladder! He's probably lucky Fred is a nice guy. In fact, the entire Board of JCWRRC has been put at risk.

If the Singletons were about to embark on a corporate facility, their Board should have considered insurance. Individuals can be covered by their homeowner's policy. Centers are a more vulnerable organ. Rehabilitators must train their volunteers to respond with deliberation, consider the options, and seek help and input from others. They may NOT, in the name of the organization, pursue a solution that "seemed like a good idea at the time". If a volunteer is prone to that behavior (and some are) she/he should be notified in writing that this is unacceptable. If that is not adequate, membership in the organization should be terminated, in writing. "The road to Hell is paved with good intentions."

-Wildlife Rehabilitator, Southwestern U.S.-

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4. Rehabilitators should recognize the potential for lawsuits from volunteers who may become injured while volunteering, as well as the potential for lawsuits from other services provided, as in this case.

It should be policy for volunteers to sign a "Liability Waiver" prior to participating in rehabilitation activities. Proper health and safety training should be a part of every volunteer's initiation and policies should be reviewed. This also applies to home rehabilitators who use volunteers. An addendum to the 'liability waiver' should state volunteer's willingness to undergo necessary training and to accept and adhere to all policies.

All home rehabilitators and centers who have volunteers, would be well served to include under their insurance an excess liability policy. A $1 million liability coverage under a personal policy would run between $100 and $250 per year depending on the carrier. A commercial policy would be higher. If a rehabilitator or center were found to be negligent in a court of law, this coverage would be important.

To find one's organization or life in financial jeopardy because these precautions were not taken is disastrous. The time to implement policies is before they are needed. A call to your attorney and insurance agent is an important first step in protection.

The above is a personal opinion and does not take the place of professional advice from an attorney and your insurance carrier.

-Wildlife Rehabilitator, Eastern Texas, USA-

Readers are invited to submit their views on the case, discussing issues they see, and offering ideas and suggestions regarding the situation. Several responses will be chosen for publication in the next issue of the journal. If you have a hypothetical case that you would like to submit for discussion, send it to IWRC, attention "UFD".

After you have read the case, think about the questions posed at the end of the article or any other issues that come to mind. Talk about them with other rehabilitators, and, if you choose, share your thoughts with us. Deadline for next Journal publication: June 12, 1998.

Next Topic - UP FOR DISCUSSION: Case IV - "Limits"

The rumors were turning out to be true. The Board of Directors of the Green Valley Wildlife Rehabilitation Center had met during the weekend. Changes were on the way. Most of them would no doubt be unpopular, and the decisions were final!

It had been no secret that there had been growing tension between the Executive Director of the center and the Board over a lot of issues. The numbers of incoming animals were increasing at a rate of about 25% annually, and fundraising efforts had not kept pace. Quality control and supervision of volunteers was spotty, resulting in inconsistent animal care. The Dept. of Natural Resources and the Dept. of Health both seemed to be making more frequent visits to the facility. And, as if this was not enough, the DNR and the Animal Control agencies from two adjacent counties were saying that the rise in nuisance wildlife calls was a result of recently released rehab animals.

The Executive Director, though clearly stretched too thin, was very popular with the volunteers. She was also very popular and well-liked within the community. Her frequent articles and public programs on humane solutions to wildlife conflicts were always well-received, and her open invitation and commitment to help all wildlife species, resulted in a steady influx of small, but consistent contributions from the public. Those who found the occasional baby rabbit, bird, or squirrel, were grateful for this community service.

The E. D. called together her four team-leaders (songbirds, raptors, waterfowl, and mammals) for the weekly meeting. They were heartbroken when they learned that she would be leaving the organization. The board had decided that a fresh perspective would accelerate the desired changes. The search for a new director was now underway and should take about three months. While the team leaders were saddened by her announced departure, they were equally upset and angry about the changes that were about to take place. Although the outgoing director was doing an admirable job in explaining the new direction, it was clear that she personally disagreed with most of them.

The board was taking a twofold approach to addressing the imbalance caused by the falling donations and the increasing number of animals. They had decided to restrict the numbers of animals and even certain species that the center would now handle. This would serve to ease the increasing numbers of intakes and hopefully reverse the trend. They could then concentrate on those species that held the most potential for fundraising activities, such as raptors. Seasonal limits had been established for the more common species (i.e. rabbits and songbirds). Once these "quotas" had been reached, no further animals of those species would be accepted and any that were dropped off at the center were to be euthanized. Non-native species such as sparrows and starlings would also be euthanized immediately. To address the Animal Control concerns, raccoons, opossums, and squirrels would no longer be accepted. Dwindling areas of proper release sites and the perception that the center was contributing to nuisance wildlife problems, prompted the board to take this "hard-line" approach.

These policy changes were now in effect. Sensing the shock and dismay of her dedicated team, the E. D. deferred to a later time in the week to discuss the specifics of how these changes were going to be implemented. Speaking now "off the record", she worried about the reaction of the community once they heard about the changes. "This was their Center!", she could imagine them saying. "Who decided to make these changes?" She also worried about the animals that would now be turned away or destroyed, due to some arbitrary limit imposed. She worried about her volunteers who all shared the common vision and goal of providing aid to all wildlife in need. Though she understood that the center needed to be financially viable, she was concerned about the apparent commercialization of the center's new direction.

As she looked around the room, she realized that these people had become her 'family'. They had been through some very hard and trying times together. They had endured some horrible and tragic events together. But, she had always been able to hold them together, cheer them up, and keep them motivated. Now, she was at a loss! Easy answers were not apparent. Reaching deep down inside, she asked them to help. What could or should be done? It was in their hands.

Possible Questions for Discussion

- Rehabilitators have considered many different ways to keep the numbers of animals at a particular level. What are some of the different options available as well as advantages and disadvantages?
- Decisions to limit the number of animals admitted to rehabilitation has many different impacts in many areas of wildlife rehabilitation (i.e., animals, community, habitat, volunteers, etc.). What should considerations be? Why?
- What about the perception by some that rehabilitated wildlife becomes nuisance wildlife? What are some of the issues? What can be done to address these concerns?
- What do you think of the decision to automatically euthanize certain species? Why? Should the rescuer be informed prior to bringing in the animal?
- How do you feel about the decision by the Green Valley Board of Directors to concentrate on wildlife with the most fundraising potential?

IWRC
Revenue & Expense Statement
January 1, 1997 thru December 31, 1997

Revenues	
Conference	35,773.55
Contributions (restricted)	2,168.00
Contributions (unrestricted)	503.00
Grants	10,000.00
Literature Sales	17,303.38
Membership Dues	60,734.05
Miscellaneous Income	660.82
Skills Seminars	58,351.18
Accreditation	750.00
Interest Income	1150.81
Total Income	**187,394.79**
Expenses	
Accounting Fees	1520.98
Bank Service Charges	2459.62
Conference Costs	14,128.60
Independent Contractor Fees	11,320.62
Insurance	3,816.16
Payroll Taxes	1,502.76
Postage/Delivery	15,787.67
Printing & Reproduction	29,696.81
Program Costs (includes travel, per diem, equipment, & supplies)	17,500.51
Publications (includes editing, book purchases, & mailing services)	14,660.93
Rent & Utilities	9,370.00
Equipment Repairs	495.47
Service Contracts	1,885.00
Wages & Salaries (includes 1 full-time & 2 part-time employees)	35,900.17
Equipment Leases	2,584.01
Outside Training Costs	190.72
Administrative Costs (includes office supplies, equipment, consumables, phone)	7,066.18
Total Expenses	**171,206.18**
1997 Net Income	**$16,188.61***

*Post-Release Research Donations Account Balance as of 12/31/97 = $13,702
(includes 1:1 matching dollars from IWRC)

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21st ANNUAL CONFERENCE PRESENTS

Craig R. Sholley, Director of Conservation & Education
International Expeditions, Inc.

Craig Sholley will be presenting the **Keynote Address** for the 21st Annual Conference of the International Wildlife Rehabilitation Council. His presentation, entitled "Gorillas in the Midst of Gorillas - Conservation Status of the Mountain Gorilla", takes a historical look at the conservation efforts utilized to preserve one of the Earth's most endangered primates and analyzes the future of this magnificent species!

Join your fellow rehabilitators in Fort Worth, Texas, October 15-18, 1998. Focusing this year on wildlife and its habitat, this presentation will lead us into the many related papers, workshops and discussion groups that will make this year's conference the best one yet!