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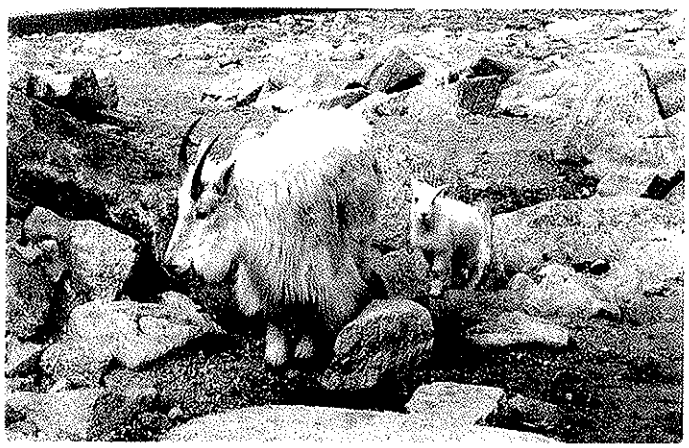
Inside this issue

- Mammal reunions
- Mouse defeats owl
- Garter snakes
- Sponsorship

ABOUT THE JOURNAL . . .

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 ultimate purpose of returning them to the wild. The *Journal* is published by the International Wildlife Rehabilitation Council (IWRC), which invites your comments on this edition. Through this quarterly publication, rehabilitation courses offered in numerous locations, and an annual conference, IWRC works to disseminate information and improve the quality of care provided to wildlife.

ON THE COVER: These juvenile Least Chipmunks were tucked by their mother into the bumper of a parked camper for shelter. When the camper's owner drove away, the babies accidentally came along for the ride. A reunion was not possible, but all were eventually released back into the wild. BELOW: A Mountain Goat and its young usually stay close together, but when young goats are left alone for brief periods, well-meaning humans might make the mistake of "rescuing" them. Sometimes these juveniles can be returned successfully to their parents, as an alternative to rehabilitation. See page 3 for an article on mammal reunions. *Photos by Allan and Shirley Casey.*



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CONTENTS FALL/WINTER 1998, VOL. 21, NO. 3-4

Editor
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FEATURES

3
Reuniting Young Wild Mammals with Their Mothers
Successful reunions benefit wildlife and caregivers
By Bridget Sparks and Shirley J. Casey

9
A Guide to North American Garter Snakes
Introduction to natural history and basic triage
By Franklin D. Gould

19
Prey Conquers Predator: A Case Study
Barred owl dies from rodent-inflicted wound
By Marjorie J. Gibson, Donald C. Gibson, and Dennis G. Bardelmeier

22
Sponsoring New Wildlife Rehabilitators
A guide to successful partnerships
By Shirley J. Casey and Allan M. Casey

29
Wildlife Conservation Crosses International Borders
Profile of a community conservation organization
By Robert H. Horwich and Maggie Jones

DEPARTMENTS

31
UP FOR DISCUSSION

35
SIMPLE SOLUTIONS

37
BOOK REVIEWS

39
IN MEMORIAM

40
NEWS BRIEFS & CAREER CORNER

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EDITORIAL

Add Your Voice to the *Journal*: Help Rehabilitation Thrive

WILD ANIMALS TODAY face many perils. Chief among these are pollution and habitat destruction — processes wrought by humanity. But the existence of an organization such as IWRC demonstrates another side of the human animal.

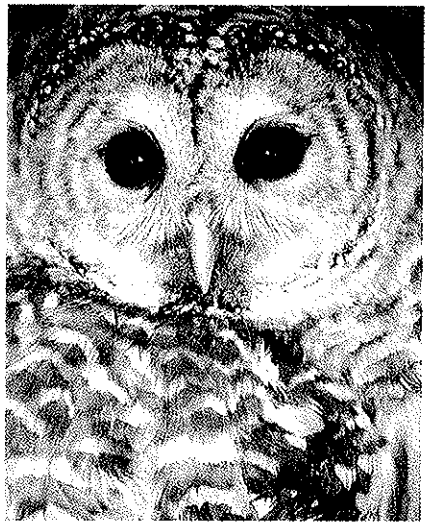
Across the United States, and in many other countries, a dedicated cadre of individuals provides care to injured and diseased wildlife, with the goal of returning healthy, wild animals to the natural environment. This army of rehabilitators is small in number, making it imperative to share information and resources.

As your new editor, my goal is to help the *Journal of Wildlife Rehabilitation* serve as an effective tool to help wildife rehabilitators like yourself share your expertise and continually improve the quality of care you can provide to wildlife.

Though usually published on a quarterly schedule, this edition of the *Journal* represents issues number 3 and 4 for 1998. By combining two issues and taking some additional time, we eased our way through the transition to new staffing and also completed a design makeover. We hope you find it time well spent.

While continuing the tradition of publishing peer-reviewed articles on natural history and rehabilitation of a wide range of animals, we do hope to make a few changes in coming editions. We will continue to refine the new design, and, as of this issue, will add more book reviews. Additional photos and illustrations may grace these pages as well.

Future editions of the *Journal* will feature articles on a broad range of topics, to reflect the varied experiences of our readers and the complexity of wildlife rehabilitation. This might include occasional articles delving into wildlife policy issues or pieces highlighting efforts to reintroduce endangered species.



See story on Barred Owl on page 19 (photo by Marge Gibson). Esophageal punctures inflicted by a mouse caused the owl's death.

This issue covers mammal reunions, garter snake natural history and triage, a documented case of a prey animal causing deadly injury to its predator (see photo above), tips on how to sponsor new rehabilitators effectively, and a profile of a conservation group working in the United States and abroad.

Please feel free to send ideas to IWRC for books to review and topics to cover, and consider submitting feature articles for future editions (see authors' guidelines on the inside back cover). You may wish to add your voice to an ongoing conversation on current topics affecting rehabilitators in the "Up for Discussion" section, featured on pages 31-34.

By contributing in any of these ways, you will help to make the *Journal of Wildlife Rehabilitation* an outstanding forum for rehabilitators worldwide.

Jan Ambrosini, Editor

Reuniting Young Wild Mammals with Their Mothers

Successful reunions benefit wildlife and caregivers

By Bridget Sparks and Shirley J. Casey

ABSTRACT: Wildlife rehabilitators are regularly contacted by people who want to bring in a young wild mammal. Sometimes, the animal can be reunited successfully with its mother, making rehabilitation unnecessary. This article describes how rehabilitators can facilitate such reunions, which offer many benefits for both wildlife and rehabilitators.

KEY WORDS: Wildlife rehabilitation; wildlife rescue; wildlife reunions; humane solutions to wildlife conflicts; human-wildlife conflicts; wildlife behavior; maternal wildlife care.

BRIDGET SPARKS *supervises WildKind, a wildlife rehabilitation program for the Humane Society for Larimer County, Fort Collins, Colorado. Each year, she handles over 4,000 telephone calls about human-wildlife conflicts from a four-county area and supervises the care of more than 1,900 wild animals. She has published on humane solutions for human-wildlife conflicts and holistic medicine for wildlife.*

SHIRLEY J. CASEY *is a wildlife rehabilitator in Evergreen, Colorado who specializes in squirrels. She is president and co-founder of WildAgain Wildlife Rehabilitation, Inc., which conducts research and offers training programs. She has published and presented nationally on wildlife care and policy, holistic health care for wildlife, and nonprofit management. She is on the Board of Directors of The Colorado Wildlife Alliance, a statewide environmental group.*

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By definition, wildlife rehabilitators assist wildlife in need to ensure their best chance of survival when returned to the wild. Some people, including rehabilitators, believe that providing care means responding to rescuers by automatically taking animals that are perceived to be in need into rehabilitation. However, not all animals that may initially appear to need help really do. There are many cases when the wildlife rehabilitator can help the animal most by returning it to the wild without ever taking the animal into rehabilitation. This can occur with adult animals that do not need rescue and rehabilitation, as well as with juveniles, that may not have lost their parent(s).

In the case of juvenile wild mammals, the rehabilitator should talk to the rescuer/caller, assess the situation, and decide whether or not to attempt a reunion. If conditions and timing are right, arrangements may be made to try to return the youngsters to the mother. If not, the animals are admitted to rehabilitation. Based on the successful experiences of rehabilitators working with a wide variety of mammals, this article discusses a decision-making process regarding when and how to attempt and arrange a reunion. For the purposes of this article the term juvenile will refer to any animal that is still dependent on its mother for all or part of its care, including neonates, infants, and older dependent offspring.

Rescue or Reunion?

There are many normal situations in the wild in which a mammal and her offspring may become temporarily separated. With certain species, cottontails and deer for example, the mother animal may leave the dependent offspring alone for long periods to minimize the risk of predation. Often the much stronger scent of the adult mammal can attract predators. Also, the movement of the larger, more visible adult will be more likely to attract predators than the well-concealed young. The adult mammal may simply be away in search of food for herself and possibly her offspring. When alone, the juveniles may either remain hidden or at a den site, or may wander off short distances, even crying out when alarmed or hungry. In most cases, the mother mammal will not be far away and will return shortly, possibly moving her offspring if she feels the site has become unsafe.

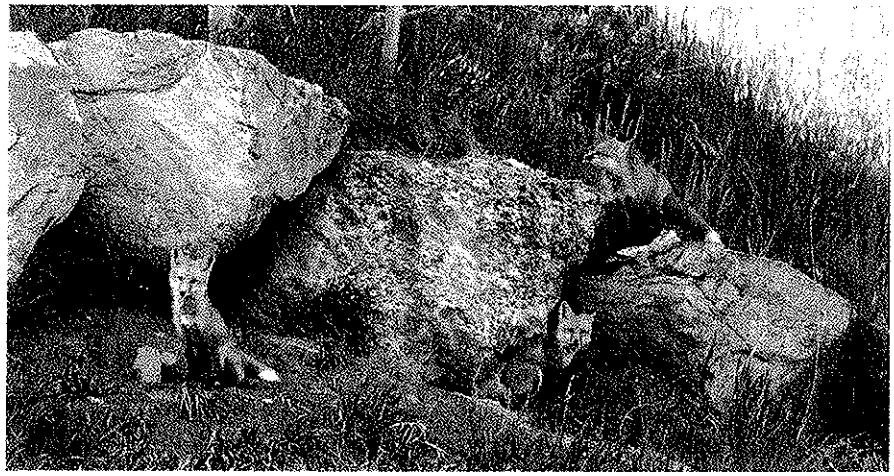
There are also many situations when young mammals may be temporarily separated from their mothers by human action, either intentional or unintentional. Mothers may be scared off by humans, their pets, or machines (e.g., lawnmowers, garden tools, vehicles). Some separations are the result of well-intentioned but unnecessary "rescues." Regardless of the circumstances or species, many of these animals can be reunited successfully. If the mother is still in the area and the juvenile is healthy and reasonably safe, a reunion should definitely be considered. While it is not always possible to get the juvenile wild mammals back to their mothers, rehabilitators have demonstrated success in reuniting a wide variety of species, including rabbits, squirrels, raccoons, fox, skunks, and deer.

Assessment

Many times, the would-be rescuers telephone to ask what to do with a young mammal they have found or if they should bring the animal to the rehabilitator. A quick assessment over the phone is necessary to determine first if the animal truly

needs to be rescued or if a reunion should be attempted. Young animals that are obviously injured or ill, cold, wet, infested with fly eggs or maggots, at risk from hazards such as cats, or have been fed inappropriately by the rescuer need to be taken into rehabilitation. If the youngster is severely dehydrated it is less likely that the mother will return and a reunion should not be attempted.

Animals that have bitten people or domestic animals, or otherwise exposed them to a zoonotic disease, will need to be handled according to local and state health regulations. Safety is a very important consideration for both the people and animals involved; in some cases, the risks of danger to the person attempting the reunion or the risk of further injury to the animal may be too high, thus requiring that the animal be brought for rehabilitation. Other considerations include the context in which the separation occurred (e.g. homeowner sealed off the chimney with a cap, not knowing young were inside; nuisance control operators destroyed some adults of that species, possibly including the mother; homeowner had state or local agency trap an adult, possibly the mother, for relocation); whether it is legal to rehabilitate the species, in which case reunion may be the only option other than euthanasia; and availability of rehabilitators to work with that species.



These Red Fox pups are not orphaned. They are just waiting for their mother to return from a foraging trip, and do not need rescue. (Photo by Allan and Shirley Casey.)

It is imperative that the rehabilitator know the natural history and behavior of the species involved before attempting a reunion. For example, a mother opossum rarely will retrieve her offspring, so a young opossum under seven inches long (excluding tail) found alone should be considered an orphan and a reunion should not be attempted. Having complete information on a species will not only determine if a reunion can be attempted but often the specific way in which it should be handled — the timing, the location, etc. In some cases, some of the litter may be able to be returned to the mother, while others may be in need of intervention, either rehabilitation or euthanasia if the injury is too severe for recovery. There have been many cases in which some of the juveniles in a litter were successfully reunited with their mother while others were rehabilitated or euthanized.

Every rehabilitator must try to assess the judgment, honesty, and accuracy of the observations of the caller. Often the caller may be unaware of all that has happened, may have misinterpreted the situation, may fail to notice critical details, or simply may not be willing disclose all of the necessary information. It can be very difficult for the rehabilitator to gather enough information or have confidence in it. Yet this is especially important when working with species that might involve higher risks, such as rabies vector species. It takes considerable skill and judgment for the rehabilitator to be able to evaluate over the phone whether a reunion or rehabilitation offers the best chance for the animal's long term survival. It cannot be stressed enough how important it is to have as much and as accurate information as possible regarding the individual animal, its species, and the circumstances involved before attempting either reunion or rehabilitation.

Motivation and Response

It is useful to step back and remember why the caller has contacted the rehabilitator. Generally, he or she is concerned and wants to provide aid to an animal perceived to need help. Research has shown that most often it is this compassion and concern for the animal that motivates the caller (Siemer). Since the caller has already taken action in finding a rehabilitator (which often takes several calls), has actually placed the call to the rehabilitator, and has possibly even captured the animal, it can be expected that he or she wants someone else to take action as well. If the caller feels the rehabilitator is not knowl-

REUNIONS: NO PEEKING

When cleaning out lower cabinets in a very cluttered workbench in the garage, a volunteer for a Colorado rehabilitation facility pulled out a small piece of old rag. Six bright pink jelly beans fell out on her lap. Upon closer inspection she realized they were newborn pinkie mice. She picked the babies up, placed them back on the rag, put the rag back in the cabinet, and closed the door.

After going to wash her hands, she went back to the workbench and just listened. She heard the sounds (squeaks and scratches) of the mother mouse moving her young to a safer place, away from prying eyes.

Later in the day, the volunteer was continuing her cleaning in another part of the garage and saw the same old rag, but now behind some flower pots. This time she just smiled and didn't move it at all. She didn't want to be a repeat offender.

edgeable or concerned, he or she may hang up and try to take care of the animal alone, choosing either to raise or relocate it. Such actions can be risky for the individual animal, wildlife populations, the rescuer, and the rescuer's family and pets. Therefore, it is essential to take the time to discuss the situation with the caller, explaining the animal's natural history (i.e., animals often hide their offspring, most mothers rarely abandon young) and ways to assess if the animal is really in need; offering some humane solutions, alternatives and risks; and describing possible scenarios about the animal's future.

It is also vital to express appreciation for the person's concern for the animal and willingness to seek help. Explaining to the caller that the animal may not need immediate rescue and rehabilitation can require some convincing. When considering motivation, it is important for the rehabilitator to consider his or her own motivation. It may be difficult for some rehabilitators to not want to take in every juvenile wild animal that might be in need. In addition, it can be difficult and risky to try to arrange a reunion (e.g., there might have been some injuries that needed treatment but were not noticed; some predator could kill the juvenile before the mother returns). Plus, sometimes the reunion just does not happen, resulting in a delay in getting care for the juveniles. However, it is still important to attempt a reunion if it is appropriate and has a likelihood of success.

Who Handles the Reunion

If the rehabilitator determines that the juvenile does not need to be rescued, the next step is to facilitate a reunion. In some cases, it may be appropriate for the caller/rescuer to handle the process. In other cases, the attempted reunion should be handled by a rehabilitator, trained volunteer, or possibly even a wildlife officer in the case of some larger species. The rehabilitator should carefully consider the circumstances, placing a high priority on the safety of all of the people as well as all the animals involved. For example, if the caller is a child, or if the juvenile animal is old enough to inflict injury, the reunion should be handled by a rehabilitator or trained volunteer, not the caller/rescuer. The rehabilitator also needs to keep in mind the full range of risks and liabilities, local ordinances, and state regulations when talking with the caller/rescuer and act accordingly.

Timing of the Reunion

The next consideration is the timing of the reunion. It is critical both to minimize separation time and to choose the appropriate time for the reunion. The shorter the separation time, the more likely an animal is to take back its young. However, many successful reunions have occurred even after 12-14 hours if the adult was still in the vicinity. Reunions of diurnal animals (those active during the day, such as tree squirrels) should be attempted during daylight hours. For nocturnal animals (those active at night, such as raccoons), the reunion should be attempted at night. Despite the pressure to reunite the juvenile with its mother as quickly as possible, it may be necessary to wait until the appropriate time of day (or night) to attempt the reunion. However, if the adult is spotted in the area, the reunion should be attempted immediately since some animals may come out to search for young regardless of the time.

In many cases, the separation time is short and the juveniles are not dehydrated. Should the juvenile need hydration, it should be done by a licensed and trained rehabilitator with a hydration fluid such as lactated ringers. The level of dehydration and other physical conditions should be considered in determining whether to attempt to return the juvenile to its mother. There have been many cases where juveniles had to be given rehydration fluids and were still successfully reunited with their mothers.

Minimize Handling

During the time between the "rescue" and reunion, there are several reasons for the caller or rehabilitator to minimize human (or pet) contact with the juvenile. Human scent on the young may increase the adults' anxiety about the juveniles, thus jeopardizing the success of the reunion. Juveniles are often stressed by human contact and may even die from over-

REUNIONS: HIDDEN IN PLAIN SIGHT

The mother cottontail made a very shallow saucer-shaped nest in the middle of the beautifully kept lawn for her seven babies. The homeowner did not see the nest until he mowed the lawn. He was appalled to find that he had killed one baby, severely maimed another, and slightly hurt another.

He gathered up all the babies, healthy, injured, or dead, and rushed them to the rehabilitator. On arrival, four seemed healthy, one had blood on an ear, and two were dead. The rehabilitator cleaned the wound and found it was barely a nick. Upon talking to the homeowner, the rehabilitator realized that he felt responsible and wanted to make up for hurting the babies.

With instructions from the rehabilitator, he returned the remaining four healthy babies and one with the nicked ear to the original nest. He covered them lightly with dried grass and put a light string across the top so he would know if the mother had indeed returned and was caring for the youngsters. He then flagged the area in his yard so he would not mow there until the cottontails had moved on.

The next morning he checked the string. It had been disturbed. He put the string back over the top each morning for a total of three days; the next day it had always been moved. He was then convinced that the mother was caring for her young. He continued to watch the site from inside the house whenever possible and saw the mother several times. Eventually he saw all the babies leave the nest and move to a nearby greenbelt. He happily mowed his lawn again — with a close watch for possible nests.

handling. Also, every time the animal is handled, there is risk of injury to the animal and the human. Thus, juvenile animals should be kept in a warm, dark, quiet, and secure place until they can be reunited with their mother. When the time arrives for the reunion attempt, the juvenile should still be kept warm, quiet, and safe but also easily accessible for the mother.

Facilitating the Reunion

Once the rehabilitator has determined that a reunion is the best course of action and the appropriate time has arrived, the animals can be placed near where the mother and babies were last together, or actually back in the nest or den.

The juveniles that are going to be reunited with the mother should always be kept together [see Assessment], both to facilitate the mother finding and retrieving all her young as well as for warmth and comfort for the juveniles themselves. If the young cannot be placed directly into the nest or den, it is essential to place them as close to the site of origin as possible so that the mother will be able to find them. If this is not possible, place them in a safe area along a known travel route of the adult.

Young small mammals may be placed in a box with some soft, nonraveling, unscented cloth (such as an old T-shirt). If the juveniles are too young to thermoregulate (maintain body temperature), a hot water bottle placed under the cloth will help maintain body heat (the water may have to be reheated depending on the length of time before the mother retrieves them).

Young of larger species may be placed, without a box, in a safe area as near as possible to the site where they were found. Depending on the ambient temperature, the animals may need to be placed in the sunshine or shade to ward off hypothermia or hyperthermia.

Efforts should be made to make the site safe for both the juveniles and the mother. The mother should be able to get to the location safely and, in some cases, be able to move her young from the area. Also, the juveniles should be safe from people, pets, vehicles, and weather and not at risk to fall, get stuck, or injured. Here again, knowledge of the species' habitat and behavior is critical to knowing where the best site might be: under a tree, near rocks, in bushes or grass, along the side of the house, etc.

Resist the temptation to feed the juveniles, since it is often the hunger cries of the young that alert the mother to their presence. However, vocalizations may also attract predators so be sure to choose the safest place possible. Noise should be kept to a minimum (e.g., if tree trimmers are taking down a tree and destroy a nest, wait until they are gone or on a long break to put the babies back). Keep all pets indoors or as far as possible from the reunion site.

Humans should watch from a distance, preferably from inside a building or vehicle. Binoculars may be helpful. If the animals are placed outside the original nest/den, the mother will most likely move her young to a safer location. If juveniles are placed back in the original nest/den, it may be necessary to place a string or other light material across the top or opening of the nest for several days to verify that the mother has been in and out (string/material is moved or broken) and is caring for her young. Whether the young are placed back in or near the nest/den, the site must be checked to ascertain that all juveniles are being cared for. If the area is checked too soon or too often it may interfere with the mother's attempt to retrieve her offspring. However, waiting too long could result in the injury or death of one or more of the young.

There are several considerations in determining how long to wait before considering the reunion attempt unsuccessful and taking the juveniles into rehabilitation. Here again, a thorough knowledge of the species' behaviors, particularly parenting behavior, is extremely important.

With some species, the mother will retrieve her young immediately, moving them to a new site and then preparing the nest/den. Other mothers may build a new nest/den before retrieving the offspring, taking several hours after first realizing her offspring are still alive. Still others will choose to remain at the original nest location, but may not return until the "normal" feeding time.

Consider weather conditions and how they will affect the juvenile's health (dehydration, hypothermia, etc.) and mother's ability to return and locate her young (e.g. high winds

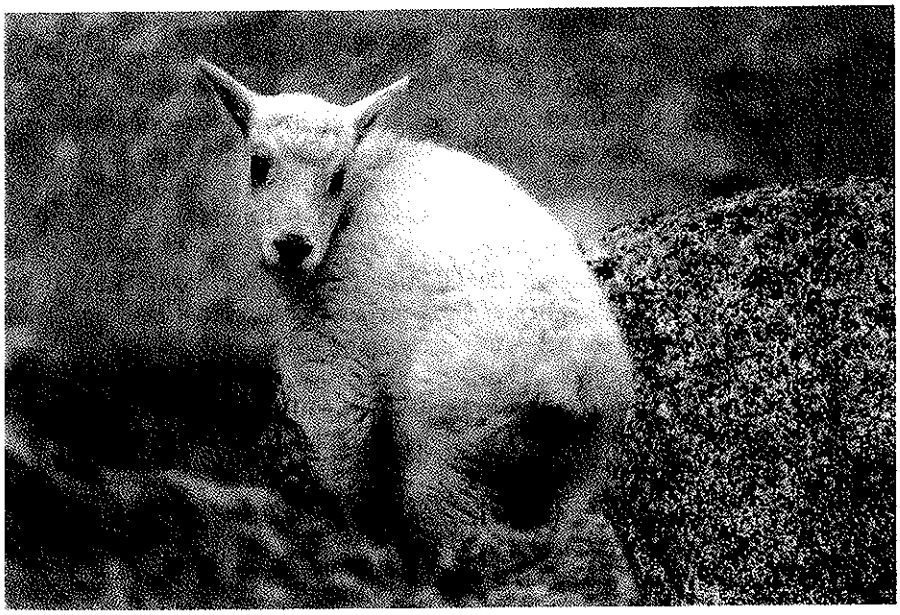
REUNIONS: THREE WENT HOME

A very anxious woman in the Denver area called WildAgain Wildlife Rehabilitation about 4:30 p.m. one July afternoon. The tree trimmers had just dropped a large branch that held a squirrel nest. The woman had checked it and found four juvenile squirrels. One had a small scratch but other than that they looked uninjured.

The tree trimmers were continuing to trim the tree. The caller wanted to know if she should pick up the nest and bring the baby squirrels to the rehabilitator. When asked if there was any evidence of the mother squirrel, the woman said the mother was in a tree in the neighbor's yard. Clearly the mother squirrel wanted to come back, but the noise and activity of the trimmers kept her away.

The rehabilitator explained that if the noise could be stopped for a while the mother squirrel could retrieve the youngsters. The caller said the trimmers were stopping at 5 p.m. She left the nest on the ground and watched from the window as the trimmers left for the day.

She called back at 7:30 p.m. to say that the mother had taken three of the babies, including the one with the scratch, by 6 p.m., but had not come back for the other. She was instructed to leave it until dark and if the mother had not returned by then to bring it to the rehabilitator. She arrived with the juvenile squirrel at 9 p.m. The basic examination indicated that the animal had several internal injuries; it died shortly after arrival.



Sometimes the "cuteness" of juvenile wildlife prompts people to want to rescue/kidnap them. This young Mountain Goat does not need rescue. (Photo by Allan and Shirley Casey.)

may interfere with her ability to pinpoint the young's vocalizations). Consider the situation and whether anything happened to interfere with the reunion attempt. For example, if the neighbor lets his barking dog out on one side of the fence just as the mother is attempting to retrieve her young on the other side, the reunion may well be aborted.

When Some Are Left Behind

There are cases where the mother animal has taken some of the youngsters back, including some with minor injuries, and not retrieved others. In some cases, the mother may have been frightened, felt unsafe, or was interrupted and was thus unable to return for the full litter.

Several rehabilitators have reported cases where the mother animal has retrieved several and left others, which were then taken to rehabilitators and found to have serious and sometimes mortal injuries or conditions. Those left behind should always be taken to a rehabilitator and closely examined.

Benefits

Returning young to their mothers has many benefits for wildlife and rehabilitators alike. Wild mammal mothers can better raise their young than rehabilitators, regardless of how hard rehabilitators work at it. Wild mothers have the correct milk for their young. They raise their young in natural habitat. They teach their young appropriate survival skills and behaviors, such as seeking food, evading predators, maintaining a territory, finding or creating shelter, and effective vocalization and socialization skills.

In addition, the return of the wild juveniles to their natural mothers reduces the number of animals cared for by the rehabilitator. Taking in fewer animals means the rehabilitator can allocate more time and resources to those animals that truly need rehabilitation as well as to other activities such as education, building facilities, and fundraising.

Explaining to the potential rescuer when rescue is or is not appropriate also has educational benefits. The potential rescuer learns something about the natural history of wildlife (e.g., that deer leave their fawns lying quietly in the grass so they do not attract predators; that an uncapped chimney is often used as a den site by mother raccoons because they prefer dark, hidden places where the temperature remains fairly constant to raise their young).

In the future the potential rescuer may be sensitized to check an area before landscaping or trimming trees, to keep domestic pets from harming wildlife, and to be more tolerant of local wildlife and their needs. Also, the individual may become more interested in wildlife in general and feel more stewardship for wildlife and habitat. He or she may tell others about this experience and help spread word of responsibility for wildlife.

Conclusion

Attempting a reunion between a juvenile wild mammal and its parent(s) can pose a variety of challenges. Accomplishing a successful reunion demands considerable knowledge of the species, natural history, behavior, development, habitat, common injuries or situations, possible risks, and legal constraints. It is

REUNIONS: A DEER RETURNED

A family camping in Northern California saw a fawn lying in the tall grass near a hiking trail. Convinced that the fawn was abandoned, they immediately picked it up, wrapped the frightened animal in a blanket, and drove it to the Lake Tahoe Wildlife Care facility.

By the time the fawn was handed to Executive Director Cheryl Millham four hours had passed. As she looked at what appeared to be a very healthy fawn, Cheryl asked if they had seen a dead doe. When the answer was "No," Cheryl explained that deer leave their fawns and go away to feed, to avoid attracting predators. The deer seem to instruct the fawns to drop, hide, and stay in one place. This fawn was trying to do just that: lie still and try to be invisible.

Cheryl explained that the fawn needed to go back to exactly where it was found. The rescuers were reluctant, but did as she told them. By the time the rescuers got it back to the exact site, a total of five hours had passed. They moved several hundred yards away and watched with binoculars. Within 30 minutes, the doe had returned to the fawn. The reunion was successful and both walked away safely.

imperative that the rehabilitator be familiar with these topics and consider some possible scenarios in advance, since there is rarely time to gather much information when fast action is required. Information may be available from publications, naturalists, wildlife professionals, other rehabilitators, and other resources.

It also takes time to attempt to return a juvenile wild mammal to its family. Sometimes such reunions are successful, other times a reunion does not occur and the animal must be admitted to rehabilitation. However, such time should not be considered lost, since the opportunity to return the juvenile to its family and give the animal its best chance of survival more than offsets the time spent.

Facilitating successful reunions can also help to reduce the rehabilitator's costs, energy, and need for space, as well as making more time available. While there are some risks of attempting such reunions, they must be minimized and balanced with the benefits of getting the juvenile back to its family. While there are no guarantees that reunions will succeed, it is worthwhile to consider them.

Many people have considered direct physical care of native wildlife in need to be the primary activity of wildlife rehabilitators. Yet wildlife rehabilitators do much more to help wildlife, ranging from educating the public about the role of different species in the ecosystem and the need for habitat conservation, to offering humane solutions to human-wildlife conflicts. Attempting reunions between juvenile wild mammals and their families is one more integral aspect of wildlife rehabilitation.

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REUNIONS: RACCOON EVICTION

After hearing scuffling and whimpering sounds in her attic for several nights, a woman went up to the attic to see what was happening. When she turned on the light, she saw an adult raccoon scurry out through a hole under the eaves. On further inspection, she found four fully furred and eyes-open juvenile raccoons wrestling in a corner. She put on heavy gloves and used a broom to scoot them into box with a towel, and then called a local rehabilitator.

The woman demanded to bring the juvenile raccoons to the rehabilitator immediately. The rehabilitator explained that the mother raccoon would really like her babies back and would take them if she was given an opportunity.

At first the woman refused to let the mother retrieve her young since she did not want them to return to the attic. The rehabilitator explained how to make the attic unfriendly to wildlife (ammonia-soaked rags, a light, and a radio turned to an all-talk station) and how to later fix the entry hole. However, the homeowner insisted the babies be removed from the house and after considerable discussion, the rehabilitator agreed to take the juvenile raccoons the next day if the mother raccoon did not retrieve them that night.

The woman reluctantly agreed to place the babies immediately in a box near the tree that the mother raccoon often climbed to get to the roof. The woman agreed to watch from a window in the house. The woman called the rehabilitator back in the morning and said that within an hour of putting the box with the juvenile raccoons under the tree the mother was down inspecting them. The mother raccoon then got them out of the box and they followed her away from the yard.

The woman said she was really touched by how the raccoon mother cared so about her young. She planned to follow the rehabilitator's other suggestions as well, and also sent a donation.

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A Guide to North American Garter Snakes

Introduction to natural history and basic triage

By Franklin D. Gould

The following paper will discuss specifics relating to the Common Garter Snake, the most widely distributed of all North American garters[1]. Garter (and ribbon) snakes found in the United States and Canada are non-venomous and thus do not pose a significant danger to most handlers. (The commonly named garter snakes found in Africa are very different, belonging to the Elapsoidae and are highly dangerous due to their extremely toxic venom.)

I. Current Scientific Classification

Garter snakes are currently classed as order Reptilia, sub-order Serpentes, family Colubridae, genus *Thamnophis*, and are divided into a variety of species (approximately thirty are discussed in *The Garter Snakes* (Rossman, Ford, Siegel, 1996) by taxonomists. As with most reptile systematics, this is under near-continuous revision. Due to their broad distribution (leading to highly varied adaptive features and behavior), sexual dimorphism and various on-going debates, identification of the various species can be difficult[2]. Approximately 16 of these species are native to North America (Collins - CNAAR 1998).

Even the Common Garter is distinguished by having a large number of highly variable subspecies with distinctive markings. This is compounded by the existence of color morphs within the subspecies. To make things worse, books written a few years apart will have different descriptions of these species based on the then-current taxonomy. Thankfully, from a rehabilitator's perspective, most garter snakes can be kept for a short term under generalized husbandry guidelines. The descriptions and taxonomy discussed below are primarily based on work published during or after 1996.

II. Identification

Identification of the garter snakes is not always simple. Because of the need for potentially complex identification techniques, the typical rehabilitator may wish to consult a reptile expert in their area for a positive identification if this appears necessary.

Sexing Snakes: Attempting to sex snakes can be an exercise in futility without the knowledge and practice of using sexing probes. However, the following general guidelines may prove helpful. Females generally have evenly tapering tails from the cloaca to the tail tip. Males generally have a longer tail and an area just behind the cloaca where a slight bulge may exist. Some males have an area just behind the cloaca where the sides appear to be parallel, after a slight taper at the cloaca itself.

Longevity: Little is known of the longevity of wild snakes, though mortality estimates have been made, based on a number of field studies. The survival rate for many species living beyond two years old is approximately 35 percent. Some studies have shown these numbers to be larger though — perhaps as high as 67 percent in some northern species (Rossman, Ford, Seigel, 1996). The longest lived garter snake in captivity was an Eastern or Common Garter Snake reported to have lived 14 years (Slavens, 1998). Typical longevity in captivity appears to be about 6-10 years. Lifespan in the wild is undoubtedly little longer than that.

III. Habitat

Garter snakes occupy a wide variety of habitats, ranging from prairie to mountain meadows. Their adaptability to a given habitat appears to depend more on

ABSTRACT: Garter snakes (*Thamnophis*) are among the most successful and widely distributed snakes in the world. Highly adaptable, their range encompasses the areas between central Canada and Central America and California to Maine. As the public has become more knowledgeable about the environment they live in, people are now beginning to recognize the valuable role these often misunderstood and feared animals play in that environment. Thus, even snakes are becoming part of the yearly intake at many rehabilitation centers. Snakes, like other reptiles, have distinct needs during rehabilitation that require specialized knowledge. The author attempts to provide a brief introduction to the garter snakes' natural history and a basic introduction to triage practices based on experience and current research.

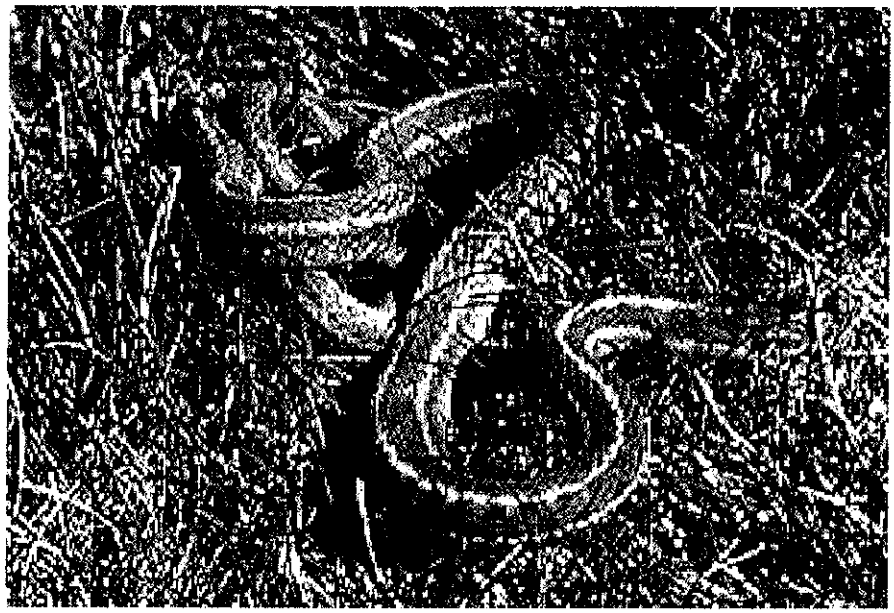
KEY WORDS: Snakes; triage; trauma; natural history; reptile rehabilitation.

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access to water than particular foods, or even climates. The *Thamnophis*' overall North-South range, reaching from central Canada to central Mexico is a good indicator of their adaptability. In the field, different species appear to show different habitat preferences.

Scientists have jokingly referred to Common Garter Snake's habitat as "everywhere" and this is not far from the truth. *Thamhophis sirtalis* is probably the most widely distributed garter snake in North America. Rather than discuss all the possibilities, the following are simply some of the most common habitats: pond margins, seasonally flooded prairies, silt flats, woodland edges, trees in pastures, native prairies, meadows, fallow fields in bottomland, weedy upland fallow fields, and disturbed or barren roads and yards.



***Thamnophis elegans elegans* (Western Terrestrial Garter Snake) (six subspecies). Length variable, 18" to 42". Variable color and markings. Dorsal scales usually limited to 19 -21 rows. Dorsal area is usually a uniform black, brown, red or gray. A side stripe is usually present in second and third scale rows. Back stripe is generally well-marked. Typically two alternating rows of black spots between the stripes. The vertebral stripe is seldom more than three rows wide. Side stripes distinct or indistinct. Single anal plate. Scales generally keeled for 19 rows. Top of head usually gray. Distribution: New Mexico and Arizona to the south, California to the west, British Columbia, Alberta and SW Saskatchewan to the North, Montana, Wyoming, Colorado, New Mexico to the East. Some populations seen in South Dakota and Nebraska at western edges of those states.**

IV. Senses

Snake senses are different from any other reptile due their evolution and ecological niche. Snakes lack ears in a form that a typical person might recognize. There is some evidence that the snake's vestigial inner ear may be able to receive some airborne sounds at certain frequencies (15- 600 Hz), but this is still under dispute. There is little doubt that snakes have a highly evolved tactile sense that allows them to sense vibrations and temperature variances very effectively (Seigel and Collins, 1993).

They also possess a highly enhanced sense of taste created by combining taste and smell through an adaptation known as Jacobson's organ. This consists of two specially adapted sensory pits in the roof of the mouth. The normal use of this organ is demonstrated by the snake's tongue flicking in and out, tasting things that it touches with its tongue, or seemingly, sampling the air around it. The tongue is retracted into the mouth where it touches the sensory pits for analysis. Snakes also possess a limited sense of smell in the ordinary way (Sweeney, 1992).

Garter snakes possess an excellent sense of sight in terms of the snake world, but it would be considered poor (even by human standards) in comparison to most other animals. It is thought that snake eyes are not as mobile as most other animals because of the lack of sensitivity in any particular area of the eye. Thus, the ability to focus a particular part of the eye is lacking. Snakes will typically move their heads to track any but the smallest movements. Their depth perception is poor compared to animals with forward-facing eyes.

It has been shown in various studies that snakes, deprived of a particular sense, can still function in a relatively normal fashion, but it would certainly limit their overall survival chances in the wild. The greatest single sensory loss would likely be their tongues. The loss of an eye might reduce their effectiveness somewhat but would unlikely be crippling. Since their tactile senses are spread throughout their bodies, it is unlikely that this would ever be incapacitating without the snake suffering death.

V. Feeding, Movement, Normal Activities, Predators

Movement and normal activities are similar for all garter snakes. They can be classed into a number of broad categories — thermoregulating, foraging, mating, predator-defense, hibernation, and shedding.

Most garters thermoregulate[3] by warming themselves in the morning hours and then maintaining a preferred body temperature (or plateau phase), which typically ranges from 28-32°C during the day. Then, after the snake seeks shelter in the evening, body temperatures fall — the degree depending on the nature of the shelter. Body temperatures will also vary depending on micro-climate, season and local weather conditions.

Geographic variation is also likely, based on preliminary evidence: southern examples of a given species have shown slightly higher preferred body temps than northern examples. Garter snakes are generally active over a

broad temperature range: 10-36°C. Most garters will have difficulty digesting food at temperatures below 12°C. Some species do exhibit broader ranges than other more typically northern species. *T. sirtalis* has been found hibernating at temperatures as low as .5°C. As an interesting aside, it has been noted that snakes found in summer exhibit a tendency toward a higher preferred body temperature than snakes caught in the spring or fall.

Foraging behaviors are typical of garter snakes, though not all snakes. Some snakes use an ambush technique instead. Garters have demonstrated the following foraging behaviors:

Peering: apparently seeking visual prey cues.

Craning: where the snake will poise itself over water, tongue flicking, in search of chemical/olfactory prey cues.

Ambush: the snake holds its head a few centimeters above water, prepared to strike.

Underwater crawling: the snake actively seeks prey at the bottom of a pond or stream.

Swimming: simply to get from place to place.

Margin crawling: movement along a shore or stream verge, apparently simply to move from place to place.

Many garter snakes possess strong navigational abilities (*T. sirtalis* and *T. radix* for example), allowing them to move substantial distances from a point of origin and return to that point successfully. It has been demonstrated that these capabilities are based on a combination of both an internal "clock" and the ability to use the sun as a compass. In these cases, even where snakes were released a substantial distance (5 km) away from their origins, they were able to return there successfully (Rossman, Ford, Seigel 1996).

Not all garters possess these capabilities. *T. ordinoides* has been, for example, shown to have little true navigational ability. There is also strong evidence that pheromone trails act as orientation devices for some garters. In most cases, it is believed that females rather than males are the primary source of the pheromones. It has also been suggested that neonate garters use these trails to find foraging grounds away from overwintering sites. These trails are also used to find a way back to dens by both males and neonates. Finally, males use pheromone trails to track females during mating season.

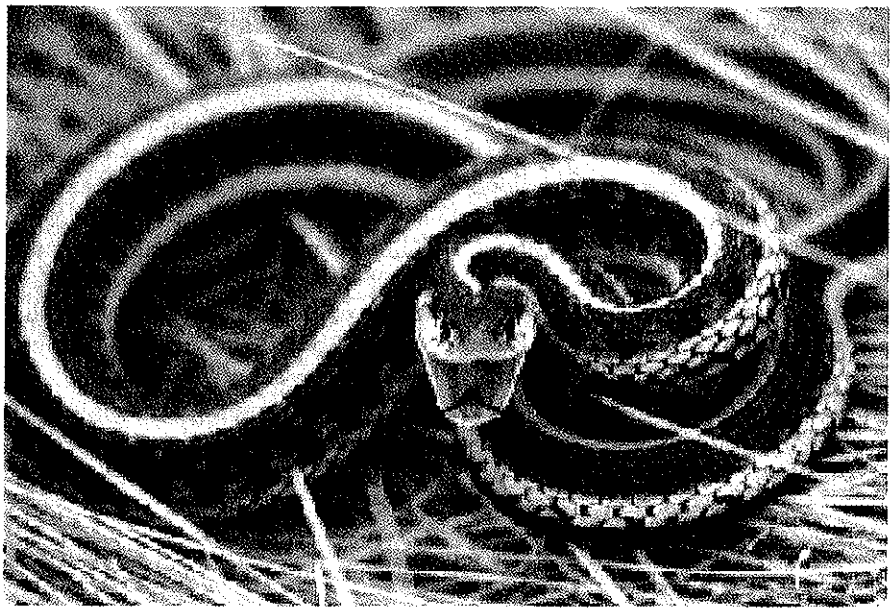
Mating behaviors[4] are similar but not identical among the garter snakes. Male sexual cycles are generally "disjunct" — that is, they are most actively producing sperm during the late summer and early fall, while they are most ready to mate in spring.

Interestingly, there is strong evidence that hormonal cycles and courtship behavior are dissociated as well. Courtship tends to occur without reference to testosterone levels. Instead the male snakes appear to enter courtship behavior based on rising air temperatures at the end of hibernation. Most existing data points to a single early spring mating period, but there is increasing evidence that fall matings occur in several species as well. This is quite mysterious since the known courtship cues are related to increased air temperatures in the spring. There is some evidence that the simple presence of a receptive female may be enough to trigger courtship rituals in some species.

Female sexual cycles are a bit better understood, since it is relatively easy to spot a gravid female and note when she gives birth (all garter snakes are live-bearers). Females typically follow a pattern called "pre-nuptial vitellogenisis," where the snake begins developing follicles in the fall and then enters a secondary period of egg production after mating in the spring. It appears that (much like the male) rising air temperatures after hibernation are the primary cue for the females to enter the receptive stage. While this pattern is generalized, there is considerable variation across species in the timing of these events. Young are born from late July to late



***Thamnophis radix* (Plains Garter Snake) (no subspecies). Length variable - 20" to 40". Usually distinct bright yellow or orange vertebral stripe. Cream to yellow side stripes at the third or fourth scale rows. Double row of black spots between side and back stripes. Frequently with light row of black spots below side stripe. Spots sometimes obscured by a dark ground color. Supralabial scales with black bars or wedges. Distribution: Oklahoma panhandle. NE New Mexico and Northern Texas to the South, then through Nebraska, Missouri, Iowa and Illinois to the East, up through Minnesota, SW Manitoba, S Saskatchewan and Alberta to the North, N Montana to the West, with some populations found on the eastern edges of Wyoming, and down into central Colorado.**



Thamnophis sirtalis sirtalis **(Common Garter Snake) (eleven subspecies). Length variable - 18" to 51". Dorsal scale rows of 19 or less, ground color generally brown or gray, but western populations may have red ground. Back and side stripes generally well-defined. Side stripes generally confined to 2nd and 3rd dorsal scale rows. Single anal plate. Generally 7 supralabial scales. Often two alternating rows of black spots between side and vertebral stripes. Spots sometimes fused vertically, creating "barred" look. Sometimes spots fused horizontally, creating thin black stripes. Distribution: Broad distribution from New England and South Central Canada to Florida in East, stretching West to central plains states, including Oklahoma and eastern Texas. Found throughout Southern Canada and Central Alberta, along coast of British Columbia and Cassar Mountains. Southwards into Washington, Oregon Northern and Central California. Also in Montana and Dakotas.**

September in some species, while others have delivered young as early as late May to as late as early October. Sperm storage appears to be common in most species of garter. It has been observed that females can make use of the sperm from late fall matings in the following spring, whether they mate at that time or not (Sweeney, 1992).

Clutch sizes appear to depend on both the species and food availability during gestation. Variations of as much as 100 percent were noted in some populations on an annual basis. These variances could be easily tied to rainfall and thus prey abundance. Most garter snakes appear to reproduce annually, though in some northern populations, a year or even two may be skipped.

Diet

The Common Garter (*Thamnophis sirtalis sirtalis*) has a broad diet in the wild as do most species of Garter. The largest components of its diet are leeches, slugs, earthworms, amphibian larvae, amphibians, and small mammals. It will, on occasion, add small birds and fish to its main diet.

Other species of Garter and Ribbon Snakes have slightly more or less varied diets. In cases where there is difficulty in feeding, a reptile expert should be contacted to provide an accurate identification so that appropriate foods can be selected.

Predators and Defense

Adult garter snakes are subject to predation by a large number of other species. The most common are hawks, raccoons, minks, foxes, badgers, and other snakes (particularly racers, king snakes, and coral snakes). While they are young they are also popular food items with shrews, jays, crows, fish, frogs and certain smaller snakes.

The most popular defensive tactic for *Thamnophis* is simple flight. This may be combined with the voiding of strong-smelling cloacal secretions. If pursued to exhaustion they may either ball up and wave their tails, attempting to confuse a predator, or hiss and strike. The latter is primarily a bluffing behavior, since they seldom bite (Rossman, Ford, Seigel 1996). Defense tactics have been shown to vary between species. Some snakes, such as Butler's Garter, seldom become aggressive, even under extreme circumstances, while others, such as *T. melanogaster,* rely heavily on aggressive striking behaviors to ward off attacks. Most garters will respond defensively to a model of a mammalian eye, when pushed to extreme, striking repeatedly at it.

Skin Shedding

All snakes shed their skin on a regular basis and the general success of the snake in shedding its skin can be used as one measure of its health. Snakes shed their skins in a single piece if they are healthy and in an environment that is healthy for them. Shedding frequency will vary with age. Younger snakes may shed as often as monthly, in order to keep up with their rapid growth. Older snakes may shed as little as once every three to six months.

It is generally fairly easy to tell if a snake is ready to shed. It will generally become somewhat irritable and you will notice a dulling of the skin. Soon after this is noted, the snake's eyes will become milky or "blue" looking. This is frequently referred to as going "blue" by many keepers.

Just before the actual shed takes place, the eyes will clear. The actual process of shedding starts with the animal rubbing its lips on rough surface. Once loosened, the snake will rub the top of its head carefully to pull away the skin over the eyecaps (spectacles). Then the lower jaw is started. If no tears or breaks occur during this process, the snake will then simply "roll" the rest of its skin off much as a sock can be rolled off your foot. In a perfect shed, the snake skin is a continuous and unbroken

"inside-out" version of the snake, lacking only the colors. Since snake skin is made of keratin, like fingernails, the skin feels very similar.

Common problems with shed include retained spectacles, retained shed fragments, and nasal blockage due to retained shed. The first is easily observed as roughened dry skin over the eye itself. Shed fragments appear as dry patchy areas usually with bits of skin sticking up around the edges. If the nares are blocked by retained shed, you can sometimes hear breathing sounds, somewhat like an adenoidal child. These can all be indications of poor health and/or keeping conditions - usually low temperature and/or inadequate humidity. In the wild, snakes seldom have shed problems, unless they have been wounded. In that case, the skin around and over the wound sometimes is retained while it heals — developing a scab-like appearance.

VI. Hibernation

All garter snakes hibernate to some extent, *T. sirtalis* up to seven months out of the year at the northern end of its range. Two critical burrow features for successful hibernation are variable depth (to allow for thermoregulation as temperatures fall) and access to water. Habitat destruction can be a critical issue, since it appears that many dens are "traditional" and used for many generations, particularly in the northern ranges of these animals. Since many places may appear suitable as dens, not all snakes entering a particular den will survive the winter. These sites may lack adequate water or may not allow the snake to den deep enough to survive in extreme conditions. This may also explain some of the great aggregations of garter snakes found in some locales.

VII. Conservation Issues

As with most animals, habitat destruction has proven to be the worst enemy of the garter snake. Over-collection by commercial interests has had an impact on certain species as well. However, the general fecundity and adaptability of the garter snakes has managed to stave off disaster so far.

This may not hold true for all species in the long term. Many of the snakes living at the extreme northern edge of the ranges have a tendency to produce smaller clutches with larger individual sizes than their southern cousins. They are also more likely to skip years in breeding cycles. Thus, the impact of losing an animal in those species is generally greater than in their southern cousins. Further, due to the variability of clutch sizes due to prey availability, destruction of habitat or over-collection may have a far greater impact on a species during harsh weather conditions. This can be particularly true if those conditions are prolonged. In general, the garter snakes are doing well at this point, though this may not last if we persist in ignoring their needs for undisturbed habitat.

VIII. Release Guidelines

Three options are generally available to rehabilitators who hope to return snakes to the wild: returning the animal to its pick-up point, repatriating it to un-tenanted but appropriate habitat, or releasing it to appropriate but tenanted habitat. Only the first has proven successful without regular human intervention. Repatriation is a topic of ongoing research. There is little information beyond anecdotal studies at this time, though the reintroduction of Indigo snakes seems to have been successful in a limited way. Return of animals to inhabited sites has shown, anecdotally, a very high death rate for various species of snakes. Thus, determining the animal's point of origin is very important in terms of its chance of survival.

IX. Rehabilitation Notes

Several concerns should be addressed prior to attempting the rehabilitation of these animals. The first is access to an experienced veterinarian. While many vets will treat reptiles, fewer have the experience necessary to do so successfully. Few veterinarians should be offended by a request for their qualifications in this area of expertise.

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.

Assuming you have made the effort to address the issues above, the next area of focus is the keeping environment. Without an appropriate vivarium setup, the best trauma care in the world will likely fail. Snakes, like all reptiles, 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. They also select "micro-habitats" based on issues such as humidity and light that are nearly as important as temperature. If we cannot provide an appropriate setup for their care, we should not try to rehabilitate them.

Two setups are required for the proper care of injured snakes. The first is a "hospital" setup, used during the early stages of treatment for trauma and illness. The second setup is used for maintenance if long-term convalescence is required. All animals should be quarantined from each other during rehabilitation. The most important rehabilitation goals can be met through the design of an appropriate vivarium for keeping.

Minimum "Hospital" setup:

10 or 20L gallon aquarium
non-tippable, appropriately sized water dish
Un-printed newsprint or plain paper towels for substrate.
Overhead heat source or under-tank heater (UTH)
Thermometer
Fine-mesh screen top
Cage Clips

The aquarium should be set up in a quiet, low-traffic area. Install heating unit and adjust heat. The sides of the aquarium may be covered with cardboard or cloth to provide a sense of security for the snake.

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. While undergoing antibiotic treatment, the animal can be maintained at temperatures of 80-85°F to improve response to the drug. A non-tippable bowl large enough for the snake to soak in can be placed over the UTH or under the heat lamp if surgery has not been required. (This ensures that the water will evaporate and raise humidity.) Otherwise, use a smaller bowl to prevent the animal from soaking and possibly infecting the wound. 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 must be used with appropriate clips to prevent injury to the snake from outside sources, as well as to prevent escape. Garters are extremely prone to escape due their slender builds and athletic abilities. Fine mesh is preferred to limit rostral scale damage. It also provides a convenient method for mounting an overhead heat lamp. Temperature settings should be established before a reptile is placed in the tank by measuring temperatures carefully at the levels the snake will move through. *Snakes should always be housed separately — never together, due to the possibility of aggression, particularly during feeding.*

Feeding should not be attempted unless okayed by your veterinarian. Snakes are capable of going for a substantial period of time without feeding as long as they have access to water and have adequate body weight to begin with.

Feeding can be accomplished with this species either by placing the feeder animal in an appropriate container (for example, fish in a small transparent dish), in the cage, or by forceps. Food animals should be appropriately sized — they should never be larger than the garter snake's diameter. Fish filet (sprinkled with an appropriate vitamin supplement such as Rep-Cal Repti-Vite) can be cut into strips thinner than the snake's head and approximately 1/2" to 1 and 1/2" long (depending on snake size). These can be offered by forceps.

The snake should be allowed to feed based on the appropriate MECS for its weight. If a snake is suffering from spinal injuries, attempt to feed by forceps or by stunning the prey prior to feeding. This will prevent over-activity during the healing process.

Maintenance Setup: The following is a generic maintenance setup likely to prove successful with most garter snake species. If your animal is from the extreme north or south, some variation may be necessary.

The hospital setup may be used with some variations for longer term care. A temperature gradient of 72°F (22°C) to 86°F (30°C) should be provided to allow for thermoregulation. The heat source should be placed at one side of the enclosure to create a proper gradient. It should not heat more than one-third of the enclosure directly. If the room temperature is maintained in the mid-70s then it is only necessary to provide a basking spot. Several commercial products may be used successfully as substrates — unused newsprint or paper towels, for example. Carefresh™ and small animal aspen bedding are both readily available at many pet stores. Never use an aromatic wood chip, such as cedar.

Two hide areas should be provided for the snake at opposite ends of the vivarium — rocks or small branches will lend a sense of security. Drapes can be removed during this phase of convalescence, enabling you to monitor the animal for improvements in behavior. A rock or branch placed under the basking light or over the UTH will be used regularly by a healing snake. Ill or underweight snakes should never be hibernated. You may generally prevent hibernation by maintaining a summer light and heat schedule throughout the winter. This may require the application of UVB light with some animals.

Assuming you have the basic components just described, you are prepared to perform basic triage and provide appropriate care during convalescence.

The following material is presented primarily for the inexperienced reptile rehabilitator. 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 rehabilitators 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.

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. If available, standard surgical gloves are appropriate. If you treat more than one reptile, this practice is even more important due to the possibility of cross-infection. Standard procedures for the sterilization of any instruments used is mandatory. Disposable equipment should be used where possible.

All snakes are carnivorous animals and thus may be somewhat defensive during handling. Bites are not common but may occur. These are seldom more than a nuisance in the species

under discussion. A typical snake bite from a snake of this size seldom hurts more than a light pinch. Small puncture wounds may result, that should be examined thoroughly for broken teeth or tooth fragments. Simple debriding with soap and water, followed by application of a topical antibiotic will usually prove sufficient.

On rare occasions, septicemia may result (usually from Gram-negative bacteria) and this should be followed up immediately with a visit to your physician. Snake bites from a non-venomous species are unlikely to cause problems except in the extremely rare circumstance that the victim proves to be allergic to snake saliva. There is, however, one known instance of a person dying as a result of a hyper-allergic reaction to garter snake saliva.

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. Next, weigh and measure the snake. Examine the snake's behavior: look for star-gazing, circling, thrashing, body rotation, head-scraping, and lack of movement or muscle tone in a particular area of the body. Turn the snake on its back. Is it able right itself without difficulty? (This exam should be done without restraint on a surface that allows some traction for the animal, i.e. not stainless steel.)

You may find that examinations are considerably easier if two people are available — one to restrain and one to manipulate.

Begin the examination by looking over the eyes of the snake. Make sure the snake's body is fully supported during this operation. Look for swelling, discharge, redness, and foreign bodies that might be present. Next, examine the nares for discharge or blockage. Then move on to the mouth. Look for hemorrhaging, a generalized yellow appearance, necrosis, swellings or caseous material. Also note any signs of "stringy" mucous. Watch to see if the snake wheezes or keeps its mouth open for breathing when not held. The mouth may be opened by gently inserting a moistened cotton swab at the side and pushing back toward the joint — do not use the end of the swab other than to enter the mouth — use the length of the swab. Overly rough handling can cause mouth damage by itself.

Next, review general skin condition. Examine all skin closely for the following: retained dry skin, edema, abscesses, redness under the scales, jaundice, perforations and other signs of trauma. Run your hand down the body lightly and firmly — there should be no lumps or palpable masses. Look carefully for the presence of mites and ticks. Mites will generally appear as small, mobile, red or black dust specks. 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 spinal fractures or head swelling appear to be present.

Once complete notes are taken, review the charts on pp. 16-18. They are presented in the order of the exam protocol. Do not attempt to treat prior to a complete review.

Transport Protocol

At a minimum, the rehabilitator should keep a several small cardboard boxes or "Critter Carrier"-type enclosures and several cotton bags available at all times. Small to medium-sized styrofoam coolers are also very good for transport, especially in the depths of winter (or summer) when temperature variations between indoors and outdoors are at their worst. Coolers should have a series of tiny holes punched through the wall near the top, using a tool such as an icepick — do not make the holes larger than necessary. The animal should never be shifted through a substantial temperature change. Snakes should always be bagged in a cotton bag with tightly sewn seams before transport. The top of the bag should be twisted tightly and then tied off. I use heavy rubber bands, though twine will work fine. The bag should then be placed in a cooler or box. A hot water bottle may be placed under the cloth in the carrier to provide warmth; well-insulated ice packs may be used to keep the animal cool. Make sure the temp range is between 65-80°F if a long transport is required. In emergencies, I have bagged an animal and then transported it inside clothing near the body.

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. Major blood loss. Apply pressure with sterile gauze pad or tie off. Begin fluid replacement.

4. Crushing wounds to the body. (Cover with sterile gauze moistened with saline.)

5. Unconsciousness accompanying any of the above.

Euthanasia

Euthanasia in reptiles is an on-going debate at this time. There are a number of possible non-veterinary methods, most of which have significant drawbacks for the rehabilitator 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. It may be used in an emergency situation, if the animal is immediately pithed. (This is not a preferred method.) Freezing, while accepted in the past, may or may not be effective. Temperature requirements for successful freezing are extreme, substantially below those available to the average rehabilitator. Inhalant use is risky as well, particularly to the administrator, due to the lengthy period of time and large amounts of agent required for successful usage of inhalants.

My current preferred method is

continued on page 18

SYMPTOMS	LIKELY CAUSE	INDICATED TREATMENT
Neuro-motor symptoms:		
Star-gazing	May be caused by brain damage, viruses, liver impairment, Vit. B1 deficiency, encephalitis, IBD, poisoning.	Requires veterinary evaluation.
Circling, thrashing, rolling	Usually caused by brain damage, sometimes extreme pain.	Requires veterinary evaluation.
Lack of tactile response, lack of muscle tone	Usually caused by a spinal injury.	Requires veterinary evaluation.
Paralysis	Damaged spinal cord, viral or bacterial infection, parasites, toxins.	Requires immediate veterinary evaluation.
Tremors	See star-gazing.	
Eyes:		
Inflamed, swollen	Conjunctivitis, may be secondary to respiratory infection. (Also check for foreign bodies.)	Apply triple antibiotic ointment 3 -4 times per day.
Pupil non-responsive to light trauma	Possible blindness, brain damage.	Requires veterinary review.
White or opaque eyes, eye-caps	May be normal if snake is in pre-shed state. Conjunctivitus with pus under spectacle. May also be caused by blindness, but then usually only one eye. May be be caused in captivity by multiple retained eyecaps.	If in pre-shed state, no treatment required. Otherwise, apply triple antibiotic 3-4 times per day.
Sunken eyes	Probable moderate to severe dehydration.	See "folds," in skin section.
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 mild Betadine (ensure animal does not ingest).
Nares:		
Bubbling, discharge	Upper respiratory tract infection.	If bacterial, it is likely to be colored. Colorless discharge may indicate a virus. Both may be present. Transport to vet.
Respiratory:		
Wheezing, open-mouth breathing, distended throat	Lower respiratory tract infection (if accompanied by cyanosis and/or concurrent illness may indicate acute pneumonia). Also check for physical obstruction. Don't confuse with normal defensive hissing, which disappears when animal not threatened.	Likely to be pneumonia or severe bronchitis. Requires veterinary treatment. If acute, transport immediately to veterinarian.
Skin:		
Simple wounds	Trauma.	Depending on severity, deride, 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.	Pluck larvae with tweezers. Treat same as wounds above. Repeat as needed. (Treatment may be required for some days due to hatching fly eggs.)
Localized body swelling	May be an indicator of internal injury. Steatitis. Cellulitis. May also be caused by pregnancy or malignancy.	If the swelling is regular and slightly mobile, it is likely a pregnant snake. If the swelling is hard and off-center, malignancy is possible. Swellings around obvious trauma sites can indicate severe internal injuries.

SYMPTOMS	LIKELY CAUSE	INDICATED TREATMENT
Lumps, bumps under skin	Likely abscess - see "abscesses" below.	Requires veterinary evaluation.
Visible ribs or visible spine	Probable starvation, tumor, parasites, systemic infection.	Rehydrate gradually. Tubefeed small amounts of Ensure™ (2% body weight q24) after animal is rehydrated and demonstrates weight gain. Then tubefeed small amounts (2% of body weight q24) of slurried Hills a/d™. Review with vet for differential diagnosis.
Folds, wrinkles in skin where the animal coils	Probable dehydration - check for skin tone by pinching.	Mild to moderate: snake will drink - Rehydrate by soaking and making water available. Moderate to severe - sq or ic fluids - 15 -25 ml/kg q24 divided dose. Severe - sq or ic fluids, 25 - 40 ml/kg q24 divided dose.
Scale loss - abscesses at injection site	Drug reaction.	If within two or three drug injections, assume an allergic reaction. Discontinue treatment and review case with veterinarian for alternate drug therapies. Treatment involves keeping in a sterile cage with daily sterilization of water dish. Change 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).
Mites	Red or black "specks" moving around eyes or at scale edges.	Provent-a-Mite™ has proven very successful when used exactly as directed.
Blisters on ventral area	"Blister disease," generally found only in captive snakes.	Keeping environment too wet. Move to a dry "hospital cage" setup and treat with triple antibiotic ointment 2 -3 times daily.
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 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. Abscess must be lanced, then curetted. Supportive therapy may require fluids, daily flushing, wound packing. Systemic antibiotics may be required.
Burns	Trauma.	Debride with dilute Betadine or hydrogen peroxide. Dry. Treat with triple antibiotic cream, Silvadene or Gentamicin applied topically.
Masses under skin	If found in the rear third, possibly a gestating female, constipation or tumor. If in center or front third, possible tumor.	Try soaking in warm water (80- 85°F) to see if constipation is an issue. May require several soaks over two days. If unresolved, review with vet.
Gastrointestinal:		
Mass protruding from cloaca	If red, may be prolapsed organ. If any areas are blackened - this may indicate gangrene. Possible sperm plug (usually tan or brown in color).	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.

SYMPTOMS	LIKELY CAUSE	INDICATED TREATMENT
Diarrhea	Temps too low. Parasites, bacterial infection.	Review with veterinarian.
Vomiting	Stress. Obstruction. Tumor.	If occurs more than once, review with your vet. Avoid handling 24 -48 hours after feeding.
Dirty vent	Possible infection or endoparasites.	Requires veterinary intervention. Cultures and physical exam required to determine cause.
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 80s, administer fluids, consider use of corticosteroids such as dexamethasone. A generalized dose for dex is .1 mg/kg IM.

NOTE:The drugs noted above are the most common, readily available and least expensive brands or type available in America. Others that are perfectly suitable substitutes are available and should be used as recommended by your veterinarian. Provent-A-Mite is a trademark of Pro Products. Carefresh is a trademark of Absorption Corp.

Garter snakes

continued from page 15

the administration of a suitable barbituate (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

Betadine: trade name for Povidine-Iodine.
Caseous: paste-like.
Cloaca: a chamber where the urinary, genital and digestive systems empty.
Dorsal: upper half of the snake.
Ectothermic: animals that regulate their temperature by external sources, i.e., solar radiation.
Nares : paired nasal openings.
Rostral: nose tip.
Scale rows: always counted from the ventral scales up to the spine on the diagonal.
Supralabial: above the mouth.
Ventral: lower half of the snake.
Vivarium: an enclosure designed to mimic the natural conditions in which an animal lives.

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USFWS - Endangered Species List. http://www.fws.gov/r9endspp/endspp.html (World Wide Web Site)

Notes

1. This is the second in a series of three articles utilizing common reptile species to introduce reptile rehabilitation practices regarding turtles, snakes, and lizards. Material may be repeated as applicable to more than one sub-order of reptiles.

2. The most detailed indentification key of which I am aware utilizes some 59 key identifiers to lead to a confirmed ID of the species, with additional material on subspecies.

3. See Seigel and Collins, 1993, chapter 7, for a good discussion of snake thermal ecology.

4. See Rossman, Ford, and Seigel, 1996, pp. 106-112, for a discussion of courtship behavior.

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Prey Conquers Predator: A Case Study

Barred owl dies from rodent-inflicted wound

By Marjorie J. Gibson, Donald C. Gibson, and Dennis G. Bardelmeier

Raptor rehabilitation facilities are accustomed to dealing with human-caused injuries to their avian patients. These injuries run the gamut from birds that are hit by motor vehicles, caught in traps, or poisoned — either purposefully or accidentally. It is less common for birds to present with injuries resulting from natural activities in the wild. Territorial disputes between raptors may result in serious injury or even death. It is more unusual for the prey species to inflict a fatal injury upon the predator. While the raptor research community acknowledges anecdotally that this kind of injury could occur, specific necropsy cases have not previously been noted in publication.

History

On February 23, 1998, a call was received from a local farmer. For a period of several months the man and his wife had been watching the resident Barred Owl (*Strix varia*) mousing near the woodpile. The bird's habit was to hunt from the woodpile just before dawn. A fresh snowfall and bright moonlight provided a perfect backdrop for observation. Occasionally, the couple would witness a successful hunting attempt. Such was the case a few days earlier, when they saw the bird pounce on a small rodent. The bird quickly swallowed the rodent and flew off, presumably to its roost just before the sun rose. Two days passed without sighting the owl. Three days after the successful hunting attempt the bird was noticed near the woodpile crouched in a protected space. It was lethargic and did not move with the approach of humans. The bird was left alone for the day. As evening approached, the bird's posture was less erect than earlier in the day and still refused to move with the approach of people. The Wisconsin Department of Natural Resources was contacted. The bird was captured without incident or struggle and put into a cardboard box for transport.

Examination

At 7:30 p.m. on Feb. 28, 1998, the bird was presented at Raptor Education Group, Inc., a raptor rehabilitation facility in Antigo, Wisconsin. First examination of the bird revealed a well-fleshed and well-feathered Barred Owl. The bird weighed 730 grams. There was no obvious sign of injury to the bird.

Physical Exam Results:

Oral Cavity: Unremarkable. Mucous membranes: Pale pink. Throat: Clear, no discharge noted.
Nares: Normal.
Eyes: Normal in appearance and pupils equal and contract normally.
Ears and Canals: Normal in appearance; no blood present.
Body: Normal, well-fleshed individual. Stands slightly bent over, no injury on thorax noted. Bird appears uncomfortable with abdominal palpation. No abdominal distension noted.
Wings: Both right and left appear normal with no sign of injury.
Legs: Normal, no abnormalities noted.
Feet: Normal, grips with both feet and all toes. Foot pads normal, no lacerations or thickening.
Feathers: Well feathered, no feather parasites noted.
Mutes: Normal in size, color, and consistency.

ABSTRACT: Life as a winged predator is not without peril. The following case study deals with a Barred Owl (*Strix varia*). The bird was assumed to either have swallowed a mouse while the latter was still alive or still moving enough to cause claw punctures to the owl's esophagus. The injury that was inflicted and the necropsy results are presented and discussed.

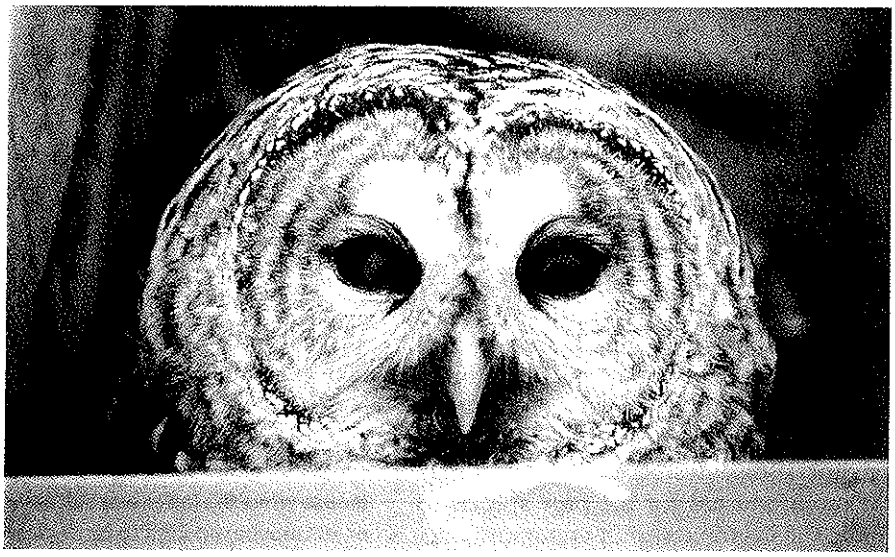
KEY WORDS: Esophageal puncture; predator injuries; raptor injuries; raptors; owls.

MARJORIE J. GIBSON *has been involved in wildlife research and rehabilitation specializing in raptors and other avian species for over 30 years. She is Founder and Executive Director of Raptor Education Group, Inc., Antigo, Wisconsin. A medical technologist by profession, Marge and her pathologist husband joined forces many years ago to focus on laboratory medicine in avian species. She is currently president of IWRC.*

DONALD C. GIBSON *graduated from USC School of Medicine and did his pathology residency at the United States NMS, NNMC in Bethesda, Maryland. Recently retired from private practice, he devotes much of his time and energy to his wife's passions: raptor rehabilitation and IWRC.*

DENNIS BARDELMEIER *is a 1973 graduate of University of Illinois College of Veterinary Medicine. He is owner of the Antigo Veterinary Clinic and maintains an active general practice. He enjoys the change of pace that wildlife patients provide.*

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This Barred Owl (*Strix varia*) died from esophageal punctures inflicted by a mouse caught by the owl. (Photos by Marge Gibson.)

Behavior: Lethargic, eyes close often.
Provided fresh mice and beef heart; refuses to eat.
Strenuously resists tubing attempts.
Non-aggressive.

Following the exam, the bird was installed in an airline kennel for the night. The next morning the bird was found lying in a sternal position. Breathing was labored. The bird died within a few hours before further testing could be performed.

First Thoughts

Poisoning was suspected in this case due to the excellent physical condition of the bird, the lack of outward signs of injury with the exception of a pale color to the mucous membranes, and the speed with which the bird died after presentation. The farm owners were questioned about the use of pesticides or rodenticides. They denied they had used either in the area of the barn for over a year. Pesticides that are used in the fields during the summer season were kept in a separate building that was not accessible to rodents.

Necropsy Results

At necropsy, there were two distinct, closely approximated perforations within the esophagus, one centimeter above the entrance to the proventriculus. Each measured roughly two millimeters at its greatest dimension, and the two punctures were two millimeters apart. A probe could be passed through these into the adjacent tissue. The surrounding mucosa was pink and appeared normal. In the soft tissue surrounding the esophagus there was abundant, thick yellowish, foul-smelling purulent material in which food particles were discerned. This extended mostly to the left around the base of the left lung, but also to a lesser degree into the right lung. The proventriculus, gizzard, and intestine contained a minimal amount of semi-liquid greenish material with no other abnormalities found.

The remaining exam was unremarkable. The bird, an anatomic female, appeared well-nourished.

Cause of Death

The cause of death of the Barred Owl was suppurative thoracic infection secondary to traumatic esophageal perforation. Since an esophageal tube was not passed into the bird following admission to the rehabilitation center, there is no chance the injury was due to accidental injury with a tube-feeding attempt.

It is theorized, using the history collected and the obvious injury observed during necropsy, that the owl swallowed a rodent alive and the rodent either bit or clawed through the esophagus before it died and was digested or was egested out of the esophagus. No rodent remains were found in the digestive tract nor were any pellets found in the bird. Using the amount of purulent matter in the thoracic cavity as an indicator, it is further theorized the injury occurred up to three days before the bird's death.

The rodents that are most probable as prey in the region and woodpile habitat are the Starnose Mole (*Condylura cristata*), White-footed Mouse (*Peromyscus leucopus*), Deer Mouse (*Peromyscus maniculatus*), House Mouse (*Peromyscus leucopus*), or the Boreal Redbacked Vole (*Clethrionomys gapperi*).

Discussion

Esophageal perforations are extremely difficult to diagnose and treat even in the well-documented cases in human medicine. Most perforations that occur are as a result of injury from surgical endoscopy. In children, trauma to the upper thorax and swallowing of foreign objects can also perforate the esophageal wall and cause sudden death or death under suspicious circumstances. There is occasional literature reference to human death resulting from puncture of the esophagus due to fish or chicken bones. Death of the patient is frequently the result of esophageal puncture, especially when the trauma is not immediately identified. Suggested methods of detecting esophageal puncture involve radiography, including CT scans and esophagoscopy.

Punctures and lacerations of the upper GI tract are relatively common in fish-eating birds. These punctures most commonly originate from either the bones or spines of fish in the diet or from ingested fishing gear (hooks, lures, etc.). Pokras and Miconi have observed such injuries in a wide variety of species including cormorants, loons, herons, gulls, osprey, and waterfowl. Williams reports similar injuries in Brown Pelicans (*Pelecanus occidentalis*). In a study of 400 Common Loons (*Gavia immer*), Pokras

and Miconi (unpublished) found that about 25 percent had sustained punctures from either fish bones or fishing gear. In no case, however, did simple fish bone punctures of the esophagus, proventriculus, or gizzards result in clinically significant pathology. Several birds had hooks lodged in the oral cavity, which lead to debilitation and death. In one additional case a hook had caused a large laceration of the thoracic esophagus leading to significant scarring and starvation.

Normally, owls kill their prey by biting the head or breaking the neck prior to ingestion. In most cases, the rodent is dead or at least stunned when it is swallowed whole. Once in the esophagus, a stunned animal could not live long due to asphyxiation.



This close-up view shows the esophageal perforations found during the Barred Owl's necropsy (see arrow pointing to punctures).

Conclusion

Predators have many obstacles to overcome to survive in their natural environment. Human population growth and the habitat loss that follows, illegal shooting as well as pesticides and a host of human-related injuries are the situations wildlife professionals note when discussing raptor mortality. While natural mortality and occurrence such as severe weather and prey abundance certainly play a part in predators' survival, apparently owls at least occasionally have incidents when the prey becomes the victor and the predator succumbs to the prey.

Acknowledgments

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Sponsoring New Wildlife Rehabilitators

A guide to successful partnerships

by Shirley J. Casey and Allan M. Casey

ABSTRACT: Experienced wildlife rehabilitators who become sponsors play a vital role in preparing new home-based rehabilitators. This paper details the need for sponsors, reasons that people may be reluctant to take on the task of sponsorship, considerations in becoming a sponsor, and possible actions to reduce difficulties. The authors suggest ways to help newcomers understand wildlife rehabilitation, requirements/resources, and performance expectations, and ways to determine which applicants may not be an appropriate match for home-based wildlife rehabilitation. The paper was developed with input from wildlife rehabilitators with experience sponsoring and training new wildlife rehabilitators.

KEY WORDS: Sponsoring wildlife rehabilitators; wildlife rehabilitation training; wildlife rehabilitation education; supervising rehabilitators; wildlife rehabilitation volunteer; rehabilitation apprentice; sub-permittee.

SHIRLEY AND ALLAN CASEY *are licensed wildlife rehabilitators in Evergreen, Colorado and specialize in squirrels. They are co-founders of WildAgain Wildlife Rehabilitation, Inc., which also conducts research and presents training programs for rehabilitators and wildlife agencies. The Caseys publish and present nationally on wildlife care, holistic health care for wildlife, and wildlife management policies. They are also on the Board of Directors of the Colorado Wildlife Alliance, a statewide environmental group.*

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Reports from wildlife agencies indicate that the majority of wildlife rehabilitation license holders around the United States have home-based facilities (Casey, 1995). Preparing effective home-based wildlife rehabilitators requires training, supporting, and supervising new people so they are able to provide high-quality care for wildlife. Some of this experience may be obtained through classes and volunteer experiences at facilities or with independent rehabilitators. Apprenticeships under the guidance and supervision of experienced wildlife rehabilitators or sponsors are another common and important training tool. In addition, a formal "apprenticeship" is a license requirement for new rehabilitators in some states as well as with many federal permits (Casey, 1995).

Reluctance to Sponsor New Rehabilitators

Even with a pressing need for new rehabilitators, some experienced rehabilitators are reluctant to take on the responsibility of training and supervision. Many potential sponsors are already very busy and do not want to have to allocate their already limited time training and supervising new people. In some situations, the sponsor's own license may be affected if problems develop from the apprentice's action or inaction. There can also be legal and financial risks. Others dislike the multitude of tasks involved with training and supervision or fear that the apprentice will quit after training, which may be viewed as a major loss of time. These are just a few of the reasons people have not wanted to sponsor new apprentices.

Deciding to be a Sponsor

Before recruiting people to train, the potential sponsor should assess his/her own motivation. Desperation for more rehabilitators to help during the busy season is a commonly cited reason for taking on new people. Other reasons include wanting to share one's personal knowledge and experience, enjoying the training process, and anticipating an increase in the numbers of animals needing rehabilitation.

A potential sponsor must assess his or her own level of wildlife rehabilitation skills and experience (years, number of animals rehabilitated, types of conditions treated), as well as the amount of his or her specialized training and knowledge of the specific subject. For example, a person with experience and training with rehabilitating waterfowl may be effective in training and supervising rehabilitation of those species, but not for deer, turtles or hummingbirds. It is also useful to consider one's own track record of safety for wildlife and humans, releases, recognition by fellow rehabilitators, and other possible measures of effectiveness.

It is also important to consider if the potential sponsor has or can make adequate time to train and sponsor new rehabilitators. If the potential sponsor does not have enough time, the sponsorship may be extremely difficult and result in numerous problems. The time constraints may suggest the need to schedule some of these sponsorship activities prior to busy seasons.

There are also various communication, training, and supervision skills that sponsors need to possess, such as assessing performance and giving feedback (Craig, 1987). In addition, it helps for the sponsor to enjoy training and supervising. If someone does not have these training skills or really dislikes this activity, problems can result. In some cases, strengthening the potential sponsor's own training and

supervisory skills would be useful before taking on apprentices. A variety of publications, classes, and continuing education courses are available on these topics (Laird, 1985).

In addition, potential risks should be identified and assessed. Some people may be interested in helping with training, but not interested in having apprentices in their home facility for long hours. Others may worry about safety for animals or people, or other liabilities.

While it may seem rather fundamental, the sponsor should have a valid rehabilitation license(s).

There are times when wildlife rehabilitators become overwhelmed by the workload and desperate for additional help. For some people, sponsoring new rehabilitators may be a good alternative. Others who do not want to sponsor new people, for any of the reasons listed, might seek other alternatives, such as recruiting, training and supervising volunteers; networking with other rehabilitators to optimize workloads; and even considering the development of a central rehabilitation facility. The decision about whether or not to sponsor new rehabilitators should be made only after serious consideration, and is not necessarily a good or automatic choice for everyone.

Explaining the Realities to "Wanna Be" Rehabilitators

It is not unusual for wildlife rehabilitators to be approached by people who are thrilled to find someone helping wildlife and for them to express an interest in helping too. Those rehabilitators who are new or very busy may be delighted with the possibility of an influx of more help. Many of these possible applicants, however, do not truly understand wildlife rehabilitation.

The person who thinks he or she wants to become a rehabilitator needs to gain a clear and realistic understanding of wildlife rehabilitation. The potential rehabilitator needs to understand that rehabilitation involves considerable physical work on a daily basis for a difficult, unpaid, volunteer activity.



Author Allan Casey teaches cage-building to new wildlife rehabilitators. Hands-on instruction is an essential part of the sponsorship process. (Photo by Shirley Casey.)

Rehabilitation is not pretty, fun, or cuddly, and it is not a hobby. It includes seeing and treating injuries, parasites, diseases, making euthanasia decisions, responding to difficult members of the public, cleaning cages, and handling emotional stress. It requires maintaining a physical facility that can be separated from humans and domestic animals, and finding ways to finance the cages, supplies, food, medications, and veterinary bills. It requires learning a wide range of skills.

It means getting and maintaining the necessary wildlife rehabilitation licenses, and attending continuing education programs on an ongoing basis in order to stay current on techniques and information. Wildlife rehabilitation is complex and demanding work.

Some people can not and should not become wildlife rehabilitators. If, at any time, it appears that the applicant is unsuitable for wildlife rehabilitation, it is better to inform that person rather than continue the relationship and let the situation deteriorate, possibly resulting in poor care of wildlife. This screening can significantly help the sponsor save their own time, reduce frustrations and risks, and help ensure that future rehabilitators provide appropriate and effective wildlife care.

Consider a Written Description

A written description of "what it takes" to be a wildlife rehabilitator can be extremely informative and make wildlife rehabilitation seem more "real." The written description can describe the commitment, time, tasks, facilities, costs, licensing, and other requirements in some depth. This documentation is more complete than a job description; it is also more than the wildlife rehabilitation license requirements and regulations that some states send to applicants (Casey, 1995).

This written description helps ensure that the key points are not forgotten as the sponsor is trying to get rehabilitation work done at the same time that he or she is talking with the potential rehabilitator on the phone. Using a written description [sample available from authors upon request] also reduces time spent with people who are not serious.

Those people who seek more information after reading a complete description of wildlife rehabilitation are more likely to make an informed decision and commitment to the activity. At the same time, many people may decide that wildlife rehabilitation is not for them. This exercise can serve as an early screening activity.

Assessing the Potential Rehabilitator's Abilities

When provided with the cold, hard facts about wildlife rehabilitation, some prospective rehabilitators will decide not to proceed. In other cases, the sponsor must evaluate the person's ability to become a rehabilitator. That is not saying that the sponsor sits in judgment of the applicant, but rather considers a variety of factors that affect the person's ability to rehabilitate wildlife effectively.

This information can be gathered in several ways. A written application form, structured interview, or unstructured conversation may provide basic information and insights. These techniques may seem to be rather formal for the home-based rehabilitator, but this information is critical to deciding if the applicant may become a successful rehabilitator or if the sponsor should accept the person for training. It also helps the applicant realize that the sponsor takes this relationship seriously. Requesting and checking references is also a useful tool.

Another consideration is the type of rehabilitation the applicant wants to learn. If they want to learn about bears and the sponsor only rehabilitates opossums, or if they demand to start on learning raptor rehabilitation and the sponsor works with songbirds, they might be referred to a more appropriate sponsor.

In addition to basic information (name, address, phone), it is good to ask other questions. Why does he/she want to be a rehabilitator? When is he/she available (time and days)? How much time is spent daily with work, family, pets, or other commitments? Is there adequate physical space indoors and outdoors to rehabilitate wildlife (separate space away from humans and domestic or exotic animals)? Do they have a vet willing to work with them?

Questions that might be on the sponsor's evaluation/observation form include: Is the person willing to do the range of tasks required? Are his/her values, interests, skills, and experiences compatible with rehabilitation (i.e., dedicated to release, not making pets; recognizing that death is part of the life cycle)? [See sidebar above for additional questions.]

Subtle things sometimes reveal themselves when the sponsor listens "between the lines" and observes closely. For example, many people would say that they are motivated and willing to do what it takes. But if the sponsor observes that an applicant is inflexible about scheduling or desires their children to be able to play with wildlife, that might suggest the applicant is not truly interested in the daily demands and work of rehabilitation.

The compatibility of interpersonal and management styles must be considered. Not all styles work well together. If the styles are not compatible or synergistic, that does not mean that either is bad or wrong. Rather, the applicant might work better with another sponsor and could benefit from a referral to another prospective sponsor.

ASSESS YOUR APPLICANT

Below are issues sponsors might want to consider when assessing information provided by applicants (these questions are not asked directly!). The authors encourage sponsors to add and tailor questions to meet their own needs and concerns.

Does the applicant:

1. Show willingness to do the range of tasks required?
2. Show initiative and dedication to learning?
3. Show self-motivation?
4. Respond effectively to rapidly changing situations and multiple tasks?
5. Anticipate the possible consequences of his or her actions with wildlife?
6. Demonstrate attention to detail?
7. Respond to conflict or emotional stress?
8. Communicate well with the public?
9. Show values compatible with rehabilitation (e.g. not making wildlife into pets)?
10. Show commitment to wildlife and people?

When It Is Not a Match

In some cases, it is necessary to explain to the applicant that rehabilitation may not seem to fit with their situation at this time (i.e., time availability, space for cages, zoning, health). Or it may be appropriate to recommend that the person contact another rehabilitator for training. While it may be difficult to tell some people that rehabilitation may not work at this time or that they should consider another sponsor, it is far better to stop the relationship early rather than delay and compound problems in the future. This screening is a very important step in the process and can make a significant difference for both the sponsor and apprentice by saving considerable time, energy, and frustration.

While some people may not be strong candidates for doing home-based wildlife rehabilitation, they could still provide extremely valuable contributions in other ways, such as getting involved with telephone hotlines, fundraising, education, political action, and transport. It is useful to explain that these activities can be just as beneficial to wildlife as direct care.

More Realities of Wildlife Rehabilitation

After the applicant has shown that he/she has some understanding of wildlife rehabilitation and the sponsor believes that they might work together effectively, it is time to provide a closer look at rehabilitation. This is a reasonable time to show them facilities, supplies, materials, cages, cleaning materials, resources, publications, regulations, zoonoses and parasite protocols, tasks/activities (including some not so fun), and budgets. This type of overview may vary from several hours to a few days. It is also a good opportunity to review the challenges and difficulties as well as successes, positives, and rewards in more depth. The sponsor provides information while continuing to gather data on the applicant. Either person could still decide that the re-

lationship might not work.

It is also a time when the sponsor can identify a variety of educational opportunities. The applicant should be given a list of relevant publications (e.g., journals, training manuals, books) and encouraged to read them. The applicant can also be encouraged to attend short training programs or state rehabilitation or wildlife conferences. This expands the applicant's knowledge of rehabilitation topics and helps them meet other rehabilitators. Whether or not the applicant seeks out this type of learning gives further clues to his/her potential as a rehabilitator.

After developing some basic knowledge and skills (from the sponsor and/or other training), the applicant should be given some basic tasks such as cage work, transport, and feeding of healthy orphans.

The applicant needs to be closely supervised in order to ensure that he/she understands the activity and performs it acceptably. Again, it is a good time for the sponsor to assess skills, interests, dependability, initiative, attention to detail, response to emotional stress, and problem-solving and decision-making skills. The sponsor must assess the person's performance in a supervised setting. If the performance is not acceptable, the sponsor must evaluate whether it is because of a lack of experience or other factors (e.g., the difference between awkward feeding techniques, missing feedings since "it's only a squirrel/opossum/crow," or disregarding safety procedures). The sponsor also must assess whether the sponsor trusts the person with wildlife away from direct supervision.

Clarifying Expectations

After deciding that the person is ready to move beyond working under direct supervision, it is important to discuss general expectations of when he/she will be taking wildlife to his/her own facility.

It is useful to provide a list of knowledge and skills he/she will be required to learn and perform while under the person's sponsorship. Whether brief or comprehensive, this list serves as a critical communication tool (King, 1989). This list of expectations and proficiencies reinforces the broad knowledge and skills rehabilitators must use as well as helping to identify areas for additional training. It is also important for the sponsor to discuss the documented expectations and reach agreement, preferably with signatures to complete the process. Without such agreement, new rehabilitators may later say that they did not understand what they were expected to learn or master. [See sidebar above for a sample list of proficiencies.]

The list may include skills the person is expected to acquire. It can be very helpful to identify sources for learning, such as lists of required and suggested resources (bibliographies, supplies, etc.), training programs, and cost estimates.

This list of expectations can be used to help evaluate when the person has achieved a knowledge and skill level appropriate for applying for his or her own rehabilitation license (wildlife agencies may have additional requirements, such as some minimum time spent as an apprentice or volunteer, or certain required facilities).

It is also helpful for the sponsor to discuss how the knowledge and skill levels, performance, and other expectations will be measured and

REHABILITATION PROFICIENCIES

Wildlife rehabilitation requires specialized knowledge and skills in order to rehabilitate and release wildlife back to its native habitat successfully. A small group of rehabilitators have developed working documents that sponsors and apprentices can use to chart the apprentices' acquisition of the basic skills, or proficiencies, they need in order to become fully prepared as rehabilitators-in-training.

Below is a sampling of the types of skills included on the forms. On a complete form each of the skills below includes several specific components for mastering the larger proficiences, and several additional columns of data show which resources can provide the training or instruction needed. These resources include videos, training, workshops, training by the sponsor, and other resources. Sponsors and apprentices would check off (sign and date) each skill once it is fully completed. [More complete sample forms are available upon request from the authors.]

Completed (initials/date)	
_____	"A Wildlife Rehabilitator's Code of Ethics," developed by NWRA/IWRC.
_____	State and federal regulations affecting wildlife rehabilitation
_____	Basic identification of common native wildlife species
_____	Natural history and behavior of common native species
_____	Methods to prevent problems with wildlife and humane solutions
_____	Diet and nutrition of wildlife species applicant wants to rehab
_____	Ability to capture and handle safely the species applicants wants to rehab
_____	Identification & general assessment of basic health problems (not diagnostics)
_____	Basic first aid and problem-solving for species
_____	Wildlife parasites and disease, including zoonoses
_____	Life skills for wildlife
_____	Euthanasia, necropsy, and disposal
_____	Release criteria, considerations, preparation
_____	Public contact (handling phone calls, getting info., etc.)
_____	Recordkeeping
_____	Facilities/caging/habitat needs for wildlife species
_____	Basic resources and references
_____	Demonstrated commitment to and ability to rehabilitate wildlife

evaluated (King, 1989). The sponsor may evaluate the item by observation (e.g., feeding or handling an animal; mixing formula; conducting an initial examination); discussion or asking general questions (e.g., information gleaned from a rescuer or veterinarian; action or inaction by the new rehabilitator; timing of decisions; seeking additional information); and records (e.g., intake data, care records). The timing, frequency of evaluations, and feedback format should also be established early in the relationship (King, 1989).

It is particularly useful to confirm the expectations and evaluation methods (e.g., self-evaluation, evaluation by sponsor), so that misunderstandings are minimized.

Discussions with rehabilitators who have sponsored many new apprentices reveal that numerous problems have resulted from misunderstandings and unclear expectations. A sample of problems includes: lack of communication with the sponsor; apprentices not feeding animals according to schedule; wildlife being handled by or transferred to unauthorized people; enormous veterinary bills showing up in the sponsor's name; sponsors being surprised to see the apprentice on television or in the newspaper with unauthorized wildlife; and wildlife dying due to poor care.

Some people may want to confirm initial expectations with a face to face meeting and some kind of written outline. Others may add a written agreement of expectations and responsibilities, such as a memorandum of understanding (MOU), signed and dated by both the sponsor and apprentice.

An MOU or similar agreement should include responsibilities of both the sponsor (availability, type of support, resources, etc.) and apprentice (such as animal care, costs, insurance, caging, frequency of communications, record keeping); how long the person will be an apprentice/provisional/sub-licensee; and how the relationship can be concluded. [See sidebar above for a sample MOU. A complete copy is available from the authors upon request.]

A CONTRACT TO CINCH THE DEAL

A memorandum of understanding (MOU) is one type of agreement that the authors have found useful as a tool to help sponsors and apprentices firm up their expectations of each other. Below is a sample of some of the key items sponsors might want to include in such a document, with abbreviated examples for two of the sections. [A more complete sample is available from the authors.]

Section 1. Parties.
Section 2. Purpose and Scope.
Section 3. Terms.
Section 4. Expectations of Performance from the Sponsor.
A.) The Sponsor will provide general training, coaching, support, and feedback regarding the wildlife rehabilitation process...
B.) The Sponsor is expected to be available for help and consultation, and to arrange for backup help and consultation during those times that the Sponsor is unavailable for an extended period...
C.) The Sponsor is expected to provide needed oversight and supervision as to the Apprentice's progress. This includes frequent communication...
D.) The Sponsor is not expected to provide financial assistance, insurance, or all the services required to perform wildlife rehabilitation activities, such as securing the services of a veterinarian for the Apprentice, building cages, providing supplies...
Section 5. Expectations of Performance from the Apprentice.
A.) The Apprentice is expected to learn and know about, understand and comply with laws, regulations and ordinances...
B.) The Apprentice is expected to become knowledgeable and skillful in the various general aspects of rehabilitation...
C.) The Apprentice is expected to secure the services of a veterinarian and is personally responsible for those costs...
D.) Prior to accepting any wildlife into rehabilitation, the Apprentice is expected to have certain minimum supplies and resources...
E.) The Apprentice is expected to deliver the highest quality of care possible to wildlife, including feeding and medical treatment schedules, and maintaining proper isolation from humans and domestic animals (including no displaying of wildlife)...
Section 6. Assumption of Liabilities.
Section 7. Termination of the MOU.
Signatures and Dates.

Obtaining the Initial Wildlife Rehabilitation License(s)

Once the decision is made to sponsor the new rehabilitator, there are numerous state and/or federal license requirements. These may cover a wide range of requirements, including caging/facilities, training, tests, and letters from veterinarians agreeing to treat wildlife. In some states, the sponsorship describes the relationship and training, but the new rehabilitator immediately has his/her own license. Sponsorship is a condition of the licensing requirement for applicants seeking federal rehabilitation permits as well as some state rehabilitation licenses. In those cases, both the new rehabilitator and the sponsor may be required to complete the application and send letters. This licensing process reinforces the range and extent of the sponsor's responsibilities and liabilities.

Setting Limits

When some people get their first rehabilitation license(s) (as sub-permittee, novice, provisional, etc.), they may want to accept more animals than they can reasonably or effectively handle. It is beneficial for the sponsor to encourage starting with a

limited number of animals that are relatively stable, healthy, and pose minimal risk. It also helps to limit the number of species that they initially accept. This will build their knowledge and skill levels as well as help ensure the animals get effective care. Taking too many animals in the beginning can decrease the quality of care for the animals and overwhelm the new rehabilitator.

The need for limits also applies to the sponsor. The pressing need for more care-givers may prompt some rehabilitators to want to sponsor too many new people. This can be problematic. It takes time to train and supervise new people. Plus, situations could develop when the sponsor would have to take back all the animals in the apprentice/sub-permittee's care. This could negatively affect the sponsor's facility, workload, and ability to provide quality care.

Monitoring Performance and Giving Feedback

Once the apprentice has his/her license and is rehabilitating wildlife, the sponsor's role becomes even more involved. The sponsor and apprentice or sub-permittee need to be in regular and frequent communication. The sponsor needs to monitor the apprentice's performance and the progress of the animals in his/her care. This review can be accomplished by visiting the apprectice's house or facility and observing his/her practices. Rehabilitation records should be reviewed by the sponsor.

The sponsor needs to stay current on the status and progress of the animals in the person's care. The sponsor needs to monitor the performance even if he or she expects the apprentice's skills to be at a particular level based on the amount of experience or training.

It is useful for the sponsor to note the types of questions, rate of learning, and skill development throughout the relationship. Suggestions and feedback from the sponsor are necessary for the apprentice's learning and to ensure wildlife gets the highest quality care.

If and When Problems Develop

Since the apprenticeship is a learning process, problems or difficulties are to be expected. When problems arise, it is critical to identify and correct them. Regular communication and observation will enable difficulties to be identified when they are still minor, easily remedied, no harm is done, and it still feels like a "learning opportunity" instead of a crisis. In some cases, the problems may become more serious and need more drastic action. The sponsor needs to monitor these types of situations closely and act quickly.

Occasionally problems with the new rehabilitator may not be corrected or may escalate, resulting in risks to wildlife and people. If such problems are found or are believed imminent, it is incumbent on the sponsor to retrieve the wildlife in the person's care. This can be very difficult on wildlife, the new rehabilitator, and the sponsor. It may, however, be necessary in some cases. If this happens, the sponsor may decide that the person needs more training or other action before continuing, or may decide to stop the sponsorship. Any decision to change sponsorship status and the reasons for the action should be documented and communicated in writing to the appropriate licensing agency. If the sponsor allows the apprentice or sub-permittee to continue after discovering inappropriate action, the sponsor's own license and status could be affected.

Changing Status

At some previously agreed-upon time or according to a schedule, it is useful to review whether apprentices have met the learning objectives and are ready to have their own licenses. The sponsor and apprentice/sub-permittee may agree that the person has shown the necessary commitment, skills, knowledge, and experience, and decide to get their own license. This may involve applying to various agencies, tests, inspections, or even letters of endorsement from the sponsor. Or, it may be desirable to continue the apprenticeship.

In other cases, apprentices may decide that while wildlife rehabilitation is a worthy endeavor, it is not the path they want to follow. Other things could have changed, such as health, job, or family status. In some situations, the sponsor may decide that the apprentice does not meet the expectations of a fully licensed wildlife rehabilitator or that the person needs to work with someone else to complete an apprenticeship. The sponsor has an important role in each of these decisions. Regardless of the decision, it is beneficial to try to continue a positive, friendly, and supportive relationship.

Summary of the Steps

Sponsoring new people to become knowledgeable, skillful, and effective wildlife rehabilitators is very important to the future of wildlife rehabilitation. It is also a time-consuming and complex endeavor. While this sponsorship can be done many different ways, there are some useful steps to follow.

It is beneficial for the rehabilitator considering sponsoring new people to assess his/her own motivation, skills, and interest in training and supervising new people. The rehabilitator must consider the time commitment and risks associated with such sponsorship. These considerations may result in some rehabilitators deciding not to sponsor new rehabilitators formally.

Once the decision is made to become a sponsor, there is more planning and preparation. The potential sponsor needs to first help the potential applicant understand the full scope of wildlife rehabilitation, and if it is really what the person wants or can do. Then the sponsor needs to decide if he or she wants to sponsor that individual. If the answer is affirmative, more exposure to wildlife rehabilitation, including volunteering for basic rehabilitation tasks and additional training, will follow. This training and volunteer period is also time to decide if the person is really a "match" for becoming a wildlife

rehabilitator. Either party may decide to step back and change direction.

If the sponsor and potential applicant decide to proceed with the person getting a rehabilitation license, there are even more steps. Expectations need to be clarified by both parties. Written documentation of expected learning objectives, performance expectations, and standards help reduce misunderstanding and reinforce the importance of these items. It is also beneficial for these discussions to include how communication, coaching and supervision, performance monitoring, and feedback will occur — for both the sponsor and apprentice. Discussions with experienced sponsors have indicated that this phase is one of the most important and difficult aspects of the relationship, and one that is often neglected.

While critical to the process, obtaining the actual rehabilitation license is just one of many steps. By this time, the sponsor and the new rehabilitator are clear about overall requirements, expectations, and the sponsorship process. Then, both the sponsor and new rehabilitation apprentice implement the plan. Frequent communications, more training, monitoring, and coaching follow. After some time has passed, the sponsor and new apprentice will discuss the degree to which expectations have been met and decide about the person becoming a fully licensed wildlife rehabilitator.

Conclusion

There are times of year when the wildlife rehabilitation workload is extremely heavy. It is then that the need for additional rehabilitators is felt most desperately and the urge to enlist more help may be most strong. This help can come in many forms, including volunteers or new rehabilitation apprentices.

However, training new people to be able to rehabilitate wildlife on their own is different from a person working under the rehabilitator's direct supervision. Sponsorship is a complex and time-consuming activity that should not be taken on in a rush. The decision to sponsor new rehabilitators needs to be given serious consideration and planning as well as effective implementation. The results of sponsorship can significantly affect wildlife, future rehabilitators, and the sponsors themselves and deserves to be done well.

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Some Additional Resources

International Wildlife Rehabilitation Council (IWRC); 4437 Central Place, Suite B-4, Suisun, CA 94585; 707/864-1761 for training and publications.

National Wildlife Rehabilitation Association (NWRA); Carpenter Nature Center, 12805 St. Croix Trail, Hastings, MN 55033; 612/437-9194 for training and publications.

Wild Ones is also an excellent source of mail order publications (800/539-0210).

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Wildlife Conservation Crosses International Borders

Profile of a community conservation organization

By Robert Horwich and Maggie Jones

ABSTRACT: Community Conservation Consultants (CCC) strives to establish community-based wildlife sanctuaries with a strong emphasis on voluntary local participation and respect for the rural people and landowners to be the best stewards of their own lands. CCC provides local groups with fresh approaches toward the conservation of species and habitats and works to empower local people to manage their own lands with minimal outside interference.

KEY WORDS: Community conservation; ecotourism; translocation; manatee; spider monkeys; howler monkeys.

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ROBERT H. HORWICH *received his Ph.D. in 1967 from the University of Maryland and did postdoctoral work in India with the Smithsonian Institution. Based on his 25 years of research on infant development, he developed a method for reintroducing cranes using sounds, puppets and costumes. Since 1984, he has initiated community conservation projects in Belize, Mexico, the United States, Russia, India and Nicaragua. He founded and is Director of Community Conservation Consultants.*

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Community Conservation Consultants, (CCC), based in Gays Mills, Wisconsin, is a non-profit, nongovernmental organization that works directly with communities to promote management and conservation of natural resources. A primary function of CCC is to catalyze the formation and development of community-based conservation programs. Our programs seek to find a balance between preservation of natural resources and community development. We work in partnership with local people to provide assistance, expertise, and training in resource management in the context of local, cultural, social, and economic conditions.

CCC is designed to address specific program needs through integration of its four main divisions: conservation and resource management; ecotourism and sustainable development; research; and education and publications. CCC's main strength is its flexibility to mold creative solutions to individual projects. Input is from a balance of professionals and community members. This process is designed to produce programs with a greater chance of long-term success. Community conservation demands creative solutions to individual situations. Each situation is unique and requires unique solutions often revolving around flagship animal species, specific habitats, natural landmarks, endangered species, or locally prominent or historically important species.

Belize and Other International Projects

Our first project, the Community Baboon Sanctuary (CBS) in Belize, started as an experimental grassroots conservation effort by rural Belizean subsistence farmers to protect the Black Howler Monkey (*Alouatta pigra*). By approaching landowners with respect for their autonomy, decision-making capacity, and way of life, while underscoring the benefits of proper management on their own lands, the CBS has succeeded in placing control of the stewardship of lands with the individual landowner. The CBS was initiated in 1985 involving 7 villages and over 100 landowners to protect approximately 18 square miles of private lands. There is a tourism and education program centered in a small natural history museum at Bermudian Landing. The sanctuary is managed by a local committee with representatives of each village. Financial administration was originally by the Belize Audubon Society but it is currently administered by a committee of local landowners. CCC's current involvement consists of advising when requested and carrying on research on the Black Howlers within the sanctuary. This project has become a successful model spawning a new wave of conservation projects within Belize and internationally.

Gales Point Manatee Project, Belize

The Gales Point Manatee project involves helping the community of Gales Point, Belize, create a protected area of the 170,000 acres surrounding the village, encompassing a large river and lagoon system. The area extends through a cross-section of varied ecosystems, including cayes, ocean tidal areas, coastal beach and mangrove forests, pine forests, lagoon mangrove forests, brackish lagoons, broad leaf semi-deciduous tropical rain forests, cohune palm forests, and riverine rain forests. The area also includes many limestone caves within the karst hills in which are

found pot shards and bones, indicating ancient Mayan burial grounds. The Government of Belize has created two Special Development Areas for the region as interim protected areas. CCC volunteers have created a zoning plan for the area as well as specifically for the village, which resides on a long narrow peninsula extending into the Southern Lagoon.

Additional work included carrying out a biodiversity assessment with a United States Agency for International Development grant, including a general survey of howlers and Spider Monkeys (*Ateles geoffroyi*) within the area. Village development work included installing better sewage systems, planting viral resistant coconuts, and creating a buoy system for manatee protection.

With the participation of villagers, researchers are gathering data on tree phenology, hunting and fishing yields, monitoring and protecting sea turtle nests, as well as creating vegetation and wildlife Geographic Information System (GIS) maps. CCC works with Belize Enterprises for Sustainable Technology and the Gales Point Progressive Cooperative in these works. This project, along with working with other Belize communities, has led to work with the Protected Areas Conservation Trust to create a park system for Belize based on community co-management.

Punta Laguna, Mexico

Another project with primates as its focus involves CCC working with Pronatura of Yucatan to help the village of Punta Laguna in Mexico to protect their local population of Spider Monkeys. The area is currently an archeological site, which the Mayan community hopes to develop for additional tourism. There is currently a rainforest honey project to develop income for the community. CCC associate Dr. Laura Vick of Peace College, North Carolina, is gathering basic information on the ecology of the population of more than 100 Spider Monkeys and helping to create a conservation plan for the Spider and Howler Monkeys. Future plans include initiating a tree phenology study and helping to create an area guidebook. A conservation plan to connect Spider Monkey populations and their habitats through expanding the protective areas and connecting them through corridors has begun through the work of Pronatura de Yucatan.



Visitors tour the museum at CCC's Community Baboon Sanctuary in Belize.

Other International Projects

CCC has worked elsewhere in the world including work in Taldom, Russia and a community mapping project in Trinidad. The group is currently beginning two new projects in Assam, India and Nicaragua. In Assam, the project involves creating a conservation plan for the highly endangered Golden Langur. The project also involves working with local nongovernmental organizations and tribal people to reforest large areas within Assam forest reserves. In Nicaragua, the project focuses on protection of the Rio Escalante-Chacocente National Wildlife Refuge, which is an important nesting beach for over 20,000 female Olive Ridley Turtles and is also an important fragment of dry tropical forests on Nicaragua's Pacific Coast.

Wisconsin Projects

Closer to home, in Wisconsin, the Kickapoo Reserve was initiated by CCC to bring local control to federally confiscated lands along the Kickapoo River in the southwestern part of the state, in the heart of the driftless area. This is one of the oldest rivers in North America, and one of the most beautiful, with unique ecosystems. This land had been under control of the U.S. Army Corps of Engineers as part of a failed dam project.

In the late 1960s, 8,600 acres were purchased under eminent domain, 144 rural families were removed from their farms by the federal government and over the next 20 years, 18 million dollars was spent building the dam almost to the point of completion. The project was halted by environmental groups who identified endangered species of plants and animals located there and by the fact that the dam would silt in very quickly. This situation has been a source of local conflict for thirty years.

In 1992, CCC proposed a community sanctuary and rural education center for the area. Despite the historical problems, the proposal was approved by the local community with little dissent. In 1994, the Wisconsin state government passed legislation, written by a local committee, for management of the lands. According to this legislation, the area is managed by a nine-person Kickapoo Reserve Board, six of whom are local residents. Recently two additional board positions were

continued on page 38

CASE V:

Ethics & Resources

I SPECIALIZE IN REPTILES AND amphibians. I have not turned away any animal for which I had space since I started doing this. I have had to turn away some very large snakes and Monitors due to lack of proper facilities for them.

As time has passed, I have noted that the bulk of the exotics I get are of the following types: Giant Snakes (Burmese and Reticulated Pythons, etc.) and Giant Lizards (Iguanas, Monitors, etc.).

Some of these animals are endangered in their native countries, others are "food animals" there, but most of the ones I receive are pretty obviously captive bred (CB). In my opinion and observation, the large animals have the following characteristics:

- I don't see most of them as being suitable for pets for *most* people. They are dangerous (Burmese, Retics, large Monitors) or difficult to keep properly (iguanas, tegus), if not both.
- The pet trade is unloading most of these animals at heartbreaking prices ($7-$12 for iguanas, $50 for Burms) and thus many people are picking them up as "disposable" pets.
- When I see them they are nearly always ill, many are abused, and some are so far gone that even break-neck efforts involving hundreds of dollars in veterinary bills per animal and many individual hours of care will not bring them back from the edge.
- As "giant" animals they require specific (and very expensive) habitats compared to most native species. Without properly secured habitats, both my community and I are at risk from these animals.

During the course of a year I can only spend so much money on animals, since most of it is "out of pocket" (try getting people to donate money for these "slimy" creatures!). I improve my facility every year, but I can only do so much. I would like to add a hibernaculum this year for turtles, but probably won't because my exotics' vet bills clobbered my improvement budget (it's gone).

I want to help any of these animals I can, but I feel as though I can't keep on dealing with abandoned pet iguanas and burms for a number of reasons:

- They are proliferating at a huge pace (both CB and wild-caught). More and more unqualified people are buying them, and then people like myself and the local shelters are being asked to pick up the slack when the animals prove unruly, dangerous, or simply "too much to deal with" for their owners.
- I have limited resources and I would prefer to give *better* care rather than *more* care where it is possible.
- I have a "no kill" policy. Once an animal is in my doors, I am committed to fighting whatever is wrong with it until such time as the vet tells me there is no hope. I can't see changing this.
- There are only so many cooperators out there with facilities for these guys. One of my best ran out of room this year — she has no more space. I have one contact left to take the big guys off my hands when I get them healed up enough to set them up for adoption. No one appears willing to take iguanas at this point.
- I don't want to burn out spending time trying to get these guys adopted after spending months getting them healthy. I *can't* put them back into the same sort of scenarios I got them out of. Adoptions take a lot of time and effort away from caring for sick animals.
- I am getting more and more non-releasable natives. They are healthy but have been kept as pets or exposed to CB exotics or their habitat has been destroyed. These need long-term homes.

WILDLIFE REHABILITATORS' INTERESTS range far beyond the direct care and handling of wildlife. Standards, ethics, wildlife policy, and community involvement are among the many issues that have a direct impact on the work rehabilitators do every day.

Since these issues benefit from broad public discussion, this section of the *Journal* is designed to offer a forum for wildlife rehabilitators to exchange ideas about challenging issues, which are "up for discussion" by you, our readers. Some of the cases may also be discussed at upcoming IWRC conferences.

The following "cases" will present either hypothetical situations or real-life problems facing active rehabilitators. Each case is followed with several questions for readers, and responses from people involved in wildlife rehabilitation. To encourage a free exchange of ideas, both attributed and anonymous responses are welcome.

Each issue of the *Journal* will publish the original case from last issue, several responses, and a new case for your consideration. Please see page 34 for this issue's new case, and see the box on page 33 for details about how to participate.

Space may not be available for all responses submitted, and responses may be edited for length, but we will include as many submissions as possible. We welcome your participation. Only with your help can this forum thrive.

NOTE: *The International Wildlife Rehabilitation Council (IWRC) makes no claims as to the accuracy or truth of the information contained in the following cases, nor does it endorse any particular answer or viewpoint.*

RESPONSES

I.

By Melissa Kaplan
Reptile & Environmental Education
Santa Rosa, California

IN A PERFECT WORLD, THIS discussion would be unnecessary, as there are relatively few native reptile species brought to wildlife centers. In a perfect world, pets would not be cheap nor would they be treated as disposable when they became inconvenient. Only people knowledgeable about what they were getting into, and committed to lifelong care, would be allowed to buy such pets.

Wildlife rehabilitators, along with independent reptile rescuers, have been feeling the brunt of our imperfect world for many years now. Once it is known that you will take in exotic pet reptiles, the floodgates seem to open.

Animal regulatory agencies, humane societies, SPCAs, police departments, parks departments, state departments of fish and game, and federal wildlife offices begin directing pet owners and finders of escaped and illegally released pets to your door. With the first three agencies, this increasingly happens despite the fact that they themselves often have the facilities, staffing, and funding to keep these animals until permanent homes can be found or the decision is made to euthanize them.

By sending the owners and animals to rehabilitators and rescuers (the latter of whom generally operate out of their own personal pockets), these agencies duck taking the reptiles in and successfully avoid dealing with the underlying issues.

Thus is the problem both commercial — a pet trade that thrives on cheap fad animals and high sales to inappropriate customers — and legislative, with city, county, state, and federal agencies avoiding making any decision by sweeping it under the rehabilitators/rescuers' carpet.

A sampling of 32 iguana rescuers two years ago yielded the astounding figure of over 10,000 green iguanas (*Iguana iguana*) being dumped that year in the United States. Talking to iguana and other reptile rescuers in other countries finds dumps on the rise in Japan, Canada, and the United Kingdom.

As other giant snakes gain in popularity — and prices continue to decline — not only are we seeing increases in the number of Burmese Pythons (*Python molurus bivittatus*) dumped, but also other large snakes, such as the usually aggressive Reticulated Pythons (*P. reticulatus*) and even the smaller, gentler Red-tailed Boa Constrictors (Boa constrictor ssp.). It is feared that soon we will start seeing the African Spurred Tortoise, (*Geochelone sulcata*), once forewarned yet persistently dense owners realize just how much a 90-100-pound snake eats, defecates, and rearranges their backyard topography.

Faced with increasing numbers of non-releasable and non-adoptable animals, including large numbers of very sick animals requiring veterinary care and intensive hands-on care and maintenance, refusing admittance to numbers beyond what the facility can handle becomes a necessity, as does euthanasia.

Will refusing to take animals in excess of what the facility can physically and financially handle affect the facilities relationship with the cooperating agencies? Would they prefer you took in animals you had no way to care for? Would they prefer that you lower your overall standards of care so that you can make their lives easier (that carpet thing again)? If the answer to any of these questions is "yes," then there are some bigger problems that need to be addressed besides the ones affecting your facility.

Will expending a great deal of time and very finite financial and veterinary resources to help an untamed, aggressive, six-foot iguana (for whom you will never be able to find a suitable home) be a good use of resources, or should the iguana be euthanized upon admission? If there is no one left in your community who can effectively care for and handle such a large slashing-and-biting machine, expending resources that could otherwise be used to treat a number of native species and adoptable or placeable pet species doesn't make sense.

If the only option for placing a recovered Burmese python (or other large boid) is with a person who will turn around and breed more of these prolific snakes, selling the offspring for $30-50, then perhaps the placement should not be done, facility resources conserved, with the snake euthanized upon admission and resource review. (The issue of euthanizing these animals is not one I take lightly, especially given my appreciation and respect for iguana intelligence and the usually gentle and inquisitive nature of Burmese pythons.)

Finally, anything any of us do to save exotic species and take over the education of the consumer that should have been done prior to or at the point of sale, promotes the continuation of the pet industry as we know it. Until we are able to effect legislative changes at the local, state, and federal level that will severely limit imports, dramatically increase the per-animal sales price, and make it more difficult for consumers to acquire them, or until everyone starts dumping unwanted reptiles right back on the pet stores' doorsteps, wildlife rehabilitators and reptile rescuers will continue to clean up the pet industry's and society's garbage.

RESPONSES

II.

Bridget Sparks
WildKind, Humane Society for Larimer County
Fort Collins, Colorado

I FIND MYSELF IN A SIMILAR situation to the person seeking answers to the dilemma of exotic ani-

mal rescue. I am also a wildlife rehabilitator who finds herself caring for more and more abandoned, and abused reptiles (and other exotic pets as well). However, working for a Humane Society that contracts out animal control services for the county automatically rules out two of the options for me. I cannot stop taking in these animals, nor can I set limits. Our contracts state that we must take all of these animals. Working at an animal shelter, also, makes me graphically aware on a daily basis of the number of animals that are killed each year simply because they are surplus, yesterday's fad, old news.

I really see no short-term solution that is not simply a Band-Aid solution (at this point I often rely on veterinarians, herpetological societies, and reptile rescue groups to help me place the larger and/or more exotic species). I believe it will take a very large concerted effort on the part of all the stakeholders involved — the wildlife rehabilitators, the veterinarians, the herpetological societies, the animal protection/welfare groups, the local, state, and federal agencies — to reach a solution. And I think it will be an arduous fight. There is a lot of money in the exotic animal trade and importers and breeders will not give up this income easily.

We, the caretakers, must begin the effort by making the rest of the stakeholder groups and the general public acutely aware of what is happening in the exotics industry. It should include a sweeping education campaign hitting everyone from school children, to the exotic pet owners, to lawmakers. We could even involve the media when necessary to bring our point home.

It may be necessary to form a coalition of local, state, and national organizations and mount a major campaign to make governing agencies aware of the possible impacts not only on the exotic animals themselves but on indigenous wildlife and human health and safety. It must be made clear to these agencies that changes in the laws *and* enforcement of those changes is imperative. We must point out discrepancies in the laws that exist (i.e. some jurisdictions have a size limitation on snakes, however, in many of those same jurisdictions it is legal to sell a snake that will far exceed the size limitation as long as it doesn't exceed the limitation at the time of sale) and work to create new and better legislation to stop this steady stream of unwanted, neglected animals.

RESPONSES

III.

David Wrede
Wrede's Wildlife Rehabilitation Center, Inc.
Sebring, Florida

WHEN YOU TALK ABOUT exotics, you are talking about the right for people to have pets. We cannot refuse the right of people to have pets, but we can make them understand what is involved in choosing exotics.

First people need to be licensed or permitted by the state to have exotics. The states need to take control of people having these types of animals by passing strict laws for exotics owners requiring at least 1,000 hours training per species. Florida has three classes of licenses. However, class 3 is easy to get at this time. Class 1 and 2 require a test and 100 to 500 hours, or no test and 1,000 hours at a facility with the relevant type of animal. Class 1 no longer covers private individuals who want to own lions, tigers, and other big cats.

We have to remember that most of us are *wildlife* rehabilitators. We have taken on the job to help the animals that no one else wants to. We have to help the wild birds, mammals, and reptiles. We have to do this the best way we can with the resources that we have.

Some centers take in 5,000 to 10,000 animals per year and have paid staff. Others take in 2,000 or more with very little monies. But no matter the scale, we have to do the best we can. Some centers don't agree with others as far as who is doing what. But most of us agree that we have to help the critters that need help. Some have resources to help them take care of exotics that come in, and others don't. Our center takes in about 1,000 animals per year on a budget of $15,000-25,000 annually. We cover 9 counties and we get called 24 hours a day, 7 days a week. We are staffed by 10 to 12 volunteers.

We receive about 200 exotics per year. But we can either keep taking in the exotics and forget about the wildlife, or take in the wildlife and turn down the exotics. I wish that we could keep them all, but we can't.

Exotics can sell for $7-10,000 per animal or more. We need stronger state and federal laws and game wardens to enforce them. We need to do our part by telling people that *wild animals don't make good pets*, and that they can hurt you if you are not careful. We also have to let the game wardens know of any laws that are being broken by people that have exotics.

RAISE YOUR VOICE: DROP US A LINE

On the following page, the *Journal* presents a new case for readers to consider. We invite you to read the new case and consider the questions at the end. The cases are designed to raise complex issues, leaving plenty of room for varied or even contradictory perspectives.

To join the conversation, please send your response by February 8, 1999, to IWRC, 4437 Central Place, B-4, Suisun, CA 94585-1633 (marked "ATTN: Up for Discussion"). You may also send responses via e-mail to iwrc@inreach.com.

The *Journal* also welcomes suggestions for topics to feature in future editions.

CASE VI:
Tough Choices

KATE HATED THESE KINDS of phone calls. She always wanted to do the right thing. But the inconsistent messages she got from her brain and heart clouded her thinking on the "right" choice of action.

The woman on the phone had called asking about the proper formula to feed two baby raccoons she had found yesterday. The formula she tried seemed to be causing some diarrhea this morning.

Once again, as she had done countless times over the last seven years, Kate explained that the best course of action was to get the raccoons to her or another licensed wildlife rehabilitator. After saying she knew the woman wanted the best for the raccoons and her family, she went through her well-worn story: these are wild animals; they need special handling, formula, and cages; they may carry diseases and parasites; and state regulations prohibit private possession by unlicensed people.

The woman listened for a few minutes then cut off Kate's monologue. The woman explained that she had been a nurse's aid but now volunteered at a local animal shelter. She knew about medical treatments and now provided regular foster care at home for several of the shelter's weaning puppies — she had five puppies on the bottle right now. She had found the raccoons in her backyard, cleaned them, treated them for bugs, removed twigs and dried leaves from their fur, and put them on a heating pad. All she needed was the right formula. Was that so hard a question?

Clearly Kate knew the answer to the woman's question, but her concern was how she could successfully get the animals from this woman.

And she knew her frustration would not end if she got the animals. The regulations on Rabies Vector Species (RVS) had just changed in her state. A recent report showed that the incident rate of terrestrial rabies had jumped 20 percent that year on the opposite side of the state, primarily in striped skunks. The overall numbers of confirmed rabies cases were very low, but the Fish and Game Department had reacted by placing an immediate one-year moratorium on rehabilitation of all RVS just one month earlier.

The requirement was clear. No rehabilitation of RVS, and immediate euthanasia if RVS animals are brought to rehabilitators — no exceptions.

As Kate was explaining the rabies concern to the woman, she was cut short again. The woman, who had still not identified herself and was listed as "anonymous" on the caller identification on the phone, had to put down the phone for a moment while she tended her four-year-old twins, who now had the raccoons and puppies all playing together.

After successfully separating the group, she returned to the phone. She said that she knew what rabies looked like and these two little guys looked just fine. She had the relevant training and could raise small animals. All she wanted was the right formula — not a lecture, not a warning, and not advice, as her voice started getting louder and obviously more agitated.

Kate had to fight to stay calm in these situations, especially with people who seemed determined to keep the animals. But after another five minutes of verbal volleyball, Kate's frustration was growing. Finally the woman said her sister and her kids had just arrived to see the baby raccoons, she had to go, thanks for nothing, and hung up.

Feeling defeated, Kate now worried about several things. First she had some worry about the possibility of rabies exposure to the woman's family and animals. Though she felt the risk in her region was still very low, she knew that rabies is deadly and there is no room for mistakes. Second, her mind was on the well-being of the animals, given the probability of continuing improper diet and handling by many different people, especially the kids. She also worried that her attempts to "rescue" the animals had failed. She tried to replay the conversation, considering where she could have said something else.

At the same time, she was somewhat relieved not to have the responsibility of euthanizing what would probably be two healthy animals. She and others had felt that the Fish and Game Department may have overreacted with the one-year moratorium. Even if she didn't get these two and have to euthanize them, it was only a matter of time before some other RVS would show up at her door.

Then Kate remembered that she had recently signed up for a new telephone service that automatically rings the last caller with a push of a button. As she reached for the phone, she hesitated.

What would she say differently this time? What if it just caused the woman to hang up again? What if the woman confronted her with the fact that rehabilitators were required to euthanize the raccoons? Could she ask her local Game Warden, with whom she had an excellent relationship, to make an exception? Could someone else confiscate the raccoons?

Fearing a new incoming call could cancel any chance of further contact, she quickly picked up the phone and punched the code.

POSSIBLE QUESTIONS FOR DISCUSSION

1. What could Kate have done differently, if anything, in handling the first call? What are the alternatives?

2. What is Kate's responsibility in telling callers about the required euthanasia of raccoons and other RVS?

3. Calls from the public are often emotionally charged and stressful. Rehabilitators may feel frustrated, battered, and helpless. What are some ways to manage the stress?

4. When a state agency requires that wildlife rehabilitators automatically euthanize some species, what is the impact on rehabilitators and people who have "rescued" the animals?

SIMPLE SOLUTIONS

Grebe's Broken Beak Mended with Paper Clip and Ingenuity

By Wendy Perrone and Dr. William Streit

BROKEN BEAKS ARE ONE OF the more difficult injuries that avian rehabilitators encounter. This is a case history of an unusual beak break, and a low-tech, low-cost method we developed to help our patient through the healing process. Also included are notes on behavior and the rehabilitation techniques we developed to make the Horned Grebe's stay pleasant and healthy. In this particular case, if care had not been taken to support the natural habits of the patient, no splinting technique would have been enough to ensure a releasable bird.

Case Study

On January 10, 1997, a Horned Grebe mistook a paved parking lot for a pond and crash-landed, face first. The impact resulted in a serious concussion, and a fracture at the angle of the lower mandible with the distal third of the beak snapped and hanging down. The hanging pieces of the beak were held by the interior tissues of the mouth and the skin that holds the jaw together proximal to the symphysis. The end of the beak was hanging, but the tissues holding it on were still viable.

Initial treatment began with a regimen of dexamethasone (to help combat swelling, shock and pain), DMSO (also to help with pain and swelling), liquid avian vitamins (to help with stress), and a mixture of electrolytes and glucose (to help with shock and to provide quick energy). All the above were mixed together into an oral suspension and gently given with a tube feeder, being careful of the fractured jaw. Initial intake weight was 15 ounces, and the bird was in good physical condition overall.

A telephone consultation was held that night with William Streit, DVM, discussing methods of repairing the mandible and beak. Due to the size of the Grebe's head and the small mouth opening, radiographs were not possible with the equipment available. The idea of pinning the pieces of jaw back together was discarded as too cumbersome for the bird and it also had the potential to trap pieces of food in uncleanable areas, which could lead to infection and disease.

The discussion then turned to beak repair. It was decided that a paper clip would work as a splint on the outside of the beak. The problem then became what would work to hold it in place, understanding that this bird would be in the water during much of its rehab time and that water could dissolve bonds of many glues and adhesives. Using our Center's experience in imping feathers, I suggested using 5-minute epoxy. We both agreed that the bird would have a hard time holding still for 5 minutes and the consultation ended with me agreeing to find some epoxy with a shorter setup time and an appointment made with Dr. Streit for the next afternoon.

The next day, armed with some 2-minute epoxy from a local department store and a number of paper clips of varying sizes and thicknesses, the Grebe (feeling feisty now), TRAC Education Director Ron Perrone, and I arrived for our appointment with Dr. Streit. The first problem to be addressed was the broken jaw. Dr. Streit's gentle manipulation brought the bone back into alignment, where it held firm.

The beak repair took a bit longer. Through trial and error, we decided that the best splint would be 2 separate pieces of a jumbo metal paper clip cut to length, shaped to fit the beak line and epoxied to the outside of the beak, extending from the bend of the mandible out beyond the break in the beak. Great care was taken to avoid getting any of the epoxy on the Grebe's feathers.

The paper clip splint was applied in the following manner: the beak was carefully cleaned with rubbing alcohol, then, after the alcohol had dried, a light, even layer of epoxy was applied to the entire length of the splint site. The paper clip splints were then imbedded into the epoxy, and another layer of epoxy was applied, covering the clip pieces completely. The Grebe was not sedated in any way, which led occasionally to having a freshly epoxied paper clip piece get shaken off, but the entire splinting process was accomplished in under 10 minutes, including "drying time."

Back at the Center, the rehab process began. The Grebe was placed in a bathtub with about 6 inches of water. This was just enough for him to move around in but not enough for him to start diving. Freshly killed minnows were placed in the water, but were ignored. He was left alone for the rest of the day, in hopes that peace and quiet would eventually convince him to try to eat.

But this approach did not work. He was still dazed from the impact with the pavement and the pain from his jaw injury was probably affecting his appetite and behavior as well. He was given oral DMSO and dexamethasone, but he refused gentle force-feeding attempts. After 3 days, the dexamethasone was discontinued, although we continued to give oral DMSO for pain and swelling control for several days more.

The refusal of food continued for days. Within a week, the Grebe's lack

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WILLIAM STREIT received his DVM from Texas A & M and has been a Hospice Veterinarian with the Center since 1993. He has been in charge of the Center's orthopedics since 1995.

of eating had caused his weight to drop to 10 ounces. After days of trial and error, we discovered two vital keys to the Grebe's feeding behavior: 1) If the minnows were pre-killed for him, he was not interested, and 2) if the water in the tub was not moving he was not interested. We discovered that both of those items had to be addressed before the Grebe consented to eat on his own.

We hesitated to give him live minnows because we were all worried that the fracture in the jaw could not stand the stress of killing minnows, and we were not sure that the splints could take it either. We discovered, however, that if the minnows had their heads crushed, they would still wiggle and the Grebe would be interested enough to eat a few. (We were feeding very small minnows at that point, no more than 2 inches long and the diameter of a pencil or less.)

Movement of the water was accomplished by either keeping water running into the tub (which met with some degree of acceptance but wasted water) or "making waves" by rowing the water with our hands. This second method was received with such great happiness that we spent many hours a day that first week making waves for the Grebe. He went from eating about 10 small minnows per day to eating up to 15 at a feeding, two to three times a day. His weight loss leveled out. It became apparent that unless we were able to row the water every hour, and were willing to have hands that looked like permanent prunes, we had better come up with another method of making moving water.

About this time, the epoxy holding the paper clip splints peeled itself free from the beak. The broken beak itself was still being held on by pieces of skin, but it was very clear that the skin was beginning to atrophy and would eventually drop off, taking the piece of beak with it. During the week we had noticed that the 2 pieces of paper clip were not keeping the ends of the beak from moving apart when the Grebe ate a minnow, despite an extra layer of epoxy at the tip of the beak. We suspected that the beak's ability to spread apart was causing some pain every time the bird ate.

With the approval of Dr. Streit, we decided to switch the splinting procedure to using the entire small bend of a jumbo metal paper clip, with the bend of the clip pinched to mimic the point of the beak and the ends going back along the jaw to the feather line of the head. We also decided to glue the splint onto the bottom of the jaw to give a little better support and to bend the point of the splint up a bit to hold the edges of the point of the beak. The new splint was attached using 2-minute epoxy.

This new version of the splint was much better, and the Grebe began to eat in earnest! With the new splint, he could now eat 24 minnows at a sitting, plucking them out of the water with ease. His total intake of tiny minnows rocketed up to a minimum of 60 or more a day. We decided to get bigger minnows.

The next problem to be addressed was what to do with the need for moving water. We visited our local building supplies store and purchased a recirculating water pump, the kind used in decorative ponds and fountains. The kind we purchased had several types of adjustable fountain sprays as well as the option of using no fountain at all and just allowing the water to swirl around in the tub. As soon as we put it in the tub and turned it on, the Grebe became very excited. We added water to the tub, allowing him about 14 inches to play in, and added an overturned pottery crock as an island to rest on.

His behavior changed radically. We would change the fountain spray formation once or twice during the course of a day and we now had a very happy patient! He would look into the mirror placed in his tub and call to the other Grebe he saw, sometimes snuggling up to the mirror for companionship. He would dive under the water and do laps around the tub, even hunting hapless minnows hiding in the shadows or under the fountain. His new splint enabled him to kill them easily, and we stopped treating him with DMSO. His minnows were now about 1 cm in diameter, and they were allowed to live in the tub during the day with him so he could eat all he wanted. His intake went to 20 larger minnows per day, and he began gaining weight. Within 16 days of his admittance, he was back to 14 ounces, just one ounce shy of his intake weight.

The splint had to be re-epoxied twice more during his stay, but we did not modify it any further. After a period of time, the broken tip of the beak fell off, leaving the paper clip to act as the point of the beak itself. The rest of the beak continued to grow with the splint intact, and about 5 weeks from the time of his admittance, Dr. Streit agreed that the beak had healed enough that we could allow the splint to stay off.

The next two weeks, the beak continued to grow, and he was able to catch and kill minnows without the splint perfectly. The lower mandible was still about a quarter of an inch shorter than the top of the beak upon release, but he had definitely learned to manage, and was very eager to leave. No other complications presented themselves, and he was released at a pond on February 28, 1997, in Greenbottom Wildlife Management Area in Cabell County, West Virginia. His final weight was 17 ounces. The Horned Grebe spent his first hour of freedom diving, swimming, vocalizing, displaying, and in general showing off! He was quickly joined by a pied billed grebe, and at sunset, they were swimming together among the reeds.

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Snakes of the U.S. and Canada

By John V. Rossi and Roxanne Rossi

THIS IS THE "GOLD STANdard" for information on the husbandry of the snakes of the United States. John V. Rossi is a practicing veterinarian and herpetoculturist in Jacksonville, Florida. He is well-respected by his peers in both fields.

These two books cover the basics for keeping virtually every common snake found in the U.S. (120+ species), with some information on the variations of subspecies. While this book set is expensive, it covers all the basics of U.S. and Canadian snakekeeping, including minimum recommended caging sizes, temperature ranges, humidity, diet, and general species characteristics. The authors also developed a rating scale (1-5) and rate each species on its relative difficulty to keep in a healthy fashion. John and his wife have kept every species listed for some time and their experience is both useful and practical. The book is well-written and reasonably easy to follow for even a novice keeper.

Many snakes require lengthy rehabilitation periods after surgery or injury. Reproducing appropriate environments is critical to the successful recovery of these animals. These books offer the minimum necessary information to accomplish that goal.

— reviewed by Franklin D. Gould

Krieger Publishing Company, PO Box 9542, Melbourne, FL 32902 USA, 1995, 66 Pages, $110 U.S. (2 Vol.: volumes also sold separately, broken into the Eastern and Western regions).

Creatures: Encounters in Wildlife Rescue

By Darroch Donald

IN THIS BOOK, THE AUTHOR brings to life in vivid fashion his "encounters in wildlife rescue." He accomplishes this through his creative writing skills, his wonderful sketches and his beautiful and touching wildlife photography.

Darroch Donald's love for his work and for nature comes through in each encounter with the "creatures" he rescues. He recreates his remembrances and experiences in such a way that readers will feel as if they are right there with him. Curiosity, wonder, sorrow, anger, pity, and joy are all part of this reading experience.

The author began his love affair with wildlife as a young boy in Scotland, roaming the coastlines and returning with injured wildlife found during his wanderings. His boyhood experiences inspired him as an adult to aid wildlife in other countries, but he eventually returned to Scotland, where he volunteered with the SSPCA's first wildlife rescue center in Middlebank and became assistant manager there.

Through thoughtful descriptions of his day-to-day experiences with animals, he illustrates the frustrations as well as the rewards of wildlife rehabilitation. The author also highlights the importance of habitat preservation, networking, and education to help keep nature wild and free for future generations.

The poignancy of Donald's work is evident in the story of Alba, a peregrine falcon with a broken wing. He describes her on her admittance as "small in size, but incredibly threatening. She was powerful and she was proud, and her eyes told me all about freedom."

Later, when she leaves the center for a life in captivity, Donald writes, "She was Alba, captive falcon, and if you knew to look a little closer you might just be able to see that her eyes could no longer tell you all about freedom."

— reviewed by Mary Reynolds

Hodder Moa Beckett Publishers, Ltd., Auckland, New Zealand, 1996, $35.00 US plus $10.00 US postage & packing. Books may be ordered directly from the author; Darroch Donald, wboardman@zoo.nsw.gov.au, c/o W. Boardman, VQC, Taronga Zoo, PO Box 20, Mosman, NSW, Australia.

Domestic Waterfowl Rescue and Rehabilitation

By Nancy Eilertsen, Barbara Lewis, and Lynn Camomile
Illustrated by Elaine Thomas and Pat Krahn

THIS IS A MANUAL ON HOW to care for domestic waterfowl. It is unintimidating and easy to read, with large print, simple language, and well-delineated topics. This is a wonderful tool for the wildlife rehabilitator but would also make a great addition to veterinarians' waiting rooms, parks departments, or any agency that deals with situations that involve domestic waterfowl.

Domestic ducks and geese do not require a federal permit for care. The reality is, however, that most rehabilitators living near a population center regularly receive calls for help with domestic waterfowl.

Although simple in presentation, this manual offers a very complete treatment of domestic waterfowl. It begins with a chapter on anatomy and continues through domestic waterfowl behavior and species identification. The book features drawings of most of the varieties that would be encountered in residential areas. The illustrations are excellent and would be invaluable to rehabilitators handling wildlife hot-line calls from the public. The text of this section presents questions that rehabilitators can pose to callers to help identify the bird before callers bring the bird in for treatment.

The remainder of the manual provides a chapter-by-chapter walkthrough of the important points of waterfowl care. Housing and nutrition are given special attention — bullet points elaborate on the reasons

birds of different ages require different foods. A vitamin deficiency chart is also included. Capture, rescue, and transportation of the birds are described in enough detail to direct volunteers to safely transport the birds. Obvious large lettering with a comic character point out the "Important Dos and Don'ts," a definite benefit to a volunteer rushing to a rescue.

The authors do a good job of addressing common health maladies associated with waterfowl. The list includes botulism, septic arthritis, bumblefoot, and other common conditions. Injuries due to interaction with humans are described, including from fishing lines and hooks. Even sensitive issues are addressed, including waterfowl injuries caused by domestic dogs. Suggestions are given on handling the public in cases where diplomacy is mandatory.

The subject of orphan waterfowl is well covered, from the incubation times and hatching information, (and suggestions on a NO hatch policy) to common health problems. Thoughts are offered on how to prepare the duckling for release or adoption. The authors conclude with important questions that should be evaluated before placement is considered.

— Reviewed by Marge Gibson
East Valley Wildlife Rehabilitation League, Phoenix, Arizona USA 1998, $15.00.

CCC crosses borders

continued from page 30

created for representatives of the Ho Chunk Nation who now own 1,200 acres of the reserve under the Bureau of Indian Affairs.

CCC is now working with Trout Unlimited to create a local water quality monitoring program within the eight valley schools, utilizing citizen monitors as well. As part of that project they have introduced GIS computer mapping into the area schools for use of the data collection, storing, and processing. CCC has also produced a small natural history museum, The Museum of the Kickapoo, in an historic building that once was a hydroelectric plant in Gays Mills, Wisconsin.

Elsewhere in southern Wisconsin, CCC is working with two local groups to help private landowners to protect the biodiversity and flora and fauna of their lands. The Blue Mounds Project works with over 100 landowners. An ecological extension worker works with these landowners to guide their land management practices with emphasis on restoring native ecosystems. This group also has seminars and events to benefit their members and landowners.

Within the same area, CCC has helped create the Eagle Land Cooperative which monitors the increasing nesting and over-wintering population of Bald Eagles along the Wisconsin and Kickapoo Rivers.

Publications

CCC has always valued and stimulated educational materials at all levels. Under the Orangutan Press name, CCC has printed three editions of "A Belizean Rain Forest — The Community Baboon Sanctuary," by Robert Horwich and Jon Lyon. Other educational material projects include writing a book on Creole uses of rainforest plants, a guide to the Cockscomb Basin Wildlife Sanctuary, a guide to community tourism in Belize, an oral history of the Natural History of the Garifuna in Orinoco, Nicaragua, and a booklet on converting farming practices to organic methods in Wisconsin.

Research Projects

A variety of research projects are also being carried out by CCC volunteers. These include studies on the ecology, social behavior, and population changes of the Black Howler Monkey and the phenology of trees in the Community Baboon Sanctuary, Cockscomb Basin Wildlife Sanctuary, and Manatee Special Development Area of Belize. Another primate research project involves reestablishing a population of howlers at the Cockscomb Basin Wildlife Sanctuary in Belize where the monkeys had historically been extirpated by hunting. This project was carried out with the Wildlife Conservation Society and the Belize Audubon Society.

Animals were translocated from the Community Baboon Sanctuary to the Cockscomb Basin during 1992-96 and were monitored using radio transmitters. In addition to the study of animal movements, there was a study of the ecology of the translocated animals before movement and later while in their new environment. Translocations of 62 animals were carried out between 1992 and 1994. A recent survey in 1997 showed an increase in the population to over 100 animals. This new population has been increasing at the rate of over 10 percent per year.

CCC is interested in providing a service to help communities to protect their forests and wildlife. If any groups or individuals are interested in help toward these goals, want additional information on any CCC projects or publications, or wish to receive the CCC newsletter, please contact the authors.

References

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Frances Hamerstrom, teacher and author, dies at age 91

AS THE SEASONS CHANGE this year, we find the cycle has taken one of the greats of wildlife research and rehabilitation. Fran Hamerstrom, field biologist, researcher, rehabilitator, and author, died August 29, 1998 near her home in Port Edwards, Wisconsin.

In her 91 years she, along with her husband Fredrick, accomplished much. She was the only female graduate student of world-renowned ecologist Aldo Leopold. The Hamerstroms pioneered research on Northern Harriers in the 1930s and were some of the first scientists to indicate that DDT was negatively affecting bird reproduction. The pair is credited with having formulated a plan that saved the Greater Prairie-Chicken from extirpation in the state of Wisconsin. It was Fran who first put into print the idea that harriers were dependent on the meadow vole population in her book *Harrier, Hawk of the Marshes: The Hawk That Was Ruled by a Mouse*, printed in 1986.

In rehabilitation circles Fran will always be remembered for her first book, *An Eagle to the Sky*, published in 1970, in which she told how she nursed an injured Golden Eagle back to health and released it to the wild.

Fran Hamerstrom was an amazing individual. To say she was a nonconformist is an understatement. She was born to an heiress and a criminologist, and her early life was filled with the frills that such a birthright demands. She was a debutante and a beauty queen. While her father maintained the only thing she was suited for was being a governess, Fran had other ideas.

"When I was a small child I longed one day to be so famous that I did not have to hide how odd I was — how unlike other people," she wrote in her autobiography, *My Double Life*. "Few people really held my attention. It was the birds, and mammals, reptiles and insects that filled my dreams and eternally whetted my curiosity."

And so it followed that she would meet Fredrick, her perfect mate. Together, they lived their unusual life in an old unfinished farmhouse with no indoor plumbing. Her lifestyle was part and parcel of this outrageous woman. Each year "gaboons" as she called them, signed on to help with the research and banding projects. Many of those "gaboons" went on to be great ornithologists. In this respect alone the Hamerstroms made an extraordinary contribution to the natural world.

Fredrick Hamerstrom died in 1990 and instead of becoming the recluse that everyone feared, Fran took a different tack. She explained to me one day that she had always had a fascination with the methods of primitive hunting and off she went to live with the pygmies in Zaire. A unusual move for a widow in her 80s, but nonetheless... She further explained that Fredrick always disliked the heat and they avoided traveling to hot climates for that reason. Now she felt a pressing need to satiate her thirst for that knowledge.

Satisfy her thirst she did and each year in late September when the field season was finished she packed her bags and was off. For the past six years she traveled to South America, canoeing the Amazon, and living with the native people. She would return to Wisconsin in April. Call me anxious, even impatient for the return of her trapping owl (he wintered with me) so the field season could begin.

If it was Fran's desire to be famous, she succeeded. If it was her desire to be different, she succeeded. If it was her desire to contribute to the knowledge of wildlife, she succeeded. I know it was her desire to be outrageous and she did that in spades. She was one of a kind. A complex mix of beauty and grace and sturdy tenacity in the same package. The world will miss Dr. Frances Hamerstrom. I was privileged to have known her and been able to marvel at close range at this fascinating person.

Both Fran and Fredrick were adjunct professors at University of Wisconsin, Stevens Point. They were honored by the National Wildlife Federation and inducted into the Wisconsin Conservation Hall of Fame.

— by Marge Gibson

Bat expert Christine Scott dies at 47

A LONG-TIME REHABILITATOR, educator, artist, and bat researcher, Christine Scott passed away October 26, 1998 of liver cancer.

She started as a volunteer at the Marin Wildlife Center (now WildCare) almost 20 years ago, coming to specialize in the intensive care of difficult and unstable patients. She began working mostly with raptors, but once she had the opportunity to treat a bat, she discovered a new sense of direction.

In 1992, Scott co-founded an organization devoted to the conservation, rehabilitation, and education about bats. She spent the past six years, largely in schools in the San Francisco Bay Area, teaching thousands of people about bats and their role in ecosystems. Local admirers affectionately dubbed her "the bat lady."

Scott helped pioneer advanced techniques of treating, rehabilitating, and raising bats. Her research articles on bat medicine and post-release studies of hand-raised and rehabilitated bats have been published in the *Journal of Wildlife Rehabilitation* and in other international publications.

She is survived by her son, Travis Scott of San Rafael, her mother, Patricia Cacio of San Francisco, and her husband, Bradley Scott of North Carolina. Memorial contributions may be made to the Christine Scott Memorial Fund, Hellen Johnson, c/o Travis Scott, 2 "K" Street, San Rafael, CA, 94901.

NEWS IN BRIEF

The Kentucky Wildlife Rehabilitators Association (KWRA) invites you to its first annual conference on February 20-21, 1999, at the Executive West Hotel in Louisville, Kentucky. KWRA's mission is to promote the welfare of Kentucky wildlife through education and rehabilitation. Titled "Making Connections," the conference will be hosted by Raptor Rehabilitation of Kentucky, Inc. This conference will be a great opportunity for new and experienced rehabilitators to come together to learn, examine, question, network, and broaden their horizons to provide the best possible care for wildlife. For details contact Eileen Wicker, Director, Raptor Rehabilitation of Kentucky Inc., P.O. Box 18002, Louisville, KY 40261, 502/491-1939, raptors@aye.net.

This year's **International Associaton of Avian Trainers and Educators** (IAATE) conference will be held February 12-15, 1999, in Sitka, Alaska. IAATE is dedicated to those who serve avian science and conservation through public education, training, display, research, and husbandry. This three-day conference will include tours of the local area and talks from local biologists as well as conference participants. For details and a registration form, contact Cynthia Gibson, Alaska Raptor Rehabilitation Center, 907/747-8662, or by e-mail at arrc@ptialaska.net. For more information on Sitka, visit their web site at WWW.Sitka.com.

As part of **a study of the coevolution of seabirds and their associated lice,** Dr. Roderic D. M. Page of the University of Glasgow invites individuals who work with seabirds to collect lice and mail them to his group. Ideally the lice would be freshly collected (or taken from frozen specimens) from as many seabird species as possible and stored in 70-90 percent ethanol alcohol. Specimens may be mailed to Dr. Roderic D. M. Page, Division of Environmental and Evolutionary Biology, IBLS, Graham Kerr Building, University of Glasgow, Glasgow G12 8QQ, United Kingdom. For details on the research project visit http://taxonomy.zoology.gla.ac.uk/Jobs/NERC/seabird.html, or send electronic mail to Dr. Page, r.page@bio.gla.ac.uk.

The public comment period for written comments on the **proposed nationwide delisting of the Peregrine Falcon** from the U. S. Fish and Wildlife Service Endangered Species List has been extended to January 23, 1999, because of public interest. Federal government comment periods give the public the opportunity to express opinions and concerns about proposed federal actions.

Individuals or groups that want to submit their comments are encouraged to do so as soon as possible. All comments received by the deadline will be considered in the final decision. Please address your letters to Diane Noda, Field Supervisor, U.S. Fish and Wildlife Service, Ventura Fish and Wildlife Office, 2493 Portola Road, Suite B, Ventura, CA 93003, USA.

In 25 states, from Minnesota to Maine and Missouri to Georgia, only 223 known territorial pairs exist. The individuals in this population are largely mixed sub-species (i.e. neither anatum nor tundra) and were never the primary target of Federal endangered species protection. But they are counted in the population total used to justify the removal of the species from the Federal List.

In western states, Alaska, and Canada there are approximately 1,388 pairs.

The eastern population depends overwhelmingly on man-made structures for nesting. Efforts to provide protection for birds dependent on this man-made habitat are often labor-intensive. It is hoped that the birds will move from this dependence to use of natural habitats in time.

It is difficult to be certain what number of breeding pairs of Peregrine Falcons would be sufficient to guarantee a stable population over time and create necessary variety in the gene pool.While DDT has been banned for use and sale within the U.S., most birds are exposed to a range of pesticides, other toxic chemicals, and heavy metal residues.

CAREER CORNER

Director for a busy (5,000-6,000 animals/year) IWRC-accredited Wildlife Shelter. Background in budgeting, staff management, with good communication skills. Prefer B.S. in wildlife or related field, current or past rehabilitation license, IWRC 1AB course. Full-time salaried position. Send résumé and references to: TWRC Wildlife Shelter, P.O. Box 19030, Houston, TX 77224.

Raptor Rehabilitation Specialist to oversee the day-to-day operation of the new 4,000-sq.-ft. Oryx Energy Raptor Centre of Texas at the Heard Natural Science Museum, McKinney, Texas. Responsibilities include the care and maintenance of 20 resident raptors used for exhibit and educational programs. Also rehabilitation of approximately 250 sick, injured and orphaned birds of prey. Send résumé or contact Steve R. Runnels, Exec. Director, Heard Natural Science Museum & Wildlife Sanctuary, One Nature Place, McKinney, TX 75069, 972/562-5566 (ext. 225), fax: 972/548-9119, or send e-mail to heardmuseum@texoma.net.

Lindsay Wildife Museum is offering four **wildlife rehabilitation internships** for spring and summer 1999. The interns will receive training in wildlife rehabilitation techniques, including husbandry, nutrition, handling, and general care, and will work with professional rehabilitators and over 200 volunteers in a large (6,500 animals/year), state-of-the-art wildlife hospital. Deadline for applications is February 1, 1999. For an application or details contact Susan Heckly, Wildlife Rehabilitation Director, 1931 First Ave., Walnut Creek, CA 94596, 510-935-1978, fax: 510-935-8015.